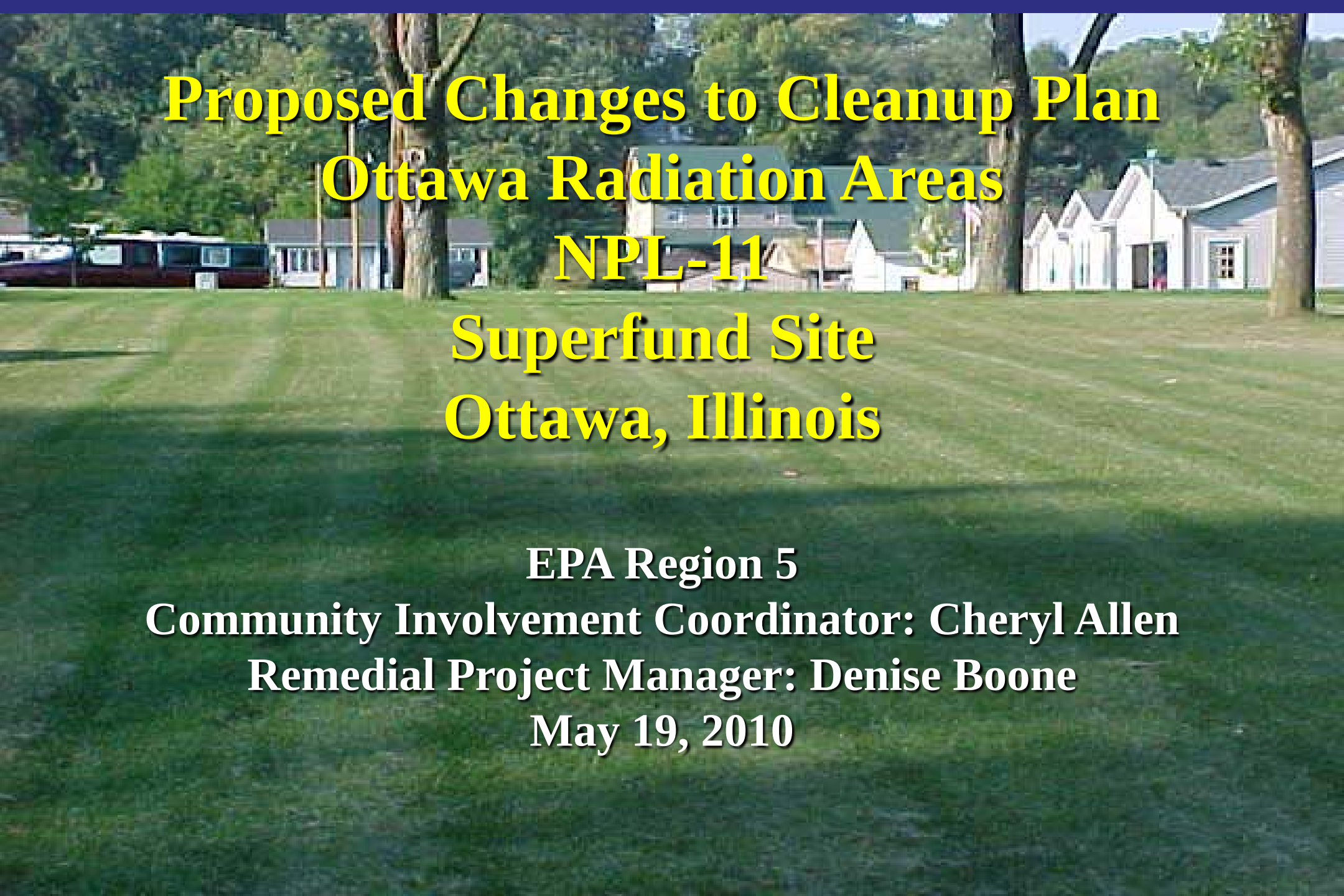


Proposed Changes to Cleanup Plan
Ottawa Radiation Areas
NPL-11
Superfund Site
Ottawa, Illinois

EPA Region 5

Community Involvement Coordinator: Cheryl Allen

Remedial Project Manager: Denise Boone

May 19, 2010

Tonight's Meeting

- Presentation
- Questions and Answers
- Public Comments – EPA will respond later in writing

Cleanup Plan Selected in 2003

- Cost - $200,000
- Excavate soil contaminated with radium-226 above 6.2 pCi/g
- Collect perched groundwater - treat and discharge to the City of Ottawa's sewer system
- Volume reduction
- Dispose of the excavated contaminated material at a licensed radioactive material or an off-site landfill

Why Change the Cleanup Plan?

