Coldwater Creek Facts
Topics of Discussion

- Introduction
- Goals and Desired Outcomes
- Radiation Mode of Transport
- Population Exposure
- Health Survey Diseases
- Disease Correlation with Ionizing Radiation
- Conclusion
Introduction

Coldwater Creek – Just the Facts Please

- Who are we?
- Why are we here?
- What do we want?
Goals and Desired Outcomes

- **Goals**
  - Public Health Awareness
    - Community
    - Healthcare Providers
  - Downwinder Status (Dept of Justice RECA)
  - Remediation/Removal… So this doesn’t continue to harm future generations
    - West Lake Landfill
    - Continued testing/remediation along Coldwater Creek, North of 270
      - Extended to include surrounding areas
Radiation Mode of Transport

- **Material Storage**
  - Open containers (St. Louis Airport Site)
  - Exposed piles of debris (Latty Ave)
  - Next to the headwaters of Coldwater Creek

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Radiation Mode of Transport

Modes of Transport

- Earth
- Wind
- Water
- Fire
Radiation Mode of Transport

- Affected Soil
  - Dust particles capable of traveling up to 7 mi radius (conservative estimate)
  - Inhalation in surrounding communities
  - Windblown particles enter creek
  - Rainwater runoff into creek
  - Flooding
Radiation Mode of Transport

- 7 mile dust particle transmission
Radiation Mode of Transport

Coldwater Creek

“Coldwater Creek is the major drainage mechanism for the SLAPS, SLAPS VPs, and the Latty Avenue Properties (and) flows adjacent to the SLAPS and SLAPS VPs, then meanders near the HISS, Futura Coatings Company and other Latty Avenue Properties and continues to flow through northern St. Louis County until it discharges into the Missouri River…”

– Army Corps of Engineers ROD (2005)
Radiation Mode of Transport

Coldwater Creek Flooding
Radiation Mode of Transport

- Affected Groundwater
  - “Soil contaminants of concern (COCs) were detected in HZ-A ground water (ACE Rod, 2005)
  - EPA Groundwater Contamination Modes

Figure 4-1. Modes in which ground water may become contaminated

- EPA (1996)
Radiation Mode of Transport

- Affected Groundwater
- EPA Groundwater Contamination Modes

Figure 3-3. Representative conceptual model of the saturated zone.

- EPA (1996)
Radiation Mode of Transport

- Affected Groundwater
- Current Watershed
  - EPA Definition:
  "area of land where all of the water that is under it or drains off of it goes into the same place. John Wesley Powell, scientist geographer, put it best when he said that a watershed is "that area of land, a bounded hydrologic system, within which all living things are inextricably linked by their common water course and where, as humans settled, simple logic demanded that they become part of a community."

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Radiation Mode of Transport

- Contamination Spread
  - Major population boom 1950 – 1970
  - Construction grading disturbed contaminated groundwater
  - Spreading contamination in fill dirt throughout all of North County
  - “Much like spreading icing on a cake”

- US Census Bureau Table
Radiation Mode of Transport

Residential development changes to the creek (1947 – 1969)

St. Denis Bridge

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Radiation Mode of Transport

- Residential development changes to the creek
- Wedgewood subdivision (established 1964)
Radiation Mode of Transport

- Residential development changes to the creek
- Paddock Estates subdivision (established 1964)
Radiation Mode of Transport

- Residential development changes to the creek
- Paddock Hills development (established 1956)

1947

1966

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Chronic Exposure to Ionizing Radiation

“Stochastic effects are associated with long-term, low-level (chronic) exposure to radiation. ("Stochastic" refers to the likelihood that something will happen.) Increased levels of exposure make these health effects more likely to occur, but do not influence the type or severity of the effect. Cancer is considered by most people the primary health effect from radiation exposure…Other stochastic effects also occur. Radiation can cause changes in DNA, the "blueprints" that ensure cell repair and replacement produces a perfect copy of the original cell. Changes in DNA are called mutations. Sometimes the body fails to repair these mutations or even creates mutations during repair. The mutations can be teratogenic or genetic. Teratogenic mutations are caused by exposure of the fetus in the uterus and affect only the individual who was exposed. Genetic mutations are passed on to offspring.

