

Challenges in the Field

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Lead and Copper in Today's Environment

- **Industry**
- **Solid Waste**
- **Municipal**

A Year Later, Unfiltered Flint Tap Water Is Still Unsafe To Drink



State of Emergency Declared in East Chicago After Lead Contamination



This is how it used to be



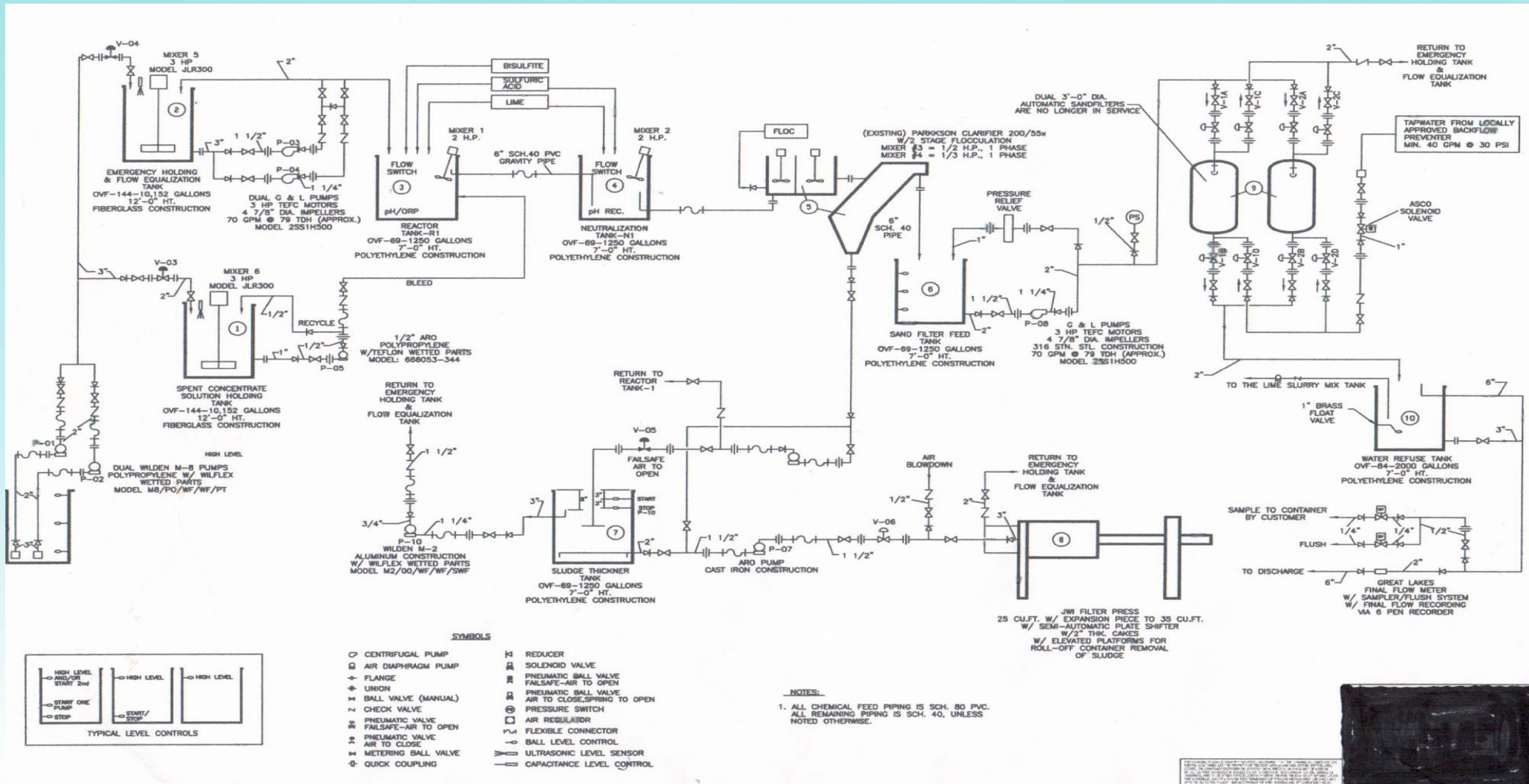
Fact

Industry today has never been better at controlling emissions from their facilities

Waste Water Treatment of Lead

- **Limits are low, yet compliance is achieved**
- **Lead will precipitate out as insoluble:**
 - **Hydroxide**
 - **Carbonate**
 - **Phosphate**
 - **Sulfide**