New data collected prior to start of cleanup

- Water level higher
- Contamination deeper
- Area of excavation larger
- Difficult to implement
- Significant cost increase from $200,000

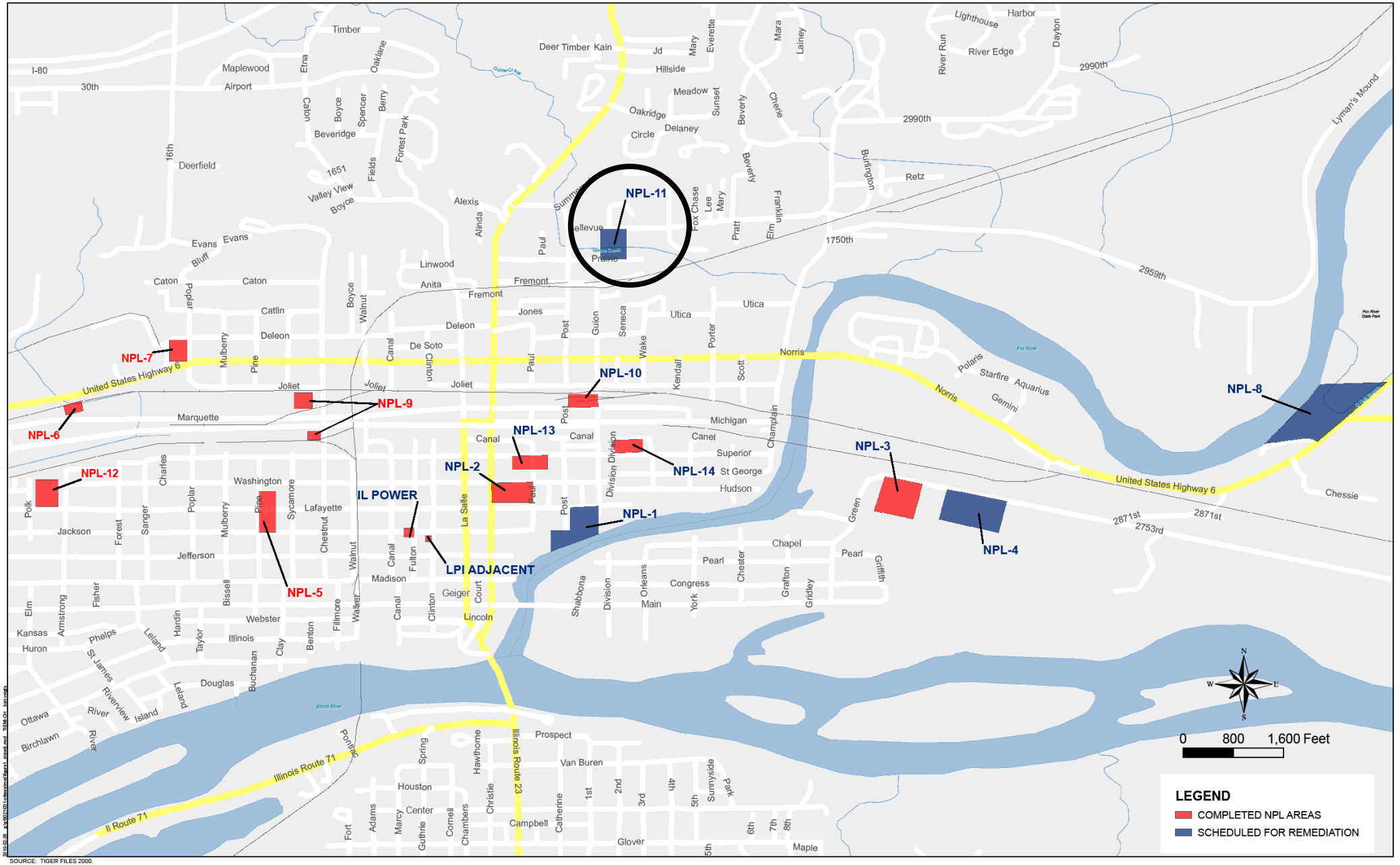
Recommended Alternative

Institutional Controls (Deed Restrictions)