– EPA Website
Population Exposure

- Dose Pathways *
  - External
  - Internal
    - Ingestion
    - Inhalation

*UNSCEAR states that dose reconstruction is different for each pathway and based on dose per kg
Population Exposure

Dose Pathways

ANNEX A: DOSE ASSESSMENT METHODOLOGIES

- UNSCEAR 200 Report, Annex A
Population Exposure

- Radiation Contaminants
  - “Radium, thorium, and uranium are the primary radiological Contaminants of Concerns at the site”.
  - Specifically:
    - R 226
    - Th 230
    - U 238

- Army Corps of Engineers ROD (2005)
Population Exposure

Radium 226

“Radium in water may be readily adsorbed by sediments, soils, and aquifer components. Radium may be bioconcentrated and bioaccumulated by plants and animals, and it is transferred through food chains from lower trophic levels to humans. Radium in the soil may be readily absorbed by plants. There is a potential for human exposure to radium by the consumption of beef and milk derived from cattle who graze on forage grown in soils containing radium.”

-ATDSR Toxic Substances Portal - Radium
Thorium 230

“There may be more thorium than normal near an uncontrolled hazardous waste site in which thorium has not been disposed of properly. Consequently, you may be exposed ... if you live near one of these sites because you could breathe windblown dust containing thorium or eat food grown in soil contaminated ... children playing near a waste site could get thorium into their bodies if they eat contaminated soil.”

-ATDSR Toxic Substances Portal - Thorium
Population Exposure

Uranium 238

“Because uranium decays by alpha particles, external exposure to uranium is not as dangerous as exposure to other radioactive elements because the skin will block the alpha particles. Ingestion of high concentrations of uranium, however, can cause severe health effects, such as cancer. Inhaling large concentrations of uranium can cause lung cancer from the exposure to alpha particles. Uranium is also a toxic chemical, meaning that ingestion of uranium can cause kidney damage”.

– CDC Website
Disease Correlation with Radiation

“Radiation exposure has been associated with most forms of leukemia and with cancers of many organs, such as lung, breast and thyroid gland…Moreover, radiation-induced cancer may manifest itself decades after the exposure and has the potential to cause hereditary effects in the offspring of persons exposed to radiation… Stochastic effects (cancer and hereditary effects) may be caused by damage in a single cell.

“It is now known that radiation can cause cancer in almost any tissue or organ in the body, although some sites are much more prone than others.”

Most solid cancers the absolute risk is higher in women than in men. People who were young at the time of radiation exposure have higher relative and absolute risks

-United Nations Scientific Committee on the Effects of Atomic Radiation - UNSCEAR
ATSDR Toxicological Facts Radiation Disease Summary (partial listing):
- Acute leukopenia, auto-immune, breast cancer, bronchopneumonia, bone marrow cancer, bone sarcomas, dental tissue decay, fertility issues, genetic mutations, genotoxic to males and females, head carcinomas, infertility, kidney tumors, leukemia's (CML), liver cancer and disease, melanomas, myelofibrosis, pancreatic cancer, respiratory system damage, spleen tumors, spontaneous abortions
- ATDSR Toxic Substances Portal

Department of Justice RECA Downwinder Diseases:
- Leukemia, multiple myeloma, pharynx cancer, lymphoma, small intestine cancer, salivary gland cancer, brain cancer, stomach cancer, bladder cancer, colon cancer, thyroid cancer, pancreatic cancer, breast cancer, esophageal cancer, bile duct cancer, liver cancer, gall bladder cancer, lung cancer, ovarian cancer
- U.S Dept of Justice RECA
Health Survey Diseases

- Types of Disease Reported in Health Survey
  - Auto-immune
  - Cancer
  - Children of Exposed Population
  - Dental
  - Thyroid
Health Survey Diseases

- Cancer/Leukemia Reported in Health Survey
Auto-immune and Thyroid/ Parathyroid Conditions and Disease Reported in Health Survey

