

The Ohio Train Derailment: Impacts and Emerging Lessons

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E Palestine, Feb 4



E Palestine, Feb 6—3 days after derailment; VC burning



Rail car contents that burned (or spilled)

- Vinyl chloride—5 tankers
- Polyvinylchloride—2 cars
- Butyl acrylate
- Ethylhexyl acrylate
- Ethylene glycol monobutyl ether
- Polyethylene
- Petroleum lube oil: spilled did not burn
- Propylene glycol: spilled
- Isobutylene: leaked
- Frozen vegetables
- Semolina flour

Known or probable products of combustion

- Vinyl chloride > phosgene gas; hydrochloric acid
- VC, PVC > dioxins, furans, other chlorinated compounds like chlorinated PAHs
- Acrolein (detected at elevated levels; Texas A&M)

Odor threshold, volatility, and uses of select compounds

- Butyl acrylate—0.035 ppm; volatile; paints, coatings, caulks, adhesives
- Ethylhexyl acrylate—0.00024 ppm; low volatility; paints, coatings, adhesives, plastics
- Ethylene glycol monobutyl ether—0.1 ppm; mod. volatility; paints, coatings, inks, cleaners
- Vinyl chloride—3000 ppm +/-; highly volatile; monomer for PVC production

Toxicity of select compounds; consistent with resident & clean-up worker complaints

- Vinyl chloride: Acute: drowsiness, headache, dizziness; Chronic: memory loss; kidney, liver disease; angiosarcoma liver and hepatocellular carcinoma
- Butyl acrylate: eye, throat, lung irritant; nausea; headache; allergic skin rash
- Ethylhexyl acrylate: drowsiness; skin, eye irritant
- EGME: skin, eye irritant; headache; nausea
- Isobutylene: dizziness; drowsiness; skin, eye irritant

Toxicity of select known/presumed products of combustion and fire suppressants

- Phosgene, HCl: inhalation—severe lung damage
- Dioxins: chloracne (high dose); carcinogenic; immune suppression; CV disease, diabetes; adverse reproductive effects; others
- Acrolein: shortness of breath, lung irritant, nausea, vomiting
- Presumed PFAS in fire suppressants: some are carcinogens; immune suppression; thyroid dysfunction; others



Leslie Run Creek; Feb 25; 22 days after derailment; south of E Palestine

Questions raised; ongoing concerns (so far)

- Validity of air testing and communication by CTEH—a consulting firm hired by Norfolk-Southern; virtually all (500) homes tested TVOCs at <0.1 ppm
- Mixture effects? Timeline of various pathways of exposure; additional products of combustion; long-term health and economic impacts
- Potential groundwater contamination; private well safety



Lessons learned (so far)

- This was preventable
- Public awakening to hazardous materials routinely transported by rail; a window onto a hazardous material economy
- Lived experience of residents conflicts with reassurances; odors and symptoms; variable sensitivity
- Enormous personal, community social & economic costs; ongoing
- Confusing communication: OH EPA, USEPA, CTEH; disorganized responses on EPA hotline; what does “safe” or “no health risks” mean in these circumstances?