- Prohibit soil excavation below the ground water table unless approved by EPA or Illinois Emergency Management Agency
- If future excavation needed, soil must be disposed in accordance to regulations
- Prohibit use of ground water
- Prohibit construction of building without radon reduction system
- EPA will review the site every five years

Site History

- A total of 16 areas in and around Ottawa were contaminated with radium-226.
- The contamination came from two Ottawa companies that used radium sulfate paint in making glow-in-the-dark watch dials.
- Radium Dial operated from 1920-1932 and Luminous Processes Inc. operated from 1932-1978.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NPL-7
NPL-6
NPL-9
NPL-10
NPL-13
NPL-2
NPL-12
NPL-14
NPL-3
NPL-8
NPL-1
NPL-4
NPL-5
IL POWER
LPI ADJACENT
United States Highway 6
Illinois Route 71
Il Route 71
Illinois Route 23
Norris
Joliet
Fremont
Deleon
Marquette
Canal
Division
Michigan
Superior
St George
Hudson
Chapel
Pearl
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Webster
Jefferson
Jackson
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Van Buren
Houston
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Glover
Campbell
Chessie
Fox River
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Oakridge
Delaney
Circle
Retz
Linwood
Anita
Utica
Jones
Michigan
Timber
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Airport
Deerfield
Beveridge
Valley View
Alexis
Bellevue
Prairie
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Bluff
Catlin
Mulberry
Pine
Sycamore
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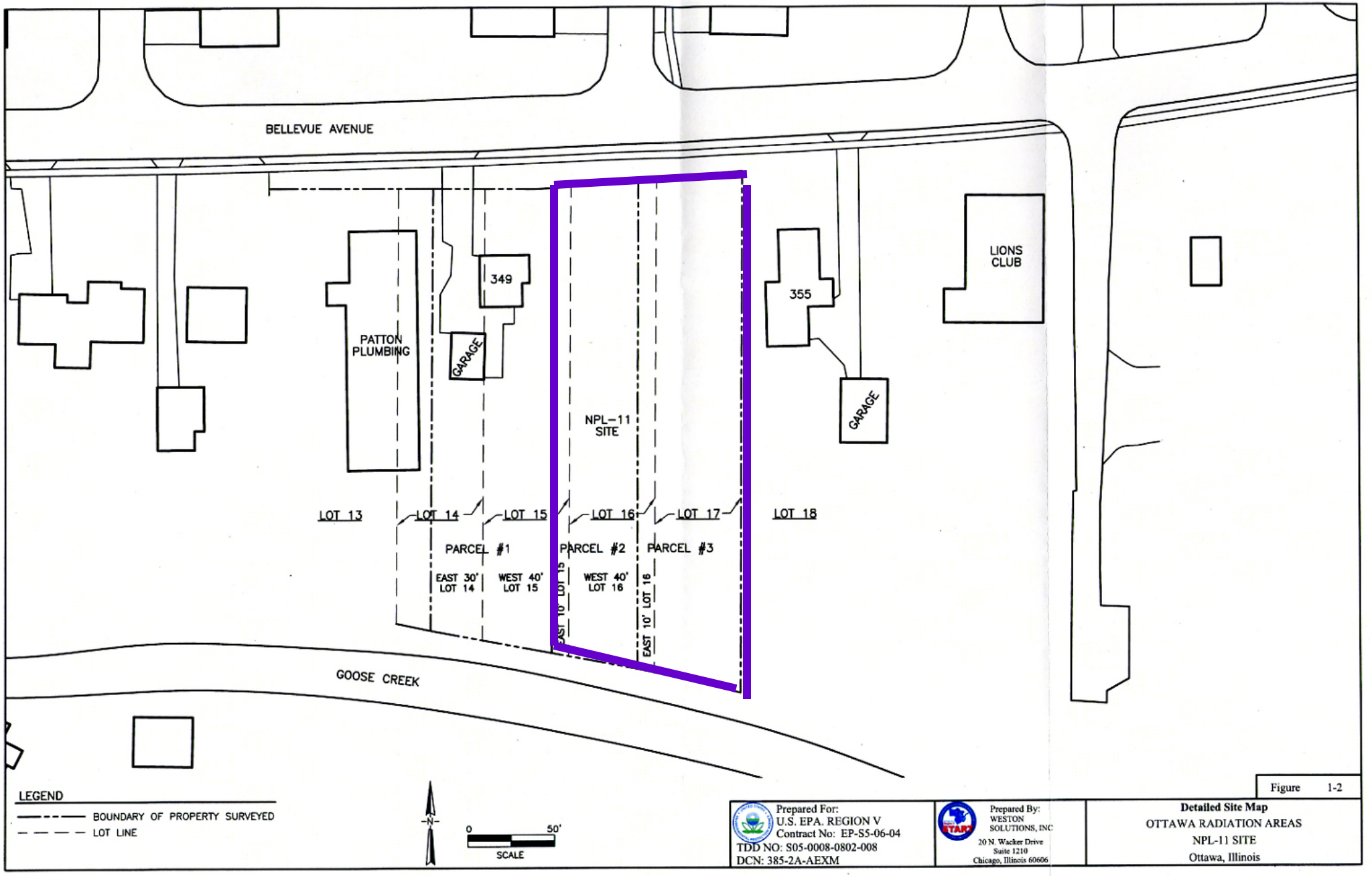
800
1,600 Feet
LEGEND
COMPLETED NPL AREAS
SCHEDULED FOR REMEDIATION
SOURCE: TIGER FILES 2000.