- Goiter, Hashimoto’s, Hypothyroidism, Hyperthyroidism, Thyroid Cyst/ Mass, Thyroid Nodules, Thyroid Removal, Thyroiditis, Abnormal parathyroid, Parathyroid tumor, Parathyroid adenomas

- Addison’s disease, Antiphospholipid antibody syndrome, Aplastic Anemia, Ankylosing spondylitis, Auto immune hemophilia, Autoimmune hepatitis, Autoimmune urticarial, Behçet's disease, Celiac disease, Chronic inflammatory demyelinating polyneuropathy (CIDP), Churg Strauss Syndrome, Common Variable Immune Deficiency with low IgG and low IgM, Discoid Lupus Erythematosus, Grave’s Disease, Hypogammaglobulinemia, Idiopathic Thrombocytopenic Purpura (ITP), Interstitial cystitis / bladder pain syndrome, Kawasaki Syndrome, Kikuchi’s disease, Lupus, Multiple Sclerosis (MS), Mixed connective tissue disease, Neuropathy, Polycondritis, Polycythemia, Polymyositis, Primary Biliary Cirrhosis, Primary Sclerosing cholangitis (PSC), Psoriasis, Psoriatic Arthritis, Raynaud’s disease, Rheumatoid arthritis (RA), Sarcoidosis, Scleroderma / morphea, Shaumberg's Disease, Sinusitis, Sjögren's syndrome, Systemic Lupus Nephritis, Type 1 Diabetes, Wegeners granulomatosis, White blood cells sent to attach the retina – lead to blindness,
Appendix Cancer Information

- Extremely Rare
  - In a 1976 study, less than 200 cases had ever been reported.
  - Recent German Study reported occurrence is less than 1 in 500,000
  - “Adenocarcinoid arising in the vermiform appendix is a rarity. The diagnosis of appendiceal adenocarcinoma has never been made preoperatively and is frequently an incidental finding at the time of operation for unrelated conditions. Because of the rarity of the disease, its natural history is poorly understood.” – (Stamatakos, M et. al., 2009)
ILLNESS MAPS
Background on maps

- **Genesis:** Facebook users posting information on illness and residence on Coldwater Creek – Just the Facts group page
  - Approximately 750 cases
  - Information collected and hand-entered
- **After Leisa Zigman’s KSDK story in January, 2013, group membership expanded dramatically**
  - Today almost 8400 members
- **Automated data collection process using SurveyMonkey**
  - Directed from FB site to survey link
  - Informed that we were collecting this voluntary information to produce maps
Survey information
- Almost 2800 additional reports via survey through October, 2013
- Added the original Facebook cases prior to the survey launch
- Removed by hand duplicate entries, entries without sufficient information

Almost 3300 reports of cancer or other illness
- Complete list of other illnesses available on Facebook site

Today: maps of over 1400 cases:
- Cancer
- Autoimmune disease
- Thyroid problems

Many no longer living in area
- Only information from those who heard about site and volunteered information
Cancer Cases

955 cancer cases in illness log
95 brain cancers
+ 18 noncancerous tumors
= 113 cases reported
Auto-immune Disorders

320 autoimmune disorders in illness log
Thyroid Cancers and Conditions

59 Thyroid cancers + 143 thyroid conditions = 202 cases reported
Appendix Cancer

39 appendix cancer cases
# Summary of Survey Information

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<th>Survey Information</th>
<th>Totals</th>
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"...the number of children and grandchildren with cancer in their bones, with leukemia in their blood, or with poison in their lungs might seem statistically small to some, in comparison with natural health hazards. But this is not a natural health hazard--and it is not a statistical issue. The loss of even one baby--who may be born long after we are gone--should be of concern to us all. Our children and grandchildren are not merely statistics toward which we can be indifferent."

-Quote from John F. Kennedy, regarding St. Louis Baby Tooth Study, excerpt from Charlie Brennan’s book “Amazing St. Louis”
Thank You

Website:  www.coldwatercreekfacts.com
Facebook Page: Coldwater Creek – Just the facts Please
References


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