Potentially Exposed Communities

Documents used:

- Phase IA SAP – Pg. 65-70

Phase 1A Attachment 10B Site Photographs

Outline

- Who:
  - Ecological Communities
  - Human Communities
- What:
  - Contaminants of particular concern (COPCs)
    - HCB
    - PCDDs
    - PCDFs
    - PCBs
    - Dioxin
  - Acidic water
- Why:
  - Toxicity
  - Cancer risk
  - Non-cancer risk
  - Irritation (Acids)
- How:
  - Exposure Pathways

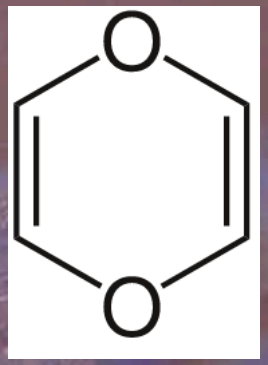
Toxicity: Communities at risk?

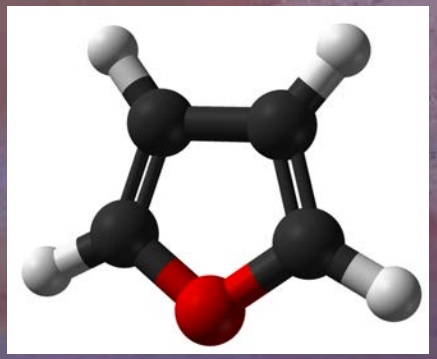
- Ecological Risk
  - Birds
  - Mammals
  - Terrestrial and aquatic plants
  - Terrestrial invertebrates
  - Aquatic invertebrates
  - Amphibians and Reptiles

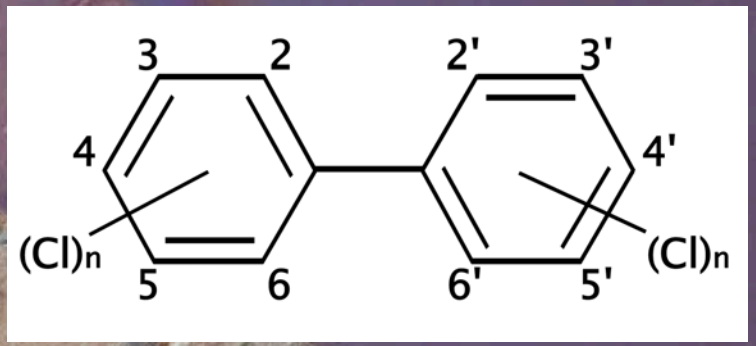
- Human Risk
  - Full-time workers at US Magnesium
  - Workers at nearby facilities
  - Episodic workers
  - State and Federal land managers
  - Off-site recreational visitors
  - Hunters
  - Ranchers
  - Seasonal workers

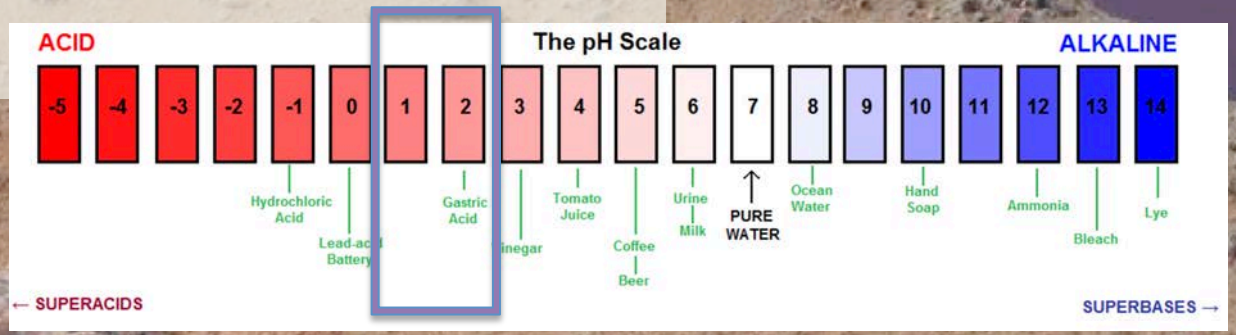
What: Contaminants and Irritants

- Contaminants of Particular Concern (COPCs)
  - Dioxins/Furans
  - Hexachlorobenzene (HCB)
  - Polychlorinated Biphenyls (PCB)
- Highly acidic pond water
  - Hydrochloric acid waste
  - Very low pH (around 1-2)