Site History (continued)

- EPA conducted removal activities between 1995 and 1997 and removed 40,000 tons of radium-contaminated soil from 12 of the 16 areas.
- EPA removed 4,176 tons of contaminated soil from NPL-11, but was not able to remove all of the contaminated soil because it is below the ground water table.


BELLEVUE AVENUE
PATTON PLUMBING
349
GARAGE
NPL-11 SITE
355
GARAGE
LIONS CLUB
LOT 13
LOT 14
LOT 15
LOT 16
LOT 17
LOT 18
PARCEL #1
PARCEL #2
PARCEL #3
EAST 30' LOT 14
WEST 40' LOT 15
WEST 40' LOT 16
EAST 10' LOT 15
EAST 10' LOT 16
GOOSE CREEK
LEGEND
BOUNDARY OF PROPERTY SURVEYED
LOT LINE
N
0
50'
SCALE
Prepared For:
U.S. EPA. REGION V
Contract No: EP-S5-06-04
TDD NO: S05-0008-0802-008
DCN: 385-2A-AEXM
Prepared By:
WESTON SOLUTIONS, INC
20 N. Wacker Drive
Suite 1210
Chicago, Illinois 60606
Figure 1-2
Detailed Site Map
OTTAWA RADIATION AREAS
NPL-11 SITE
Ottawa, Illinois

Verification After Removal

300 Block of Bellevue Avenue 1996

Water in excavation area during removal

300 Block of Bellevue Avenue 1996

Site History (continued)

- NPL-11 site investigation conducted in 2000
- Preliminary cleanup sampling done in 2006-2007

Investigation Results

Parameters	2000	2006-2007
No. of Soil Samples Exceeding Radium-226 Criteria	1 of 24	3 of 22
Radium-226 Concentration Detected	19.5 pCi/g at 6-8 feet	9.43 to 18.4 pCi/g at 8-13 feet
Ground Water Depth	7-10 feet	4-6 feet
Cubic Yards of Radium-226 Contaminated Soil Found	74 cy	6,070 cy

Investigation Results
2006-2007*(continued)*

- Installed 3 temporary wells in the contaminated soil to determine the ground water elevation and the effectiveness of a water filtration system.
- Ground water will be further evaluated to determine if a response action is necessary.

