# The Environmental Epidemiology Program

UTAH DEPARTMENT OF HEALTH

## 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

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## 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.

# Red Butte Creek Oil Spill

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# Red Butte Creek Oil Spill

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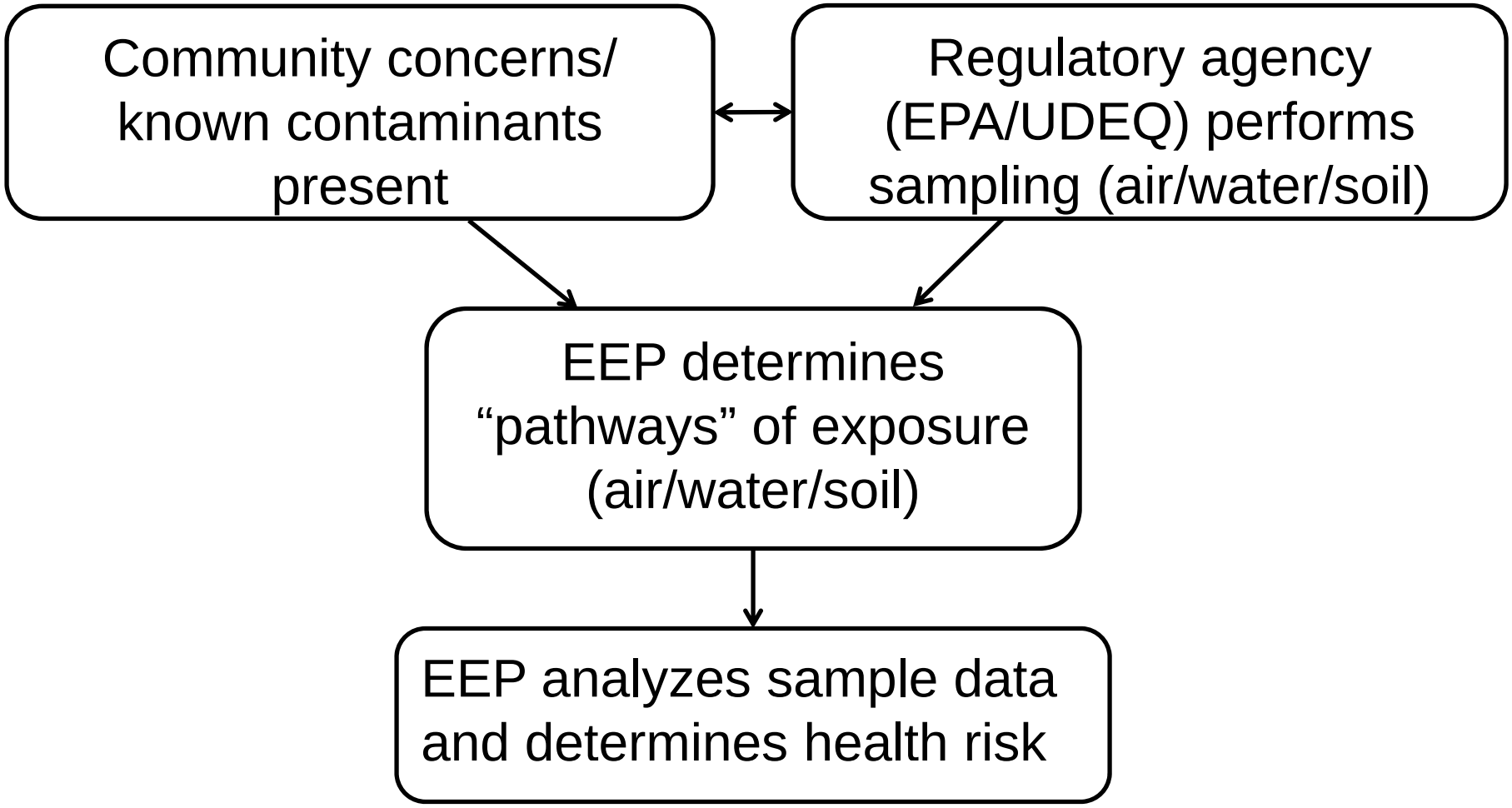
## Action Taken

- Salt Lake Valley Health Department requested an assessment of certain chemicals found in crude oil known to cause **acute** health effects.

# Assessment Process



# Exposure Pathway Analysis (Air)

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## Contaminants of Concern
## Volatile Organic Compounds (VOCs)

- ***VOCs-*** Evaporate into the air quickly.
- ***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.
- High concentrations of any of these compounds pose a health risk.

