

Red Butte Creek Oil Spill Health Hazard Assessment

**Utah Department of Health
Environmental Epidemiology Program**

The Environmental Epidemiology Program



Who We Are

- Part of the Utah Department of Health
- Co-Operative partners with the Federal Agency for Toxic Substance and Disease Registry (ATSDR)/Center for Disease Control (CDC)
- Work closely with the Salt Lake Valley Health Department, the EPA, and the Utah Department of Environmental Quality

What We Do

- Assess communities for past, current and potential hazardous exposures to contaminants.

The Environmental Epidemiology Program



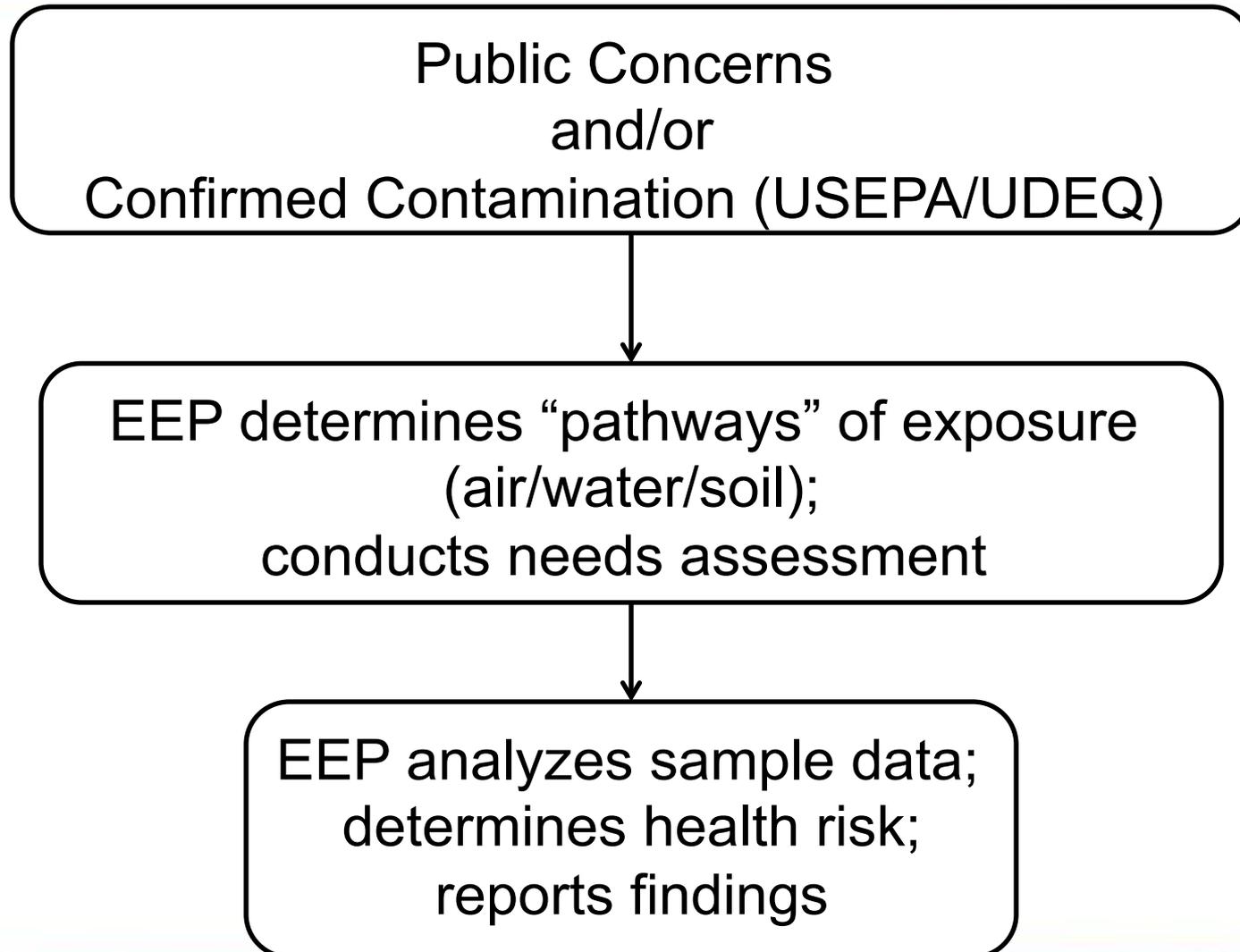
What We Provide

- Independent, objective health decisions based upon the best available science and data.
- Health education to minimize exposure.
- Recommendations to the EPA and UDEQ for further monitoring.