Risk to People and the Environment

- Human health risk assessment
- Ecological risk assessment –was not conducted for this site because of its small size, lack of habitat, and highly developed locale

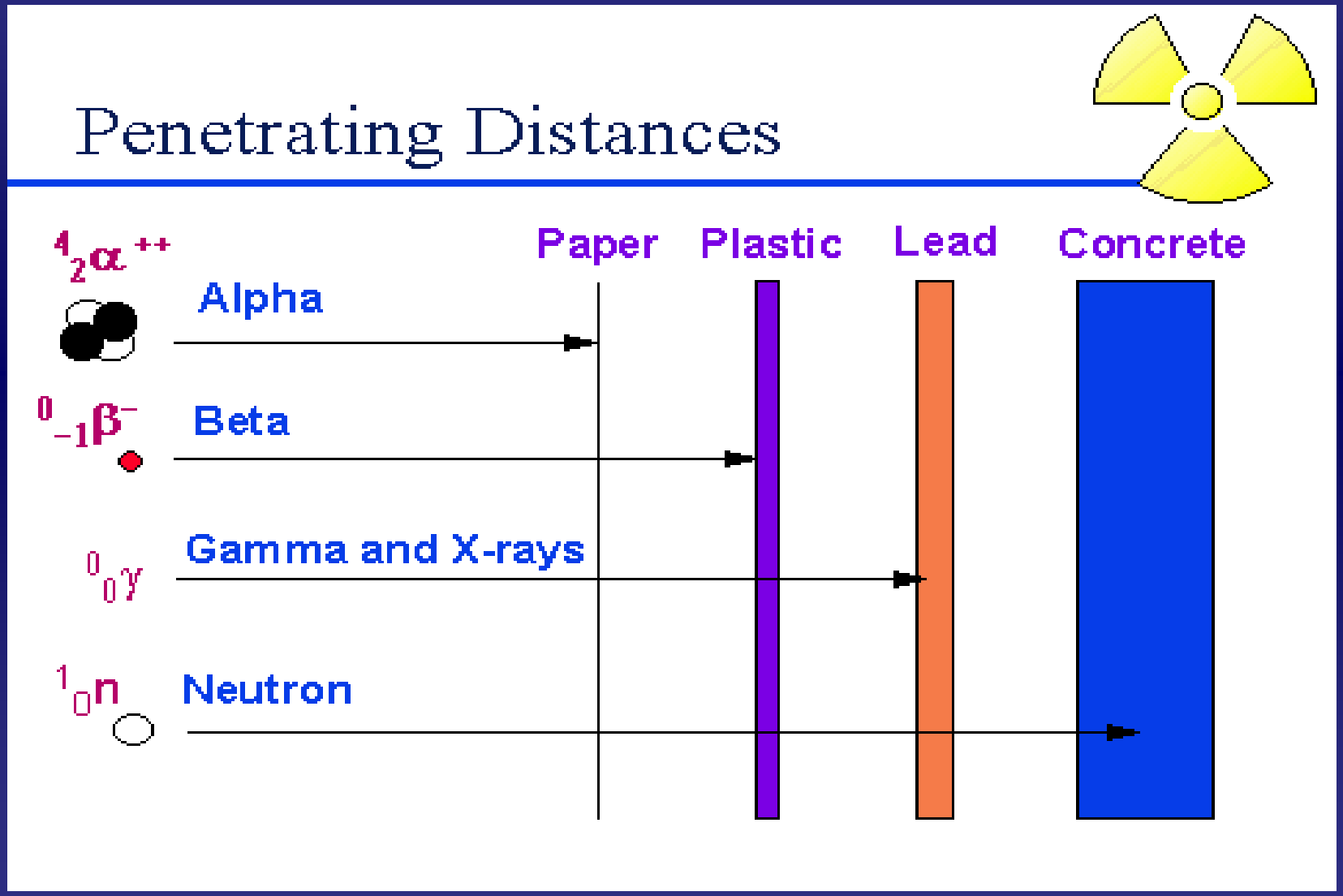
Human Health Aspects of Ottawa Radiation Areas NPL-11 Superfund Sites Ottawa, Illinois

