

# Reducing the Impacts of Burning in Rural Alaska

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# Outline

Contaminants Released into the Environment

Examples: Lead and Dioxins

Burning Best Management Practices

Burnbox Examples


Regulations

# Contaminants Released into Your Environment

- Dioxins/Furans
- Particulate Matter
- Sulfur Dioxide
- NO<sub>x</sub>
- Carbon Monoxide
- Hydrogen Chloride
- Mercury
- Lead



Criteria Pollutants and HAPs



# Example: Lead

## Where is it?

- Batteries
- Electronic waste
- Ammunition
- Weights
- Lead solder
- Building demolition with lead-based paint

# Example: Lead Inhalation Pathway?



- **YES**, if trash is burned and contains lead
- **DECREASE** exposure by removing objects that contain a lot of lead (lead-acid batteries, computer monitors)
- **DECREASE** exposure by burning when wind is blowing away from people



# Other Lead Exposure

Often stuck onto particles (dust on hands transferred to food, drink)

Lead-shot becomes transport and meat becomes point of exposure (not biomagnified)

Drinking water (lead pipes source, groundwater not likely)


Children sucking on toys with lead in paint

Lead paint (buildings from FUDS sites, old BIA schools)

Fumes from melted lead (casting bullets, fishing weights)

Dust from indoor shooting ranges

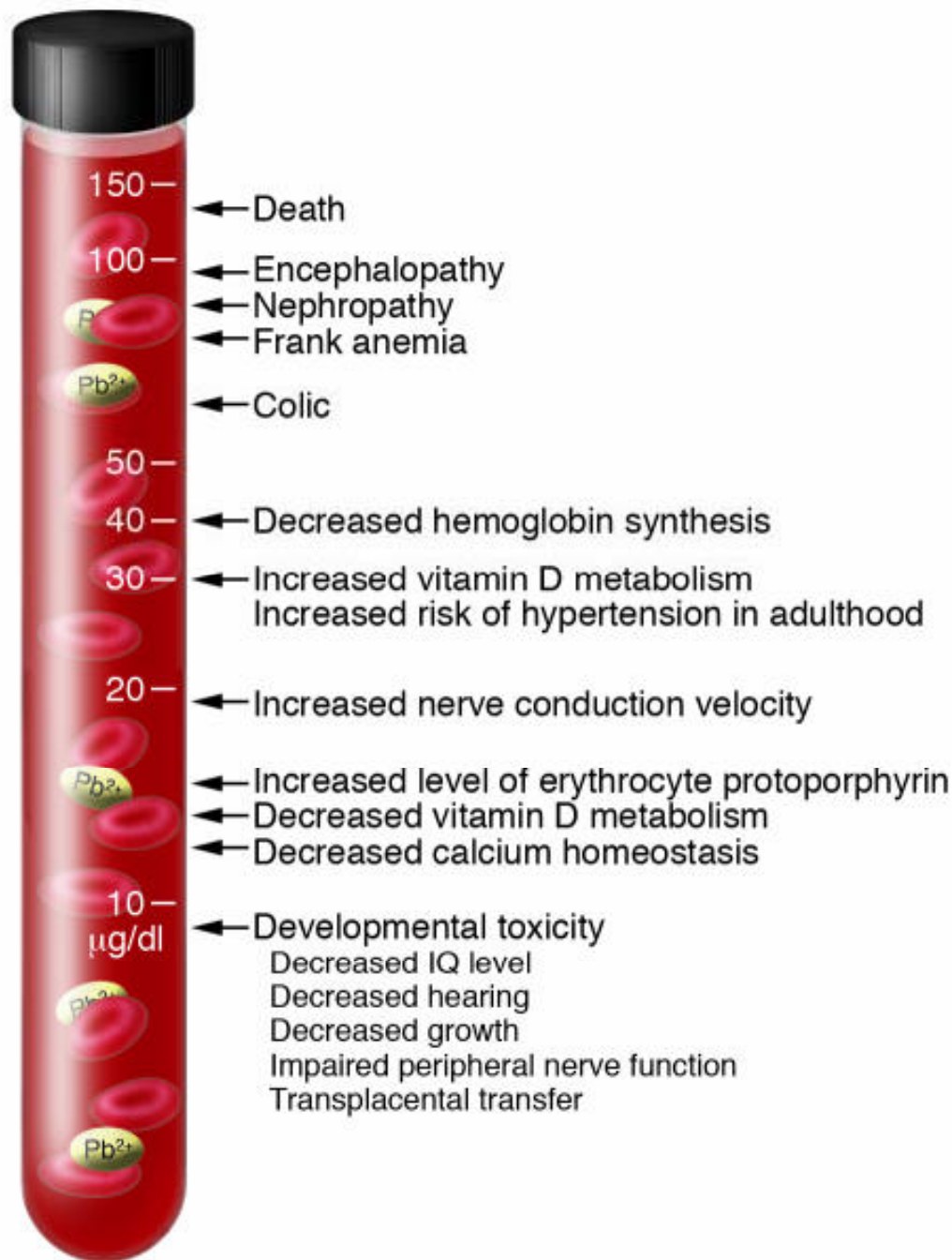




# Example: Lead

## Health Effects in Children

- Small doses are dangerous
- 1-3 years - crawl and put things in mouth
- Affect ability to learn
- Poor muscle and bone development
- Coordination problems
- Speech and language problems



Call Rachel Kossover  
at 907-269-8054,  
Alaska Division of  
Public Health to  
inquire about how  
you can have children  
in your community  
tested for lead.

[rachel.kossover@alaska.gov](mailto:rachel.kossover@alaska.gov)



# Vinyl Chloride: Where is it?

Vinyl Chloride is used to make polyvinyl chloride (PVC)

Variety of plastic products:

PVC Pipe

Wire Records

Shoes Clothes

Packaging material

Shrink Wrap

#3 Plastics

Cable coatings

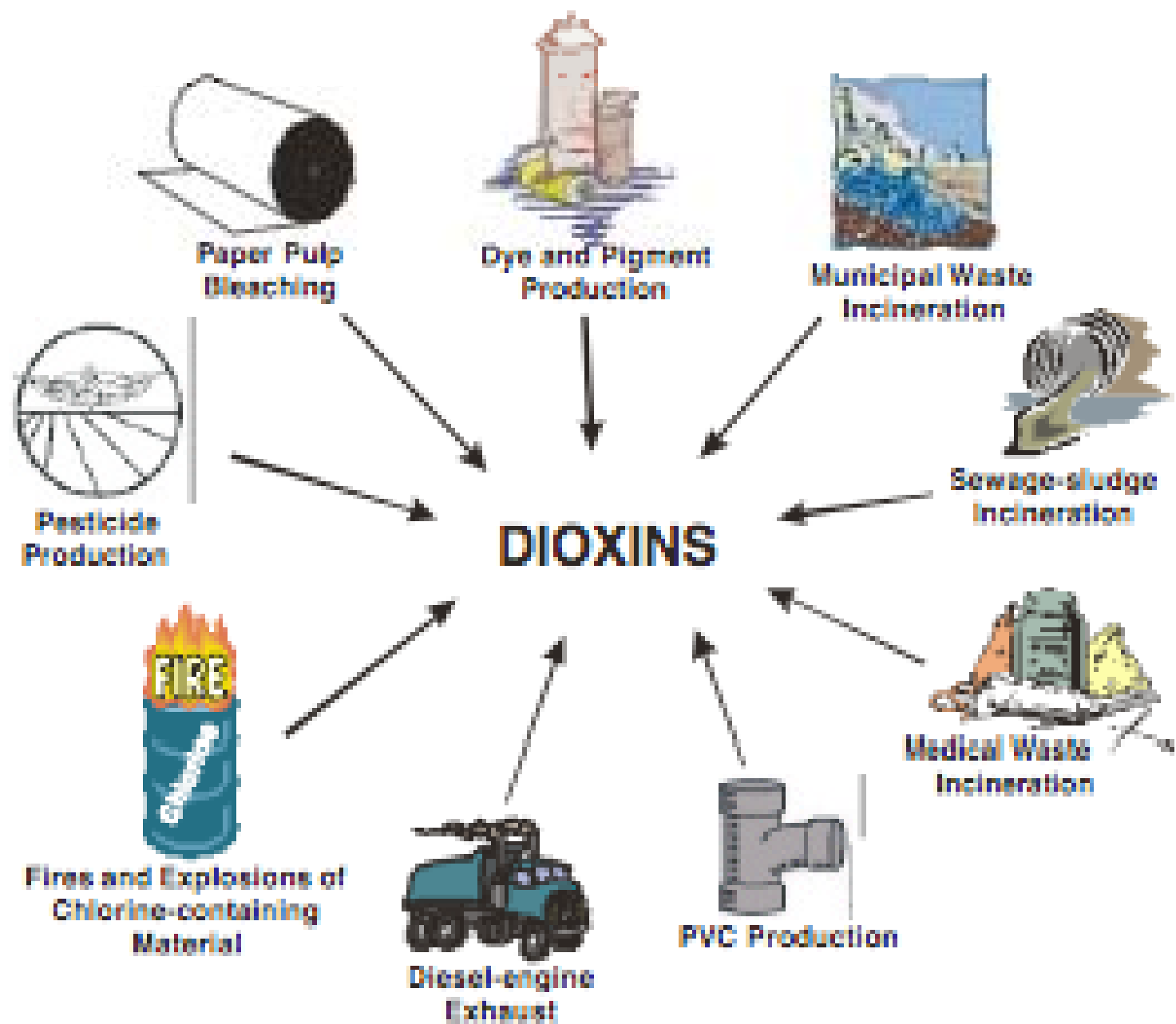



# Example: Dioxins

## How Are They Formed?

Burning materials made with  
polyvinyl chloride:







# Example: Dioxins

## How do we inhale/ingest it?

- Transported by
  - Air
  - Water (bind to sediment and organic matter)
  - Soils
- Bioaccumulate in food chains
  - Highly soluble in fat
- Transported long distances
- Not Biodegradable (persistent)

# Example: Dioxins

## Health Effects

- Cancer
- Skin Rashes
- Liver Damage
- Diabetes
- Changes in Testosterone and Thyroid
- Worsen Your Immune Function
- Birth Defects of Male Reproductive Organs





# What We Don't Know

## Open dump sites are complex

- Many contaminants & many ways people can be exposed
- Lead and Dioxins are only two examples

## Pathways we don't know enough about

- Rainwater runoff from dump sites
- Contaminated soils tracking into homes
- Contents of smoke from open burning
- Animals moving contaminants around (birds, dogs, etc.)





# REMOVE TOXICS

- Pesticides, Petroleum-based Materials
  - Cleaning Supplies (clorox)
  - Hazardous Waste
  - Solvents, Paints
  - Batteries
  - Asbestos
  - Tires
  - Plastics (PVC)
  - Products with Mercury
  - Electronics
  - Treated Wood
- (see “Burning Garbage and Land Disposal in Rural Alaska”)

# Burning Under Best Management Practices

- Don't burn non-combustible waste
- Don't burn hazardous waste
- Don't burn products that will create air toxics (plastics, bleached paper and packaging)
- Burn as far from people as possible
- Burn when prevailing winds are away from village
- Don't burn on ground
- Burn HOT and FAST





# Combustion Process

## Burn HOT

- 250-1200°F waste converted into burnable gases
  - start-up and cool-down
  - smoke produced (most contaminants)
- Effective combustion > 1200°F and mixed w/ oxygen
- > 1800°F = little dioxin formed  
(minimizes air/water pollution, cleaner ash)