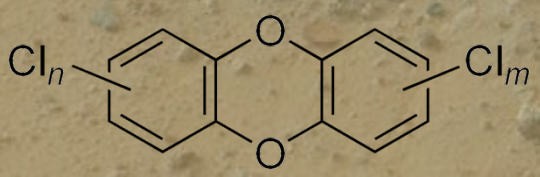




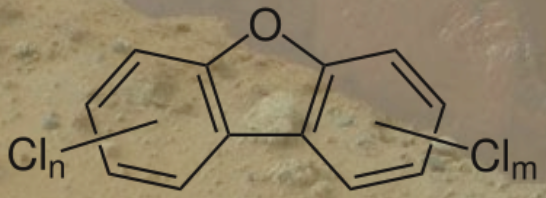


Why: Dioxin Toxicity

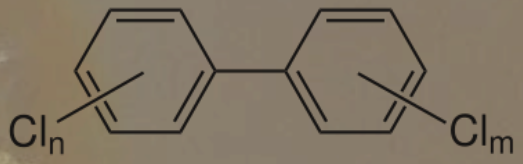
- Includes dioxin-like compounds and furans
- Bioaccumulate in fatty tissue
- Every person living in a developed country has been exposed to dioxins



PCDDs (Dioxins)



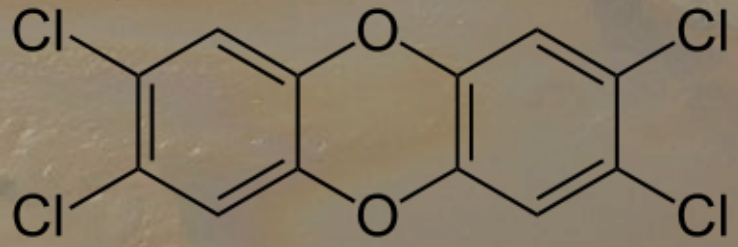
PCDFs (Furans)



PCBs (dioxin-like)

Why: Dioxin Toxicity

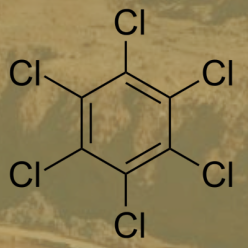
- Toxic dioxins among most potent human carcinogens
- Non-cancer risks:
  - Strong correlation with diabetes
  - Immunotoxicity



TCDD

Why: HCB Toxicity

- Hexachlorobenzene
- Readily adsorbed through GI tract



- Bioaccumulates in fatty tissue (takes 15 years to rid HCB from the body)
- Undetected in general population (no background level)
- Hydrophobic (does not dissolve in water)

Why: HCB Toxicity

- Probable human carcinogen
- Non-cancer risks:
  - Linked to diabetes
  - Immunotoxicity (can lead to cancer)
  - Liver damage
  - Miscarriage/infant death

Why: Impacts of Highly Acidic Water

- Corrosive to biological tissue
  - Mucous membranes
  - Esophageal tissue
  - Stomach tissue
- Effects
  - Perforation and hemorrhaging of gastric lining
  - Circulatory collapse