Keith Fusinski, PhD MT(ASCP)

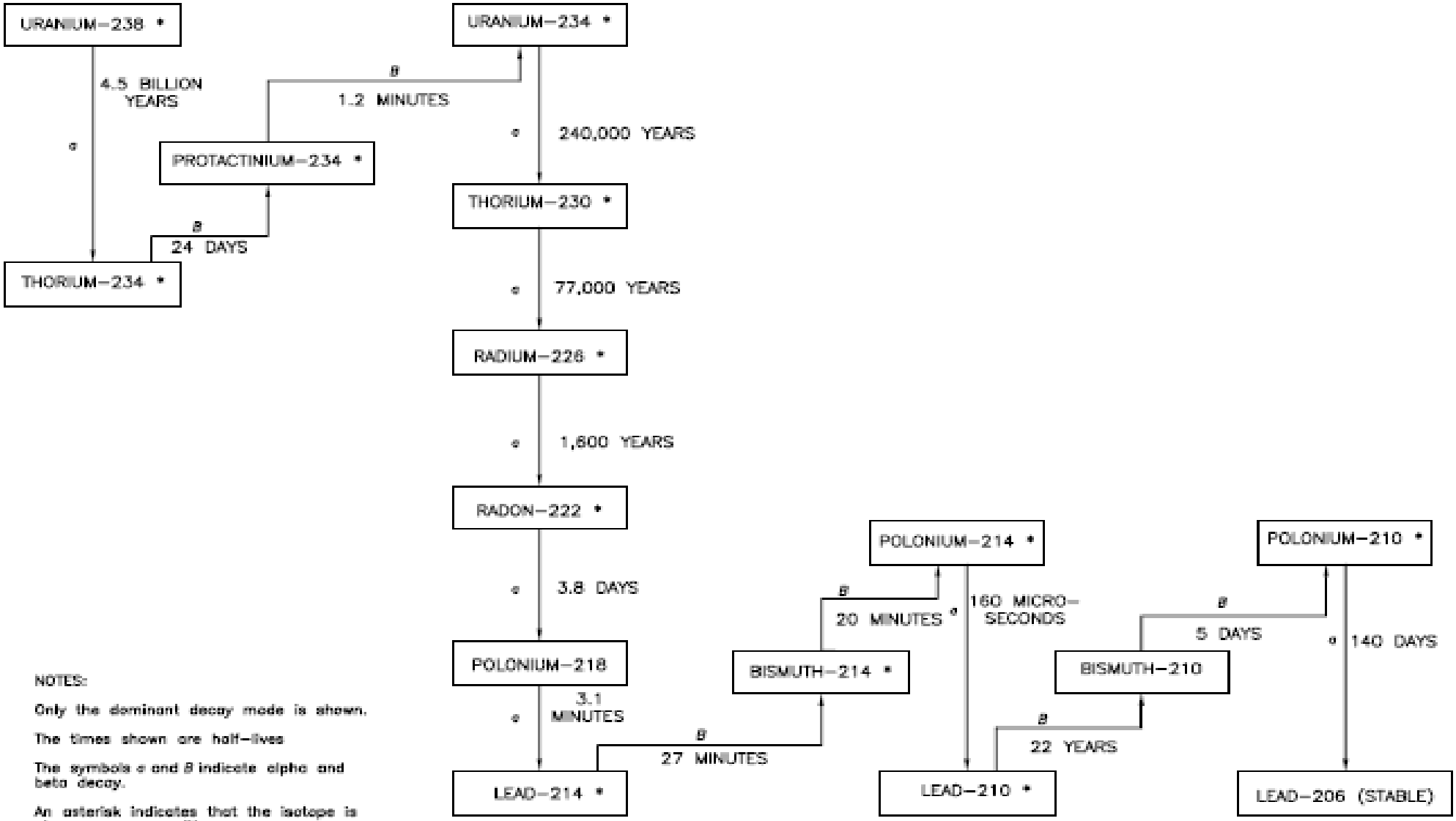
Topics to be Covered

- Radium and Radon
- Definition of Risks
- Current Risk
- Risk after Proposed Remediation

Types of Radiation



http://www.cameco.com/common/images/content/u101/r_particles.jpg



NOTES:

Only the dominant decay mode is shown.