Waste Water Treatment System



Waste Water Treatment of Copper

- **Copper will precipitate out as insoluble:**
 - **Hydroxide**
 - **Sulfide**

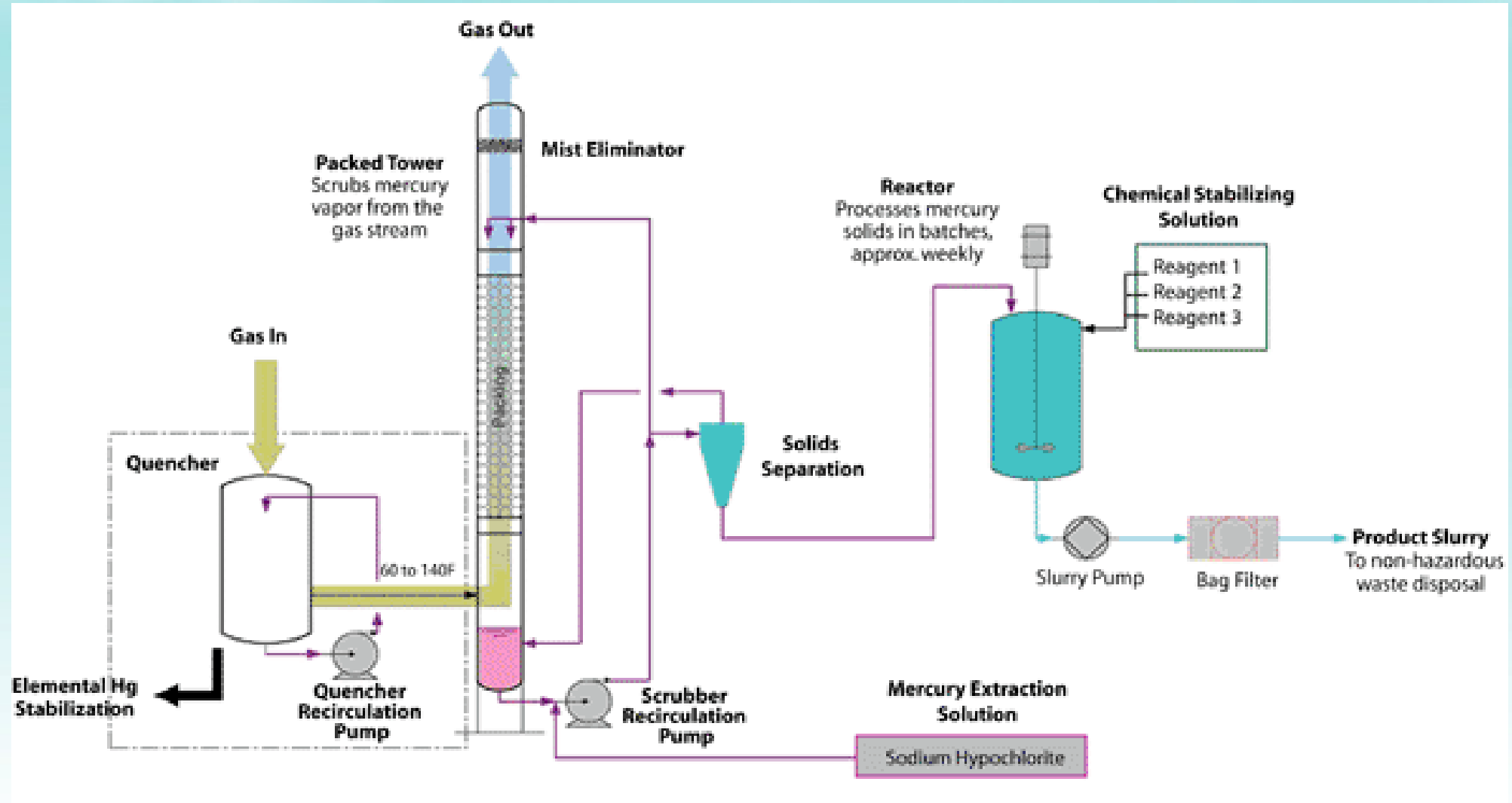
Fact

- **Lead and copper are prone to chelation!**
 - **Soft metals**
 - **EDTA and amines are problems**

Fact

- **Air emissions from facilities that produce lead and copper based products have never been better**

Wet Scrubber Schematic



Baghouse Scrubber



Baghouse Scrubber



Fact

- **Stack testing is more frequent**
- **Scrubbers have never been better**
- **Scrubber water treatment is continuous**

Regulations

- **NESHAP**
- **Local limits**
- **Title V**
- **Corporate limits**

Solid Waste – Lead and Copper

- **RCRA governed**
- **TCLP test needed to confirm hazardous characteristics**
- **Toxic, reactive, corrosive, flammable**

Solid Waste - Lead

- **5 ppm leachable lead and above means the solid waste is hazardous**
- **Stabilize with Terra Bond in order to pass TCLP test**
- **Hazardous or non-hazardous landfill must be used for disposal**

Solid Waste - Lead

- Brass dust can be hazardous
- Paint from your facility can be hazardous
 - Equipment, water tower, outside tanks

Solid Waste - Copper

- **Copper Hydroxide sludge**
- **Copper Sulfide sludge**

Solid Waste - Copper

- **Can be a value – recycle, recover**
- **Can be F006 sludge if not separated from chrome or nickel**

Municipal

- **Lead and copper regulations**
 - **Brass is obsolete**
 - **Limits will get very tight – May 2017**
 - **Potable water plants**

Municipal

- **What does the plant do to lower lead and copper?**
- **What should Flint have done?**

Municipal

- **Adopt an orthophosphate coating process**
 - **Will form a barrier film on interior of pipe**
 - **Can be fed with an LMI style pump**
 - **Fed at the treatment plant**

Municipal

- **Run test daily to verify success**
- **Success is lower lead and copper in water**
- **Adopt a couponing program within city**

Municipal

- **POTW must pass 40 CFR 503**
- **POTW must remove algae – Copper Sulfate**
- **POTW has discharge limits – zero flow creek**

Municipal

- **It is a fact that copper coming to you in city water can be higher than you are allowed to discharge to the POTW or NPDES point of discharge**

Municipal

- **Is copper toxic to aquatic life?**
- **If so, at what concentration and what pH does this occur?**

Summary

- **We have got to have lead**
- **We have got to have copper**
- **We must co-exist with both**
- **Other metals are more prevalent – lithium, arsenic, selenium – Stay tuned**

Questions and Comments