# Community Needs Assessment

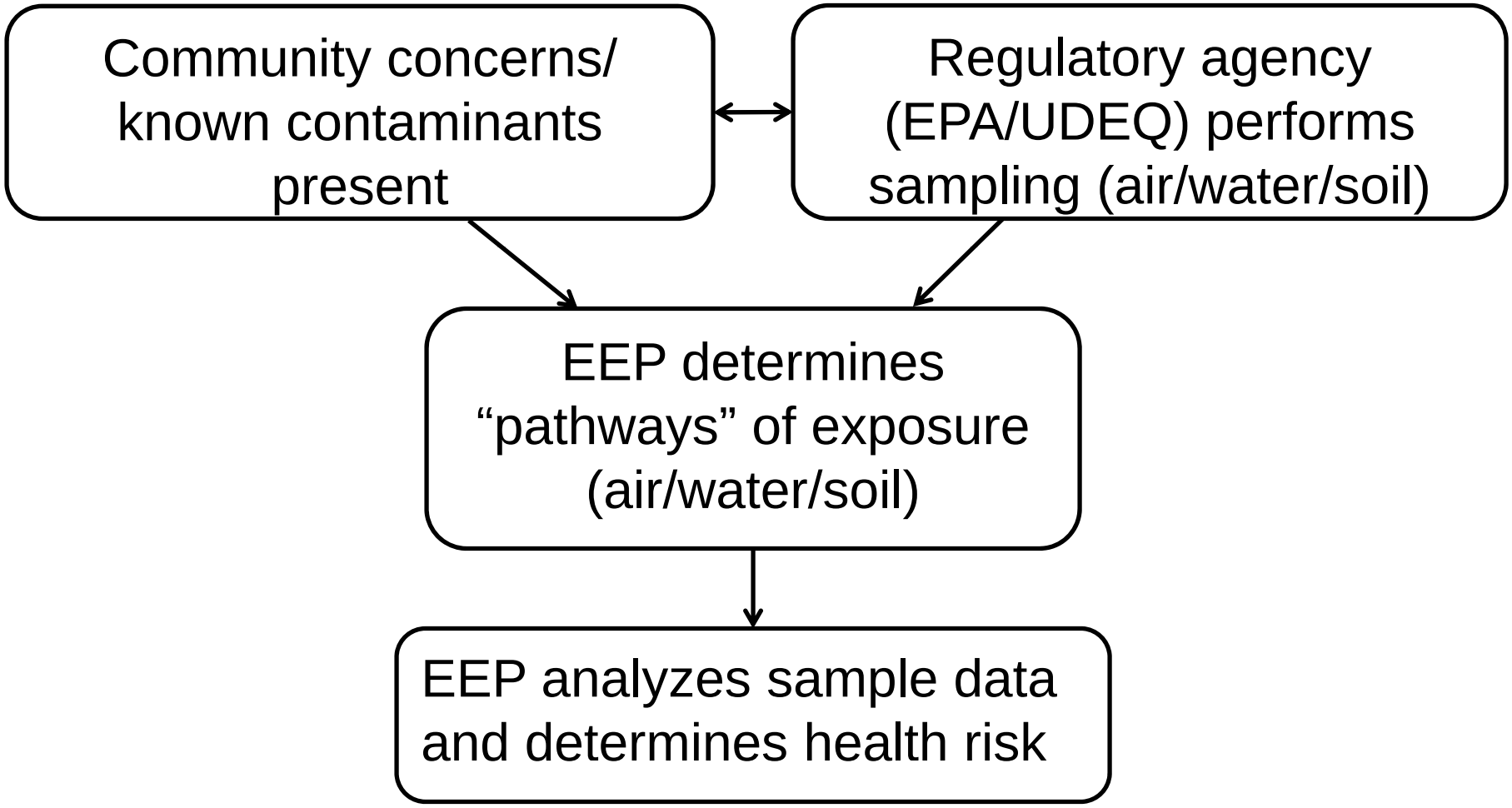
The EEP and SLVHD sent a survey “needs assessment tool” or  (NAT) to citizens residing within a 300 foot distance on either side of Red Butte Creek.