The times shown are half–lives

The symbols *α* and *β* indicate alpha and beta decay.

An asterisk indicates that the isotope is also a gamma emitter.

FIGURE 2–3

Prepared for:
U.S. EPA. REGION V
Contract No: EP–S5–06–04
TDD NO: S05–0008–0802–008
DCN: 385–2A–AFKU

Prepared by:
WESTON SOLUTIONS, INC.
20 N. Wacker Drive, Suite 1210
Chicago, Illinois 60606

URANIUM–238 RADIOACTIVE DECAY SERIES
NPL–11 SITE
Ottawa, Illinois

Radionuclide	Half-life	Emitter
Radium 226	1,600 years	alpha, gamma
Radon 222	3.8 days	alpha, gamma

Radium

- Radium is a widespread, naturally occurring metal.
- Radium-226 is an alpha-gamma emitter with a half-life of 1,600 years.
- The metabolic behavior of radium in the body is similar to that of calcium, an appreciable fraction of ingested radium is deposited in the bone.
- The release of radium from the bone is slow, so chronic intake can result in very high concentrations in the bone.

Radon

- Radon is a naturally occurring radioactive noble gas.
- Radon-222 is a short-lived alpha emitter (half-life of 3.8 days).
- The primary route of exposure to radon is inhalation.
- The primary hazard of radon is from the inhalation of its short-lived decay products. which readily attach to dust particles and can be inhaled into the lungs and deposited on the mucous lining of the respiratory tract.
- Unattached decay products tend to be inhaled deeper into the lungs, where the residence time is longer.

Possible Health Effects

- Radium
  - Studies indicate that chronic exposure to radium can induce bone sarcomas (7 years after exposure).
  - Carcinomas in the paranasal sinuses and mastoid air cells have been shown to be associated with the generation of radon-222 by radium-226.
- Radon
  - The lung is the major tissue irradiated by radon-222.
  - Damage to the cells lining the airways, potentially leading to lung cancer.

What is Risk?

Exposure

- How are people exposed to contamination?
  - Ingestion
  - Inhalation
  - Dermal

Exposure

- What are the Exposure Assumptions
  - Exposure duration
  - Exposure concentrations
  - Population exposed

Who is at Risk??

Exposure pathway						
Exposure Route	Residential	Trespasser	Commercial/ Industrial - Indoor	Commercial/ Industrial - Outdoor	Recreational	Construction Worker
	Adult + Child	Adolescent	Adult	Adult	Adult + Child	Adult
Ingestion	X	X	X	X	X	X
Inhalation	X	X	X	X	X	X
External exposure	X	X	X	X	X	X
Indoor radon inhalation	X		X			
Outdoor radon inhalation	X	X		X	X	X

Definition of Risk

- Lifetime Cancer Risk –
  - EPA recommends a screening level that would equate to a 1 in a 1,000,000 lifetime risk of developing cancer from exposure to a contaminated site.
  - EPA recognizes 1 in 100,000 to 1 in 1,000,000 as acceptable lifetime cancer risk.
  - EPA may accept 1 in 10,000 to 1 in 100,000 lifetime cancer risk dependant upon site specific criteria.
  - Greater than 1 in 10,000 lifetime cancer risk is unacceptable.

Cancer Risks

Background

Exposure Route	Residential Land Use		Trespasser		Commercial/ Industrial Land Use Indoor		Commercial/ Industrial Land Use Outdoor		Recreational Land Use		Construction Worker
	Current	Future	Current	Future	Current	Future	Current	Future	Current	Future	Current/Future
TOTAL	1 in 1000	1 in 1000	2 in 1,000,000	2 in 1,000,000	1 in 10,000	1 in 10,000	5 in 100,000	5 in 100,000	3 in 1,000,000	3 in 1000,000	3 in 10,000,000