# How to Burn Hot

## Don't Overfill Burnbox

- Regular burning schedule
- Easy to unload







# How to Burn Hot

## Keep waste dry

- Clean/dry wood and paper can be stored and used to achieve effective start-up
- Household garbage ~20% water
- Smoke production increases with moisture
- Cover at residences, at transfer stations, at the disposal site

## Keep out non-burnables (rob heat)

- metal
- glass
- moisture (food waste)

# How to Burn Hot



Induce draft / retain heat:

burnbox designed for air to be pulled in under waste

Empty out ash/ash drops below burn area:

reduces smoldering and don't cause unburned waste to catch fire





# Smoke “Reading”

Black Smoke = Extremely Bad

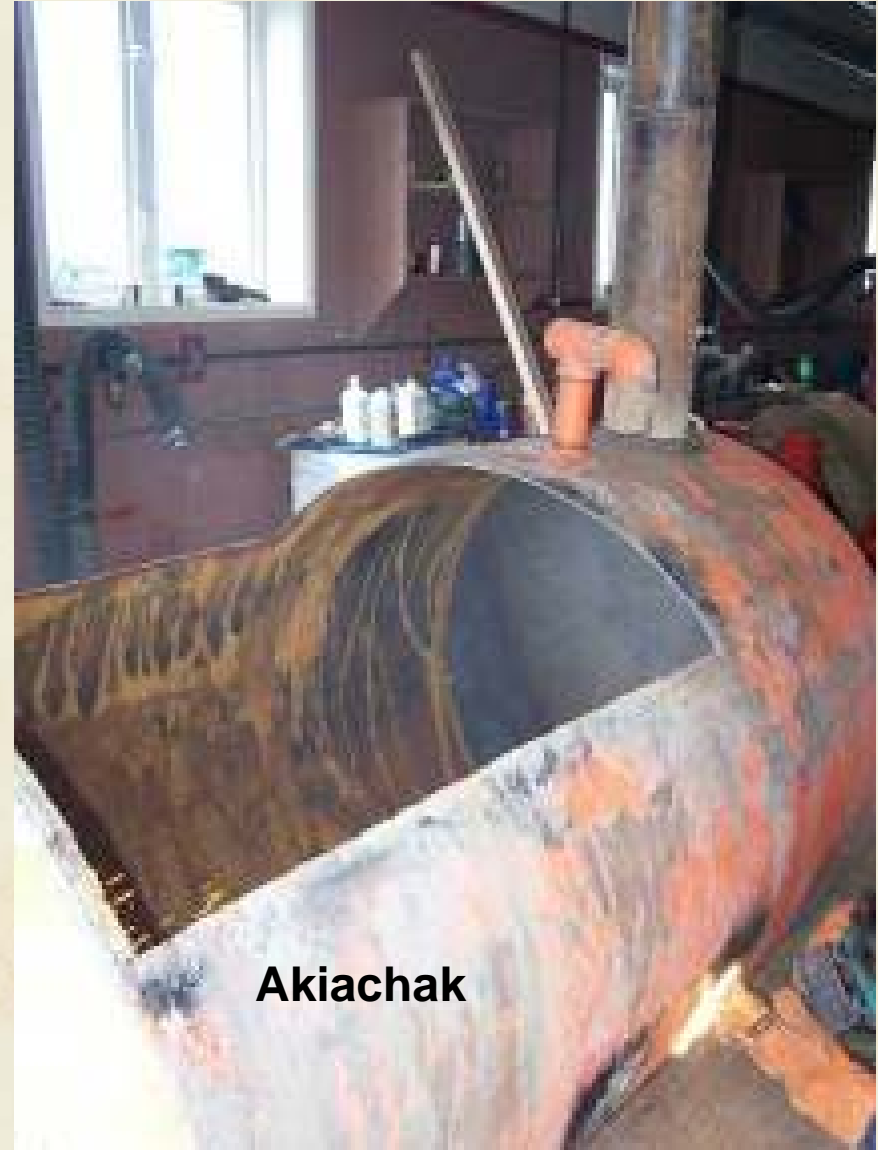
Grey Smoke = Very Bad

White Smoke = Bad

# Burnbox Examples



Photo: ADEC



**Akiachak**



# Burnbox Examples





# Burnbox Examples



# Burnbox Examples



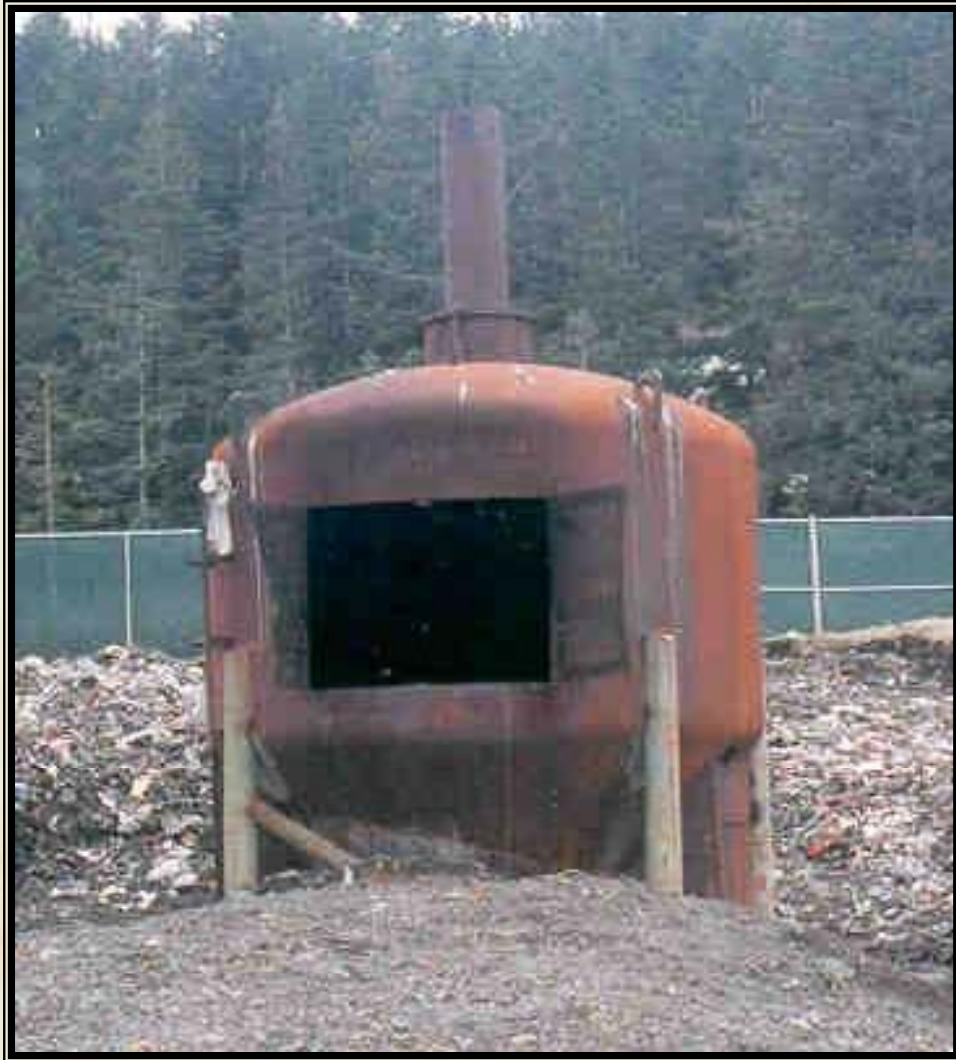


# Burnbox Examples





# Burnbox Example



# Crochet Burner





# Applicable Regulations

Solid Waste Management  
Regulations

18 AAC 60

Air Quality Regulations

18 AAC 50





# What We Covered

Contaminants Released into the Environment

Examples: Lead and Dioxins

Burning Best Management Practices

Burnbox Examples

Regulations

## Questions?