- 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

# Assessment Process



# Exposure Pathway Analysis (Air)

| Exposure element | Red Butte Creek |
|---|---|
| 1) A source of contamination..... | 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 |

# Exposure Pathway Analysis (Air)

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**Spill date: June 11, 2010.**
**First documented air samples: June 16, 2010.**

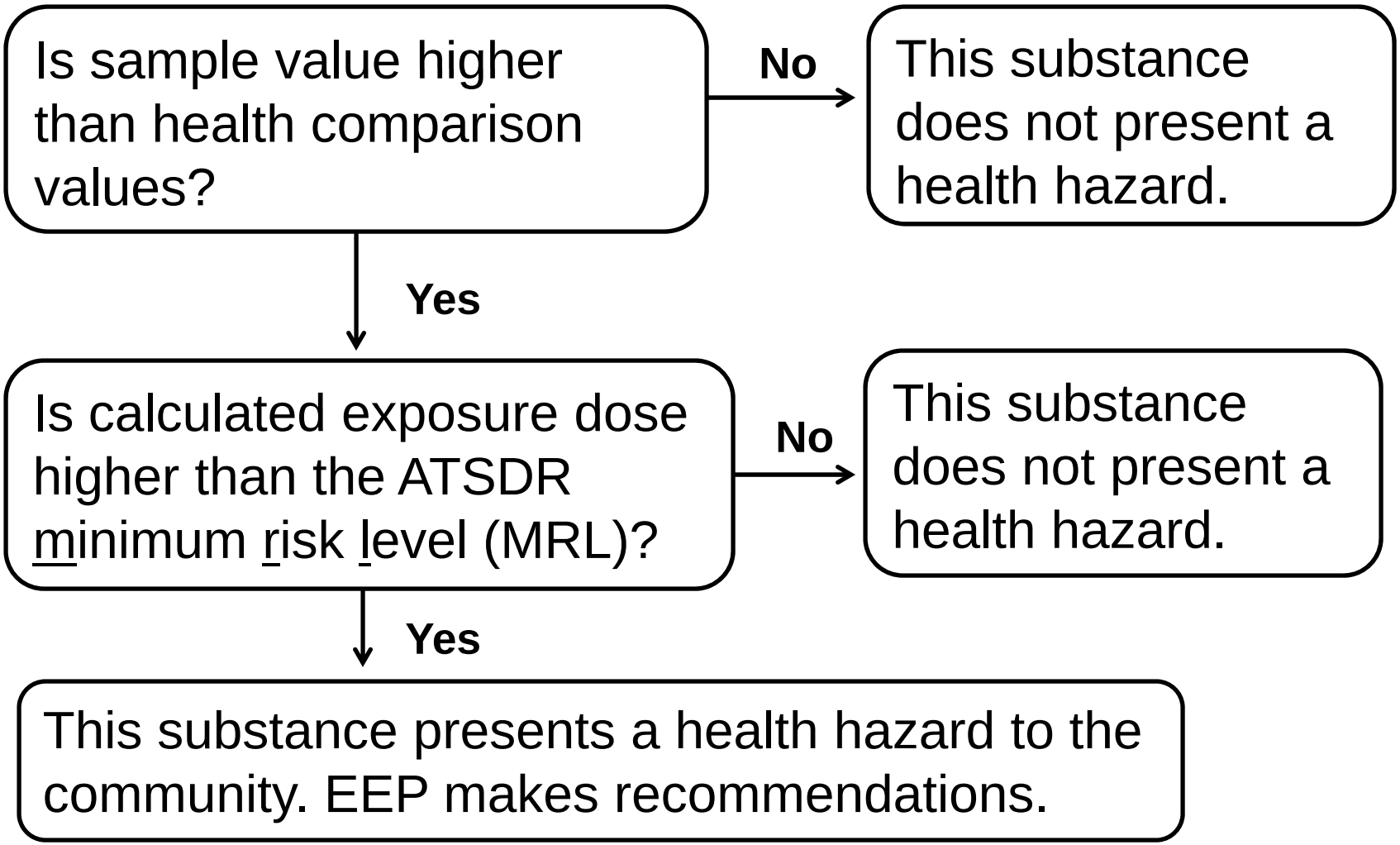
**Conclusion 1**

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

**Basis**

- Air samples for the hours 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.

