Exponent

Risk Assessment Former Municipal Incinerator

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Risk Assessment Framework

Exposure Assessment

- Scenarios
- Pathways
- Intake rates

Chemicals of Concern

Risk Characterization

- Carcinogenic
- Noncarcinogenic
- Uncertainties

Toxicity Assessment

- Validity of data
- Relevance

Evaluate Results

Implement Controls

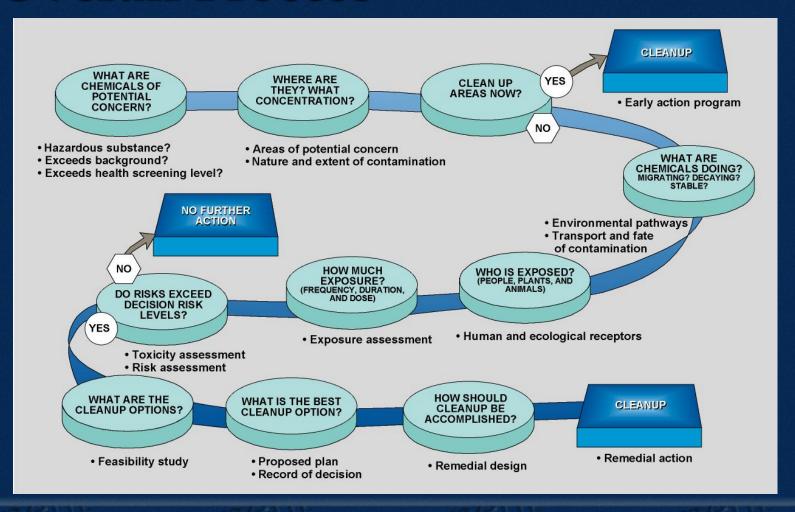
Context of Risk Assessments

- Waste-to-energy facility operated 1985 to 2000 cooperatively with SJC
- Prior operations resulted in residual contaminants
 - EPA conducted a Site Inspection in 1994
 - State required further investigation beginning 2001
 - Concerns regarding offsite migration
- Human health and ecological evaluations
- Consideration of cultural resources

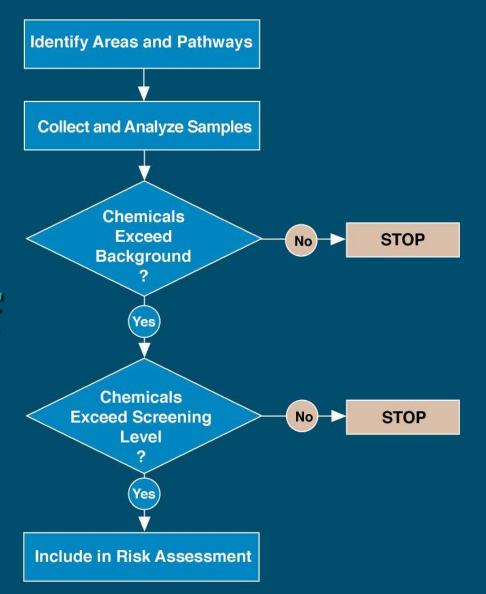
Project Team

- Directed by City of Sitka
- Regulatory oversight by DEC
- Conducted by:
 - James Clare, PE, LLC Investigation
 - Exponent Risk Assessments
- Reviewed by:
 - Sheldon Jackson College
 - Sitka Tribe
 - Public

Context of Risk Assessment in Overall Process



General Decision Framework for Screening Chemicals of **Potential** Concern



Contaminants of Potential Concern (CoPCs)

- Metals
 - Chromium, cadmium, mercury
- Residuals from burning
 - Dioxins (PCDD/Fs)
 - Polycyclic aromatic hydrocarbons (PAHs)
- Residual petroleum



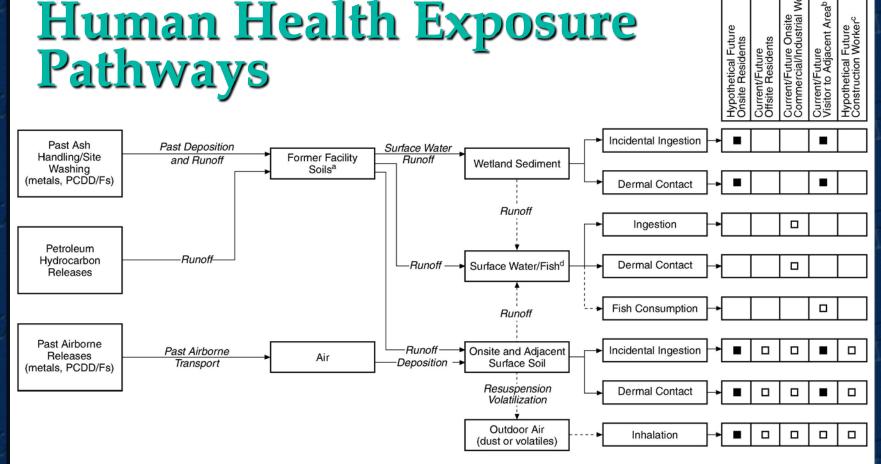
Release Mechanism

Primary Exposure Media

Secondary **Exposure Media** **Exposure** Route

Receptor Categories

Human Health Exposure Pathways



- Primary exposure pathway
- Secondary potential exposure pathway
- Primary transport pathway
- Secondary transport pathway

- a Releases from former facility soils could have occurred prior to paying in 1994.
- ^b Visitors include those who may visit graves, people using the footpaths, and recreational visitors.
- ^c If current paving were removed, exposure to chemicals in onsite soil could occur.
- ^d No groundwater sources are thought to be present at the site (see text).

Human Health Exposure Assumptions

- Health protective assumptions applied
 - Worker and daycare child assumed 250 day per year exposure (25 years)
 - Visitor assumed 24 days per year (30 years)
 - Gravesite visits assumed 6 times per year (30 years)
- Hypothetical residential scenario evaluated
 - Adult and child evaluated
 - Assumes long-term residence
 - 350 days per year for 30 years

Risk Estimates for Human Health

Scenario	Risk Estimate Adult	Risk Estimate Child	
Occasional visitor	2x10 ⁻⁵	3x10 ⁻⁵	
Hypothetical resident	3x10 ⁻⁴	5x10 ⁻⁴	
Gravesite visitor	1x10 ⁻⁶	2x10 ⁻⁶	
Daycare worker / child	d 7x10 ⁻⁷	2x10 ⁻⁶	

Ecological Assessment

- Screening based on conservative toxicity benchmarks and on exposure assumptions identified by DEC
- Contaminants of concern identified
 - Metals (cadmium, chromium, lead, and mercury)
 - Dioxins (PCDD/Fs)
- Indicator species evaluated in food web model
 - Mink, robin, Sitka mouse, shrew, and great blue heron

Source

Release Mechanism Primary Exposure Media Secondary Exposure Media Exposure Route

Ecological Receptors

Aquatic Organisms

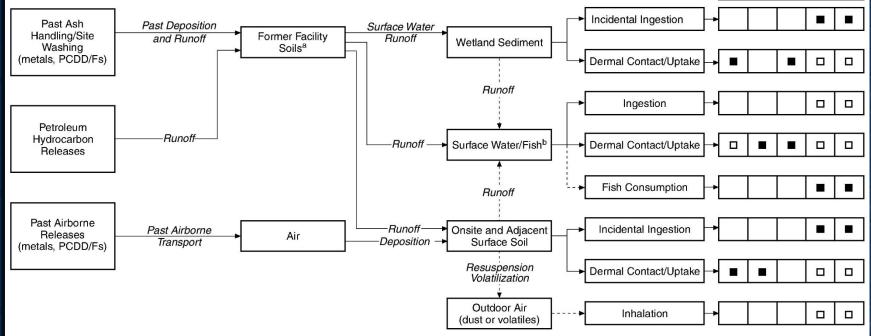
Mammals

Birds

Soil Fauna

Plants

Ecological Exposure Pathways



- Primary exposure pathway
- □ Secondary potential exposure pathway
- Primary transport pathway
- --- ➤ Secondary transport pathway

- a Releases from former facility soils could have occurred prior to paving in 1994.
- ^b No groundwater sources are thought to be present at the site (see text).

Ecological Assessment — Results

- Risk assessment could not rule out potential for impact based on comparison to screening values
- Effects, if any, restricted within wetland area
- Population-level effects highly unlikely in terrestrial area
- No effects on fish

Conclusions

- Human health and ecological risks are within acceptable levels for current use
- Potential for elevated risks can be managed with use restrictions:
 - Residential use should be restricted
 - Subsurface excavation may require special health and safety procedures
- Offsite migration limited to adjacent wetland