Alternative 1- No Action

Exposure Route	Residential Land Use		Trespasser		Commercial/ Industrial Land Use Indoor		Commercial/ Industrial Land Use Outdoor		Recreational Land Use		Construction Worker
	Current	Future	Current	Future	Current	Future	Current	Future	Current	Future	Current/Future
TOTAL	4 in 1000	6 in 1000	3 in 1,000,000	9 in 1,000,000	4 in 10,000	5 in 10,000	6 in 100,000	2 in 10,000	3 in 1,000,000	1 in 100,000	1 in 1,000,000

Alternatives 2 & 3

Exposure Route	Residential Land Use	Trespasser Land Use	Commercial/ Industrial Land Use Indoor	Commercial Industrial Land Use Outdoor	Recreational Land Use	Construction Worker
	Adult + Child	Adolescent	Adult	Adult	Adult + Child	Adult
Total	1 in 1,000	2 in 1,000,000	1 in 10,000	5 in 100,000	3 in 1,000,000	3 in 10,000,000

Alternative 4

Exposure Route	Residential Land Use	Trespasser Land Use	Commercial/ Industrial Land Use Indoor	Commercial/ Industrial Land Use Outdoor	Recreational Land Use	Construction Worker
	Adult + Child	Adolescent	Adult	Adult	Adult + Child	Adult
Total	6 in 10,000	3 in 1,000,000	7 in 100,000	6 in 100,000	3 in 1,000,000	1 in 1,000,000

Cleanup Alternatives

NPL-11 Alternatives

- Alternative 1- No Action ($0)
- Alternative 2 – Dewatering using continuous pumping, soil excavation, volume reduction, and off-site disposal ($4.9 Million)
- Alternative 3 - Installation of a vertical barrier, ground water collection, using continuous pumping, soil excavation, volume reduction, and off-site disposal ($4.8 Million)

EPA Recommended Alternative

- Alternative 4 – Institutional controls ($210,000)
  - Prohibit soil excavation below the ground water table unless approved by EPA or Illinois Emergency Management Agency
  - If future excavation needed, soil must be disposed in accordance to regulations
  - Prohibit use of ground water
  - Prohibit construction of building without radon reduction system
  - EPA will review the site every five years

Criteria for Comparing Alternatives

- Evaluated cleanup alternatives are based on site characterization, risk assessment, and land use.
- Cleanup alternatives are evaluated against nine criteria.

NPL-11 Evaluation

Comparison of Cleanup Alternatives				
Evaluation Criteria	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
Overall Protection of Human Health and the Environment				
Compliance with Federal and State Regulations				
Long-Term Effectiveness and Permanence				
Reduction of Toxicity, Mobility, or Volume through Treatment				
Short-Term Effectiveness				
Implementability				
Cost	$0	$4.9 Million	$4.8 Million	$210,000
State Acceptance	Will be evaluated after the public comment period.			
Community Acceptance	Will be evaluated after the public comment period.			
Meets Criteria	Partially Meets Criteria	Does Not Meet Criteria		

Recommended Alternative

Institutional Controls (Deed Restrictions)

- Prohibit soil excavation below the ground water table unless approved by EPA or Illinois Emergency Management Agency
- If future excavation needed, soil must be disposed in accordance to regulations
- Prohibit use of ground water
- Prohibit construction of building without radon reduction system
- EPA will review the site every five years

2011 Ground Water Study

- Ground water will be further evaluated to determine if a response action is necessary.
- If ground water contamination is found, a remedy for ground water may be warranted and presented in a future proposed plan.

What's Next

- Review and consider public comments
  - Comments due by June 11, 2010
  - Comments given tonight will be included in the decision document
- Issue final decision document amendment
- Implement plan

Questions?

Contact Information

- Cheryl Allen
  - 312-353-6196 or 800-621-8431, ext. 36196
  - allen.cheryl@epa.gov
- Denise Boone
  - 312-886-6217 or 800-621-8431, ext. 66217
  - Boone.denise@epa.gov

Public Comment Period

- Submit your comments by **June 11, 2010**:
  - Via the Internet at www.epa.gov/region5/publiccomment/ottawa-pubcomment.htm
  - Fax to Cheryl Allen at 312-408-2234
  - E-mail to Cheryl Allen at allen.cheryl@epa.gov

Information Repository

- Reddick Library
  1010 Canal St.
  Ottawa
- www.epa.gov/region5/sites/ottawa