# Assessment Process



# Exposure Pathway Analysis (Air)

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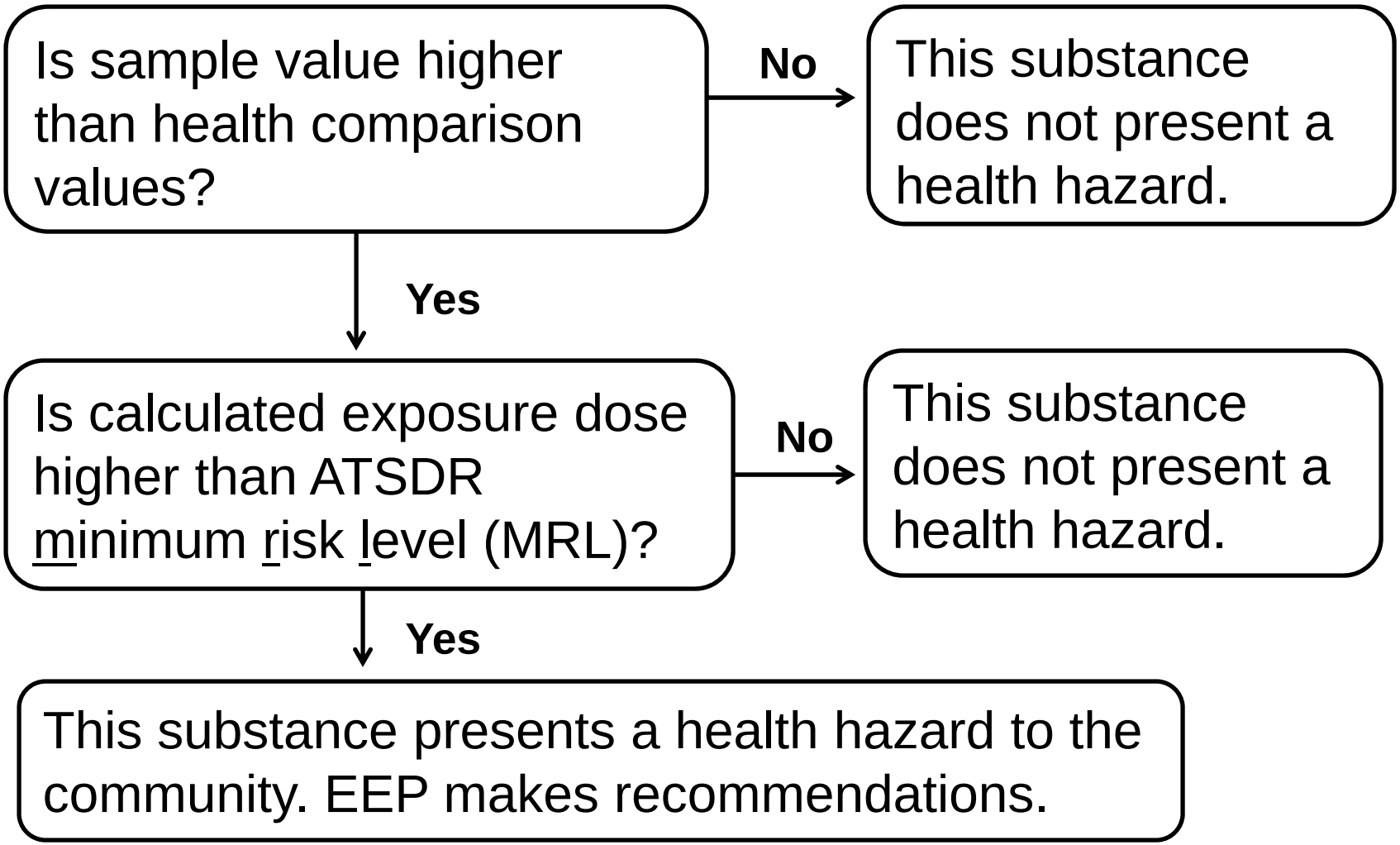
## SAMPLING

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 several air samples, Napthalene and Benzene values exceeded the health comparison values.
- **However**, estimated exposure dose values indicate an exposure dose below the ATSDR minimum risk level (MRL).

# Assessment Process



# Exposure Pathway Analysis (Air)

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**Conclusion 2**

- Breathing the air in the Red Butte Creek area does not pose a short-term or long-term hazardous exposure to VOCs.

**Basis**

- Exposure calculations determined that VOC doses obtained during this time did not exceed ATSDR MRL values.

# BTEX Values in Perspective

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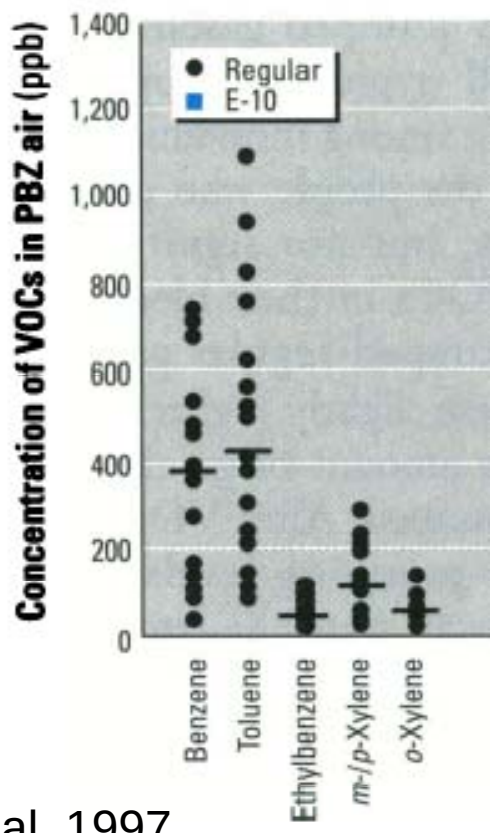
| | (RBC outdoor residential) | | (9th South 7th East) |
|---|---|---|---|
| **Chemical** | **Max ppb** | **Mean ppb** | **10/28/10 ppb** |
| Benzene | 0.53 | 0.27 | 0.32 |
| Ethylbenzene | 0.22 | 0.088 | 0.072 |
| Toluene | 1.6 | 0.93 | 0.90 |
| Xylenes | 2.0 | 0.81 | 0.32 |

**BTEX exposure when pumping regular unleaded gas**




From Backer et al. 1997, Environmental Health Perspectives

**Benzene:**

| **Acute Health Effect (<14 days exposure)** | **ppb** |
|---|---|
| **Death** | **20,000,000** |
| **Dizzyness/Nausea** | **60,000** |
| **Short breath/resp** | **60,000** |
| **Loss of blood cells** | **60,000** |
| **Eye irritation** | **30,000** |

# Exposure Pathway Analysis (Water)

| Exposure element | Red Butte Creek |
|---|---|
| 1) A source of contamination…….. | ruptured pipeline |
| 2) Transport through environmental medium..... | leak directly into creek water |
| 3) A point of exposure…… | contact with contaminated waters directly or indirectly (i.e., playing in the creek, remediating the creek) |
| 4) A route of human exposure…… | accidental ingestion |
| 5) A receptor population…….. | residents in contaminated area |

# Exposure Pathway Analysis (Water)

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## SAMPLING

**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 on one day yielded a Benzene value exceeding the health comparison value.
- The next day the sample value at that location was well below comparison value.
- Dose toxicity based on estimated exposure (recreational use) indicates a health hazard below the minimum risk level (MRL).


Oil Pipeline Spill Site
Red Butte Gardens Below Spill
Red Butte Gardens
400 South
500 South
Jordan River at Indiana Ave
Indiana Ave
900 South
900 South Conduit
Storm Drain at 900 South and Jordan River
State Street
500 East
Liberty Park
700 East
900 East
1100 East
1300 East
Sunnyside Ave
Liberty Pond at Red Butte Creek Inflow
Red Butte Creek
Red Butte Creek at 1100 East
1300 South
1300 South Storm Drain
Parleys / Emigration / Red Butte Creek Conduit
California Ave
Emigration Creek
Foothill Drive
1700 South
Jordan River at 1700 South
Emigration Creek below Westminster College
Parleys Creek at Hidden Hollow
Parleys Creek
Red Butte Creek: Chevron Oil Pipeline Spill
Red Butte Gardens to Jordan River
Wastewater Discharge
Conduit Discharge
Stream Confluence
Weir or Flow Control
Canal Diversion
Water Quality Monitoring Sites
Elevation (ft)
Perennial Stream
Ephemeral Stream
Canal or Ditch
Subterranean Conduit
Assessment Unit Boundary
River Mileage to 1300 South
N
1 in = 833 feet
scale 1:10,000
0 0.1 0.2 0.3 0.4 0.5 1 1.5 2 Miles

# Exposure Pathway Analysis (Water)

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**Conclusion 3**

- Accidental ingestion of water from Red Butte Creek does not pose a short-term or long-term hazardous exposure to VOCs.

**Basis**

- Water from Red Butte Creek is not used as drinking water by area residents; therefore, chronic ingestion is not of concern.

- Based on recreational use, exposure calculations determined that VOC doses were not above ATSDR MRL values.

# EEP Action

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## 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.

# EEP Assessment

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**Summary**

- Based upon the available data regarding air and water contamination of the Red Butte Creek due to the Chevron Oil Spill, the EEP finds no short-term or long-term health hazards to the community.

**Next Steps for the EEP**

- Continue to provide residents with information about the contaminants of concern and health effects for acute and chronic exposures.
- Provide ongoing cancer cluster studies in the area to detect any changes from the baseline.
- Provide assessment for the ongoing UDEQ Red Butte soil and sediment study.

# EEP Recommendations for the Community

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**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.

# Contact Us

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