What We Do Not Provide

- Remediation or “site clean-up”.
- Legal advice.
- Enforcement of regulatory standards.
- Medical attention or health care services.

ATSDR Assessment Process



Red Butte Creek Oil Spill

EVENT- Late Friday night, June 11, 2010.

Chevron transfer line rupture

- **Approx. 800 barrels of crude oil spilled into Red Butte Creek.**

- **Approx. 600 bbl. recovered**
- **Approx. 100 bbl. evaporated**
- **Approx. 85 bbl. remained for clean-up**



Exposure Pathway Analysis (Air)



Exposure element

- | | |
|--|---|
| 1) A source of contamination..... | <u>Red Butte Creek</u>
ruptured pipeline |
| 2) Transport through environmental medium..... | volatile crude oil
contaminants enter
ambient air from Red
Butte Creek; movement
into homes |
| 3) A point of exposure..... | contact with
contaminated air |
| 4) A route of human exposure..... | inhalation of
contaminants |
| 5) A receptor population..... | residents living in close
proximity to spill |

Community Needs Assessment



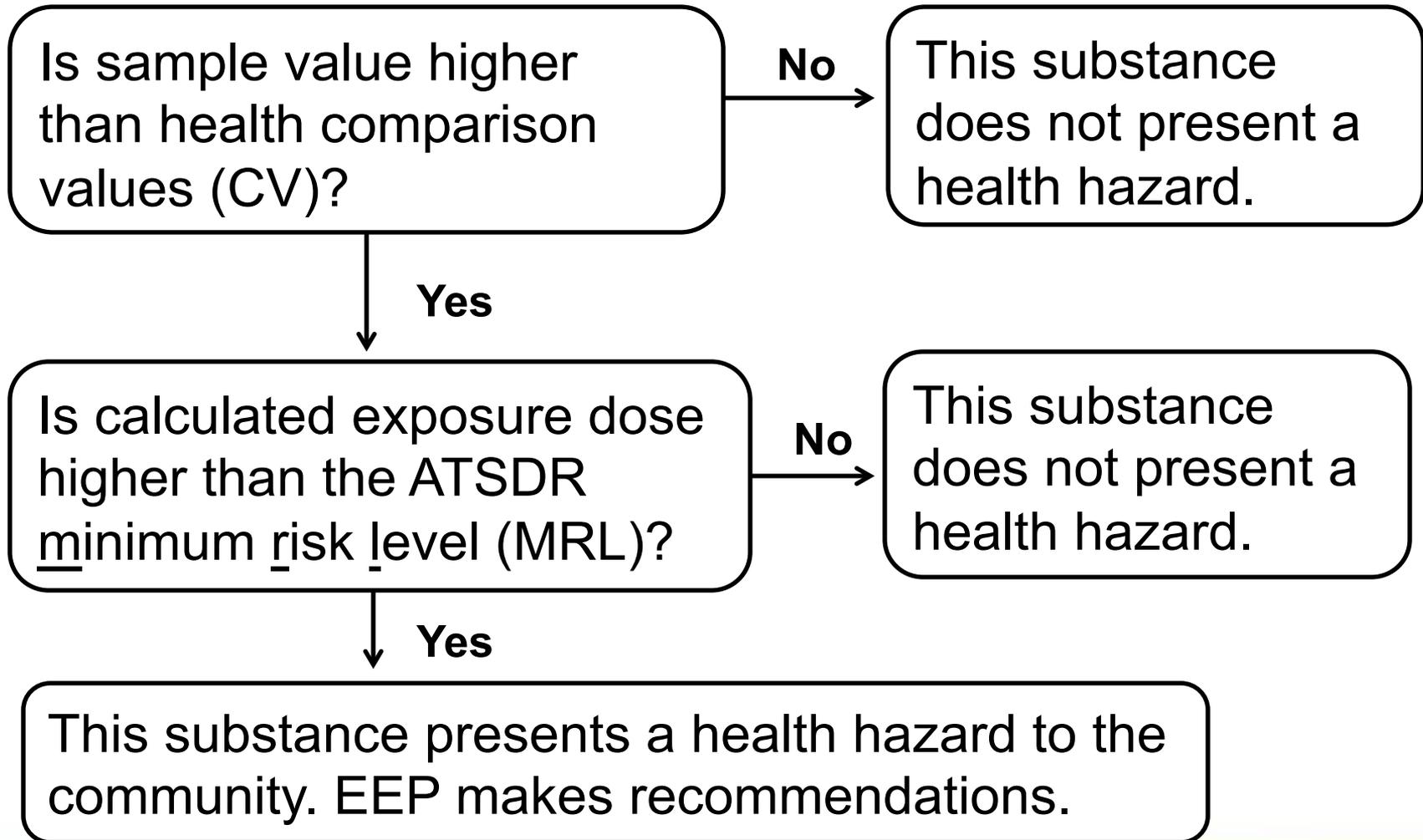
The EEP and SLVHD sent a “needs assessment tool” survey to citizens residing near Red Butte Creek.

