Zinc
A California Toxic Heavy Metal

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California American Water - Northern Division

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Tank Industry Consultants
Zinc as a Supplement

- Produces energy in your body
- Helps cell metabolism
- Builds DNA and RNA
- Regulates your immune system
- Stimulates smelling, tasting and wound healing
- Reduces the duration and severity of colds
- Protects against cancer
- Decreases allergy or asthma symptoms,
- Fortifies your skin
- Promoted as a good antioxidant
Too Much Zinc

- Can cause vomiting, nausea, loss of appetite.
- Diarrhea, headaches and abdominal cramps, according to NIH.
- Adults should take in no more than 40 mg zinc daily.
- Zinc overdose can lead to kidney failure that will cause death, according to ACS.
Other Symptoms – Too Much Zinc

- Change the way iron works in your body
- Anemia, low levels of "good" HDL cholesterol, according to ACS
- Can cause leukopenia, or a low white blood cell count, according to the National Institutes of Health
- Zinc also reduces your body’s ability to absorb antibiotics
Daily Dose

- Recommended Daily dose is 9 to 11 mg
- Zinc toxicity starts 35 and 40 mg daily
When is a Waste Hazardous?

EPA - A substance that poses a hazard to human health
A waste is considered hazardous when it exhibits one or more of the following characteristics:

- **Ignitable** (Flashpoint <140 °F) - D001
- **Corrosive** (aqueous pH < 2 or > 12.5) - D002
- **Reactive** (normally unstable, undergoes violent changes without detonating, water reactive) - D003
- **Toxic** (exceeding the regulatory limits for contaminants under the TCLP analysis) - D004 through D043
Tank Rehabilitation Project
Zinc or Not

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No - Tank Rehabilitation
2001 – Roof structure in good condition after 16 years.

2011 – More staining at unwelded seams, but negligible rust after 27 years.

Interior: SP-10, 3-coat Epoxy
Environmental Acronyms

- Total Threshold Limit Concentration (TTLC)
- Soluble Threshold Limit Concentration (STLC)
- Waste Extraction Test (WET)
- Toxicity Characteristic Leaching Procedure (TCLP)
- Resource Conservation and Recovery Act (RCRA)
- California Code of Regulations (CCR)
- California Health and Safety Code (HSC)
- Excluded Recyclable Material (ERM)
- Certified Unified Program Agency (CUPA)
TTLC, STLC, and TCLP

**TTLC**  Total Threshold Limit Concentration
Total Analysis

**STLC**  Soluble Threshold Limit Concentration
CA-Specific Leachability Analysis
Aggressive Leachability Test

**TCLP**  Toxicity Characteristic Leaching Procedure
Federal RCRA Leachability Analysis

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# Regulatory Limits

<table>
<thead>
<tr>
<th></th>
<th>STLC (mg/L)</th>
<th>TTLC (mg/Kg-wet wet)</th>
<th>TCLP (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc</td>
<td>250</td>
<td>5000</td>
<td>-----</td>
</tr>
<tr>
<td>Lead</td>
<td>5.0</td>
<td>1000</td>
<td>5.0</td>
</tr>
<tr>
<td>Cadmium</td>
<td>1.0</td>
<td>100</td>
<td>1.0</td>
</tr>
<tr>
<td>Chromium III</td>
<td>5.0</td>
<td>2500</td>
<td>5.0</td>
</tr>
<tr>
<td>Chromium IV</td>
<td>5.0</td>
<td>500</td>
<td>-----</td>
</tr>
</tbody>
</table>

(State)         (State)       (Fed)

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Hazardous or Not?

- If a substance in a waste stream equals or exceeds the TTLC level, it is considered a hazardous waste.
- Results of TTLC are used to determine further analysis. Compare to leachability limits:
  - 10-times rule for STLC (WET test)
- TCLP (federal test)
### Hazardous or Not?

**Limits and Guidance**

<table>
<thead>
<tr>
<th>Substance</th>
<th>TTLC (mg/kg) (Wet Weight)</th>
<th>STLC (mg/L)</th>
<th>Range of TTLC Values for which an STLC must be Done</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>1,000</td>
<td>5</td>
<td>≥ 50 mg/kg</td>
</tr>
<tr>
<td>Zinc</td>
<td>5,000</td>
<td>250</td>
<td>≥ 2,500 mg/kg</td>
</tr>
</tbody>
</table>
Develop a Waste Determination Plan

1. Not Hazardous
2. It could be Hazardous
3. Hazardous
4. Hazardous, but alternative disposal method, i.e., “Excluded Recyclable Material,” thus reclassified, if non RCRA.
5. Hazardous, but abrasive selection can render non-hazardous (not for zinc)
Project Team Approach

- Owner
- Consultant
- Manufactures Rep
- Contractor
- Subcontractors
- Recycling Facility
- Testing Lab

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Project Approach

- Detailed Evaluation of the Tank
- Structural, Safety, Sanitary Repairs?
- Type of Coating – Low VOC
- Overcoat or not
- Containment
- Characterize your Waste
- Develop a Waste Disposal Plan
Obtain a Paint Chip Sample

- Make sure sample is representative, i.e., overcoat
- Sample interior and exterior of tanks
- Note: It is not yet representative of the waste stream
- Recommended EPA Test Method 6010B/7000A
T.I.C. H0-78
LEG #4
W.T. 365 in.
MILES = 11 - 14
H078 LEG #4
12/6/90
# Test Results

**Sample Composition:** Grab  
**Collection Date:** 06/11/15  
**Collected By:** Client  
**Receipt Date:** 06/22/15 14:00

### Zinc, ICP-AES

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Result</th>
<th>Units</th>
<th>Quant. Limit</th>
<th>CAS #</th>
<th>Analysis Date</th>
<th>By</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc, Zn</td>
<td>4010</td>
<td>mg/kg</td>
<td>10.00</td>
<td>7440-66-6</td>
<td>06/24/15</td>
<td>amyers</td>
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</tbody>
</table>

### Lead, ICP-AES

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Result</th>
<th>Units</th>
<th>Quant. Limit</th>
<th>CAS #</th>
<th>Analysis Date</th>
<th>By</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead, Pb</td>
<td>&lt; 40.0</td>
<td>mg/kg</td>
<td>40.0</td>
<td>7439-92-1</td>
<td>06/24/15</td>
<td>amyers</td>
</tr>
</tbody>
</table>

### Cadmium, ICP-AES

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Result</th>
<th>Units</th>
<th>Quant. Limit</th>
<