How: Exposure Pathways

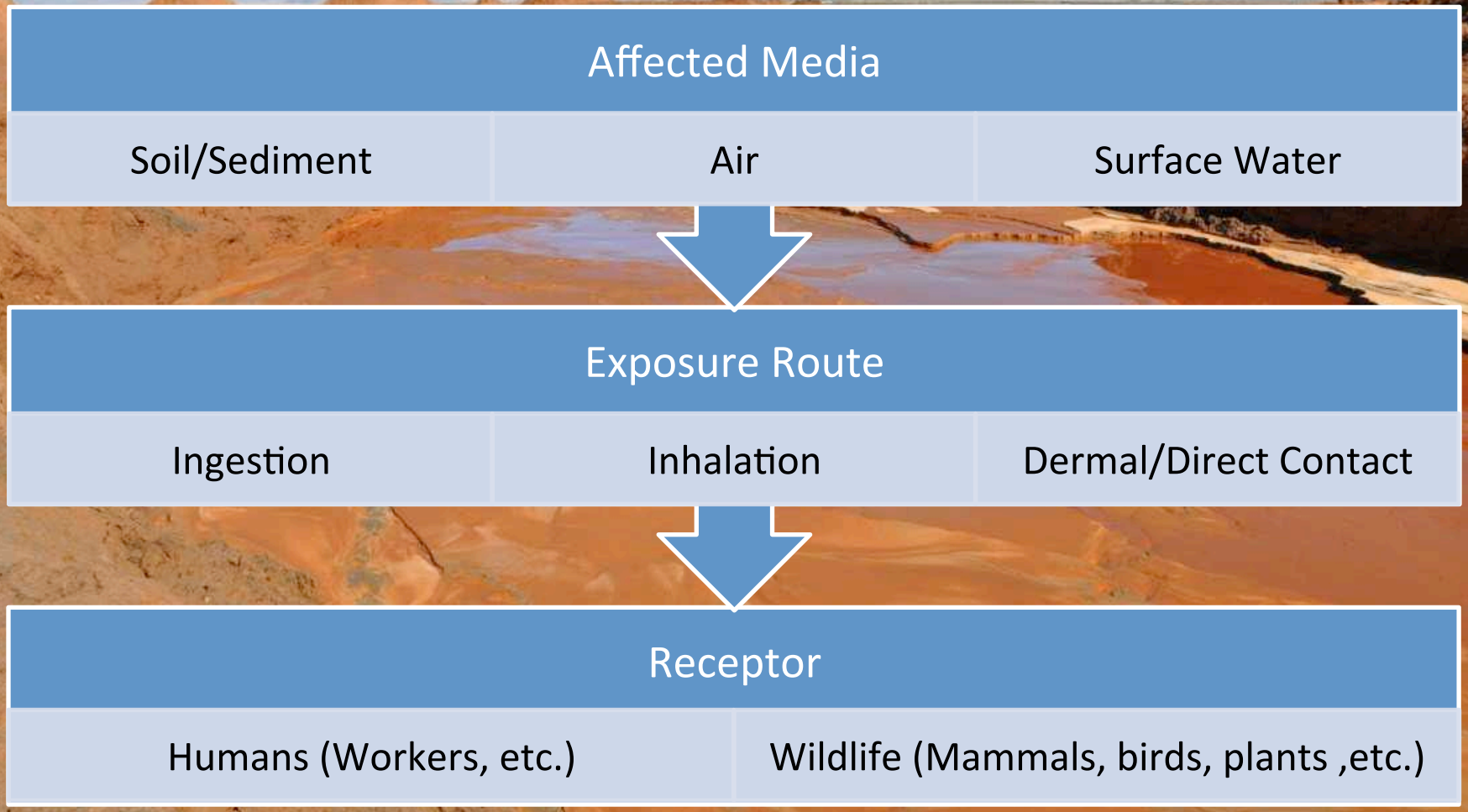
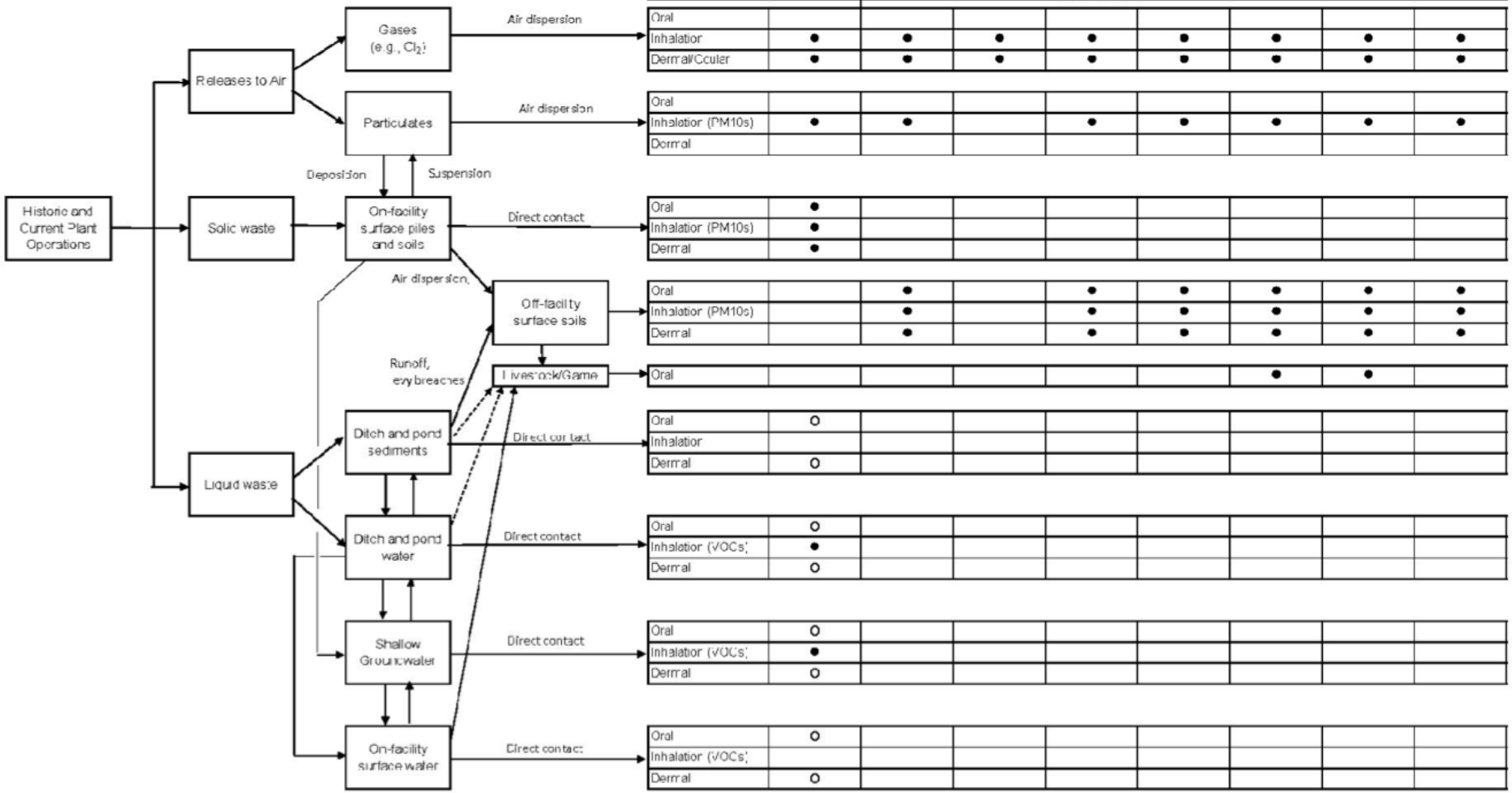


FIGURE 10-32 US MAGNESIUM SITE
CONCEPTUAL SITE MODEL FOR HUMAN EXPOSURE



KEY

- ● Pathway is complete and could be significant; quantitative evaluation
- ○ Pathway is potentially complete, but data are needed on U.S. Magnesium worker activity patterns to determine if quantitative assessment is needed
- Pathway is not complete or is negligible; quantitative evaluation not needed

→ Primary transport or exposure pathway

⇢ Minor transport or exposure pathway

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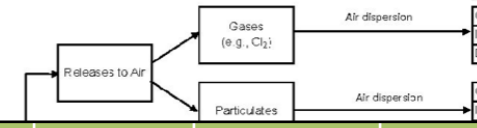
CONCEPTUAL SITE MODEL FOR HUMAN EXPOSURE



Pathway	US Mag onsite worker	Worker at nearby facilities	Episodic Worker	Land managers and environmental researchers	Off-site recreational visitor	Hunter	Rancher	Seasonal worker and family
Oral								
Inhalation	●	●	●	●	●	●	●	●
Dermal/Ocular	●	●	●	●	●	●	●	●
Oral								
Inhalation (PM10s)	●	●		●	●	●	●	●

	Pathway	US Mag Onsite Worker	Worker at Nearby Facilities	Episodic Worker	Land Managers and Environmental Researchers	Off-Site Recreational Visitors	Hunter	Rancher	Seasonal workers and family
Gasses	Ingestion								
	Inhalation	■	■	■	■	■	■	■	■
	Dermal	■	■	■	■	■	■	■	■
Particulates	Ingestion								
	Inhalation	■	■		■	■	■	■	■
	Dermal								

KEY
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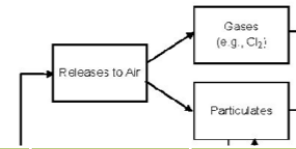

Receptor

Pathway	US Mag onsite worker	Worker at nearby facilities	Episodic Worker	Land managers and environmental researchers	Off-site recreational visitor	Hunter	Rancher	Seasonal worker and family
Oral								
Inhalation	●	●	●	●	●	●	●	●
Dermal/Ocular	●	●	●	●	●	●	●	●
Oral								
Inhalation (PM10s)	●	●		●	●	●	●	●
Dermal								

● Pathway is complete and could be significant; quantitative evaluation
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→ Primary transport or exposure pathway
⇢ Minor transport or exposure pathway

	Pathway	US Mag Onsite Worker	Worker at Nearby Facilities	Episodic Worker	Land Managers and Environmental Researchers	Off-Site Recreational Visitors	Hunter	Rancher	Seasonal workers and family
Off-facility Surface Soil	Ingestion		■		■	■			
	Inhalation		■		■	■			
	Dermal		■		■	■			
Livestock and Game									
	Ingestion						■	■	

FIGURE 10-32 US MAGNESIUM SITE
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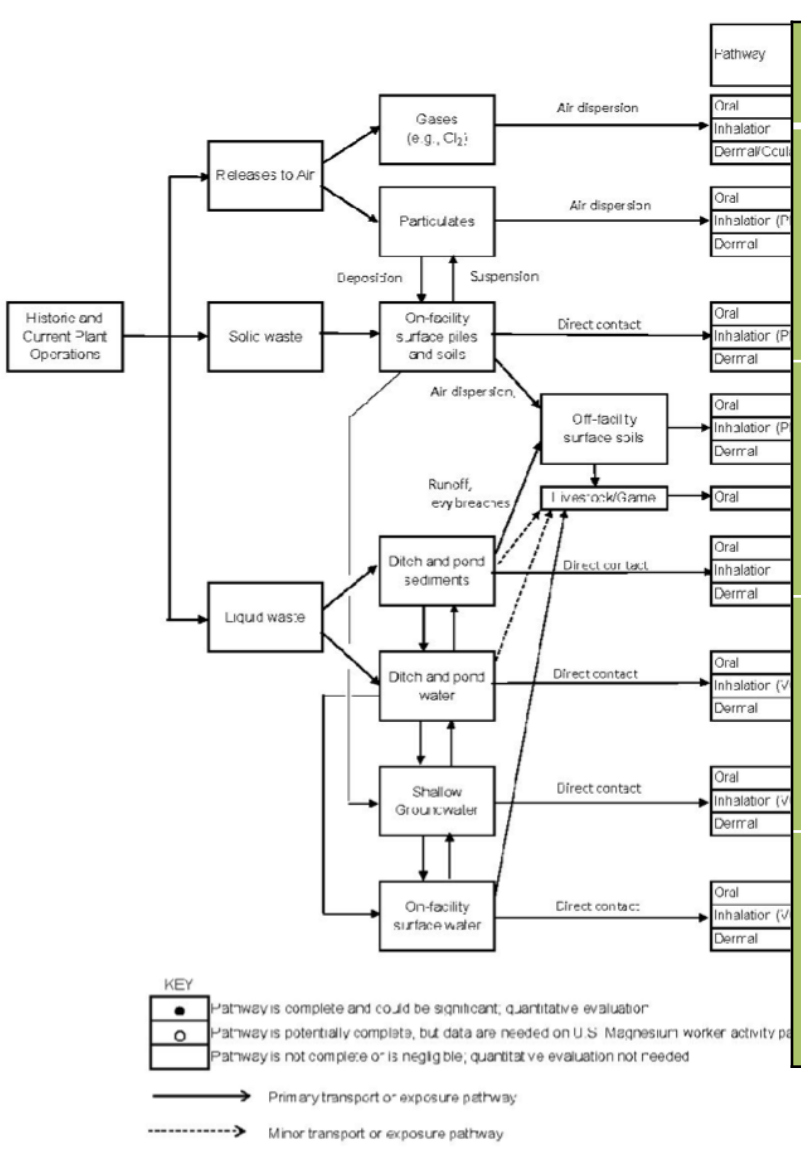
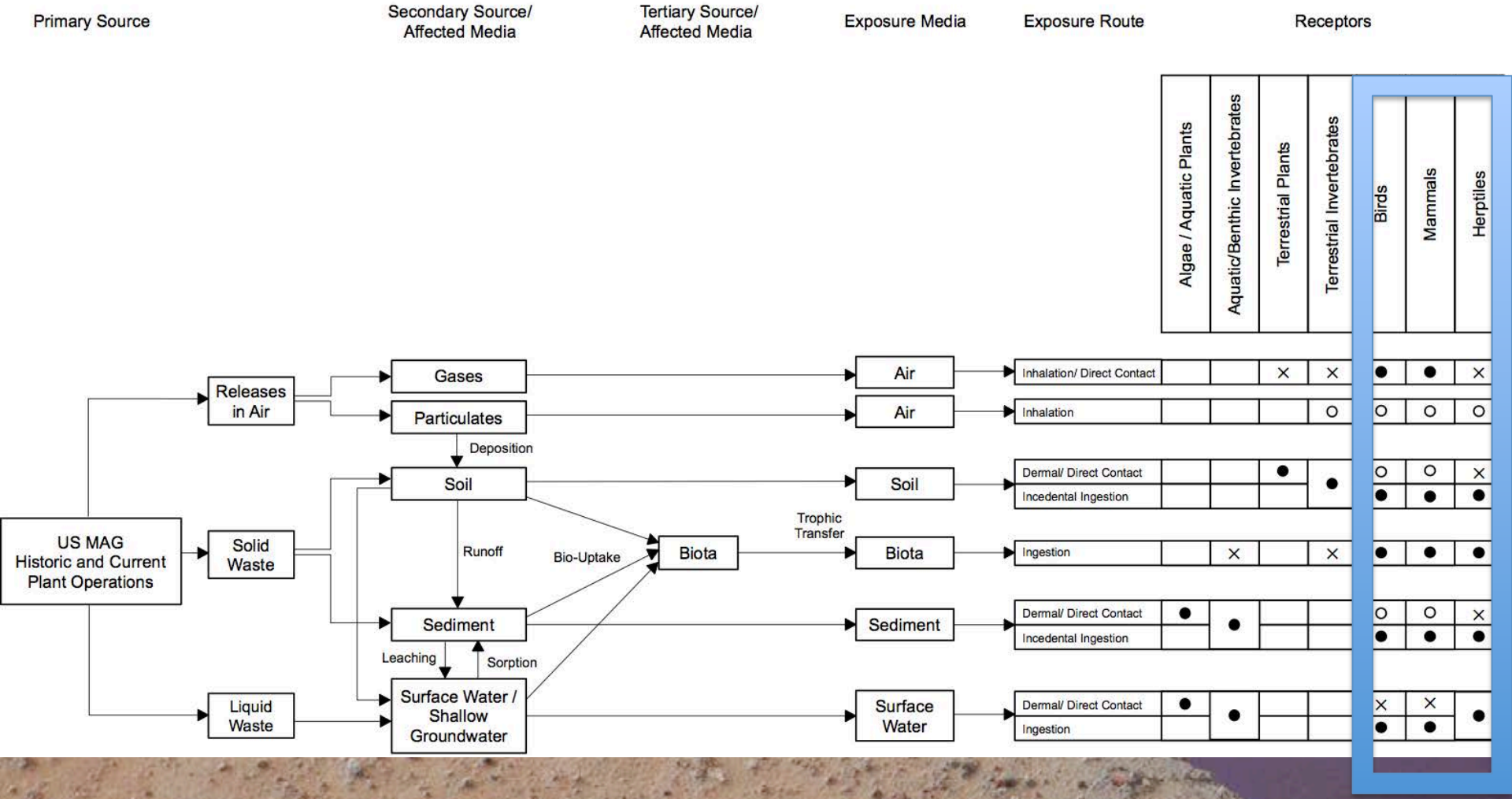


	Pathway	US Mag On-site Worker
Ditch and Pond Sediments	Ingestion	☐
	Inhalation	
	Dermal	☐
Ditch and Pond Water	Ingestion	☐
	Inhalation	■
	Dermal	☐
Shallow Groundwater	Ingestion	☐
	Inhalation	■
	Dermal	☐
On-Facility Surface Water	Ingestion	☐
	Inhalation	
	Dermal	☐


Primary Source
Secondary Source/ Affected Media
Tertiary Source/ Affected Media
Exposure Media
Exposure Route
Receptors
Algae / Aquatic Plants
Aquatic/Benthic Invertebrates
Terrestrial Plants
Terrestrial Invertebrates
Birds
Mammals
Herptiles
US MAG Historic and Current Plant Operations
Releases in Air
Solid Waste
Liquid Waste
Gases
Particulates
Deposition
Soil
Runoff
Bio-Uptake
Biota
Trophic Transfer
Sediment
Leaching
Sorption
Surface Water / Shallow Groundwater
Air
Air
Soil
Biota
Sediment
Surface Water
Inhalation/ Direct Contact
Inhalation
Dermal/ Direct Contact
Incedental Ingestion
Ingestion
Dermal/ Direct Contact
Incedental Ingestion
Dermal/ Direct Contact
Ingestion
Pathway is complete and could be significant, quantitative evaluation
Pathway may be complete but is likely to be minimal
Pathway is not complete
Pathway is complete but probably cannot be evaluated quantitatively