- 636 surveys sent out
- 131 returned to the EEP

Top Community Concerns

- Respiratory/lung health
- Poor water quality in Red Butte Creek
- Long-term impact on the Creek’s environment and wildlife
- Future Cancer Incidence

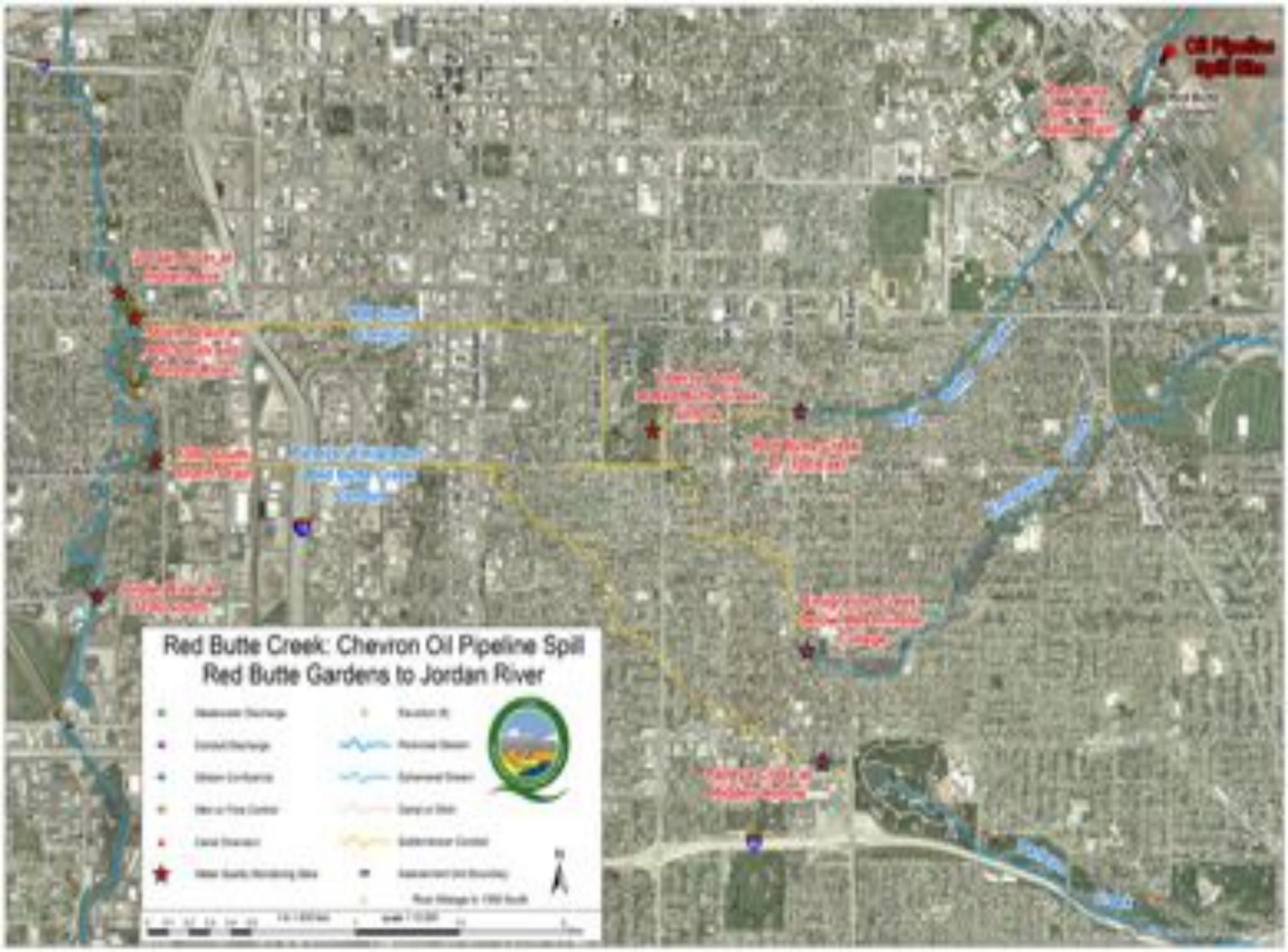
Toxicological Assessment



Exposure Calculations Include:

- Type of contaminant
- Amount of contaminant
- Type of exposure (ingestion, inhalation, dermal)
- Intake rates
- Duration of exposure (everyday, recreational, etc.)

Calculations made for Adults and Children



Exposure Pathway Analysis (Air)



Contaminants of Concern

Volatile Organic Compounds (VOCs)

- ***BTEX*** - "BTEX" is the term used for benzene, toluene, ethylbenzene, and xylene-VOCs typically found in crude oil.
- ***Naphthalene***- a VOC also found in crude oil.

Polycyclic Aromatic Hydrocarbons (PAHs)

- A group of carbon compounds found on oil, coal and tar.
- Some have toxic and carcinogenic effects.

Exposure Pathway Analysis (Air)



SAMPLING

From **June 16, 2010 to August 10, 2010**, air samples were taken **2-3 times/day** from **nine locations** along Red Butte Creek. Six of the nine locations were on residential property.

- In some air samples, naphthalene values exceeded CV.

Exposure Pathway Analysis (Air)



Spill date: June 11, 2010.

First documented air samples: June 16, 2010.

Conclusion 1

- Risk to human health from inhalation of VOCs during the hours immediately following the spill cannot be determined.

Basis

- Air samples for the hours and days immediately following the spill were not documented.
- In conjunction with UDEQ, EEP concludes that it is not possible to model early exposures with any reliability.

Exposure Pathway Analysis (Air)



Conclusion 2

- Breathing the air in the Red Butte Creek area does not pose an apparent public health hazard due to VOC exposure.

Basis

Napthalene Acute MRL	Napthalene Highest Dosage
0.6 mg/kg/day	0.03 mg/kg/day (children)

- Subsequent air testing did not show naphthalene levels above CV.

Exposure Pathway Analysis (Water)



SAMPLING

VOCs

From June 13, 2010 to July 15, 2010, samples were taken from **15 locations** along Red Butte Creek, Liberty Pond and the Jordan River

- One sample indicated a benzene value exceeding the health comparison value.

PAHs

From Dec. 2010 to Oct. 2011, samples were collected along Red Butte Creek, Liberty Pond, and several municipal waterways not affected by the Chevron Spill.

- No samples detected PAHs in these waters.

Exposure Pathway Analysis (Water)



Conclusion 3

- Accidental ingestion of water from Red Butte Creek does not pose an apparent public health hazard due to VOC or PAH exposure.

Basis

Benzene MRL (EPA RfD)	Benzene Highest Dosage
3.54×10^{-7} mg/kg/day	4×10^{-3} mg/kg/day (children)

- Red Butte Creek is not a drinking water source.
- Subsequent water testing did not show benzene levels above CV.

Exposure Pathway Analysis (Soil Sediment)



SAMPLING

PAHs

From Dec. 2010 to Oct. 2011, soil samples were collected along Red Butte Creek, Liberty Pond, and several municipal waterways not affected by the Chevron Spill.

- In some samples, benzo[a]pyrene and dibenz[a,h]anthracene concentrations exceeded CVs.

Exposure Pathway Analysis (Soil Sediment)



Dose Calculations

Non-Cancer	B[A]P (RfD 3×10^{-2} mg/kg/day)	DBA (RfD of 3×10^{-1} mg/kg/day)	Combined HI (<1.0)
Children	6.27×10^{-7} mg/kg/day	1.01×10^{-6} mg/kg/day	2.40×10^{-5}
Adults	1.20×10^{-7} mg/kg/day	1.86×10^{-7} mg/kg/day	4.62×10^{-6}
Cancer Risk	EPA IRIS ($1 \times 10^{-4} - 1 \times 10^{-6}$)	EPA IRIS ($1 \times 10^{-4} - 1 \times 10^{-6}$)	Combined Risk ($1 \times 10^{-4} - 1 \times 10^{-6}$)
Children (13 years)	9.5×10^{-7}	1.26×10^{-6}	2.2×10^{-6}
Adults (57 years)	7.0×10^{-7}	1.10×10^{-6}	4.0×10^{-6} (70 years)

Exposure Pathway Analysis (Soil Sediment)



Conclusion 4

Accidental ingestion of, or dermal contact with, soils from Red Butte Creek does not pose an apparent public health hazard due to PAH exposure.

Basis

- Based on recreational use, exposure calculations determined B[a]P and DAB doses were not above ATSDR MRL values.
- Combined calculated cancer risk is within EPA IRIS acceptable risk range of one in 100,000 to 1 in one million.

Cancer Incidence Baseline Study

- Took in an area from the point of release to Liberty Park
- Analyzed both genders and all age groups
- Investigated 1973-2007 for cancer types linked to crude oil exposure:

Melanoma

Pharyngeal

Laryngeal

Esophageal

Stomach

Lung

Multiple Myeloma

Hodgkin's Disease

Non-Hodgkin's Lymphoma (NHL)

Acute Lymphoblastic Leukemia (ALL)

Chronic Lymphoblastic Leukemia (CLL)

Acute Myelogenous Leukemia (AML)

Chronic Myelogenous Leukemia (CML)

- Found NO evidence of elevated cancer rates.
- Provides the baseline of rates to compare future analyses.

AIR

- **Lack of sufficient data for VOC air contamination in the days immediately following the Chevron spill does not allow us to determine the public health hazard at that time.**
- **Existing air data indicates that VOC contamination due to the Chevron spill does NOT pose an apparent public health hazard to residential or recreational users of Red Butte Creek.**

Assessment Summary



Water

- **Water data indicates that VOC and PAH contamination due to the Chevron spill does NOT pose an apparent public health hazard to residential or recreational users of Red Butte Creek.**

Soil Sediment

- **Soil sediment data indicates that PAH contamination due to the Chevron spill does NOT pose an apparent public health hazard to residential or recreational users of Red Butte Creek.**

Actions and Recommendations for the Community



EEP will:

- Continue to provide residents with information.
- Provide ongoing cancer incidence studies in the area.

If you have health concerns for yourself or your children:

- See a physician.
- Explain your exposure.
- Take along a copy of the Red Butte PHA and HC.

Contact Us



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The complete PHA and HC can be found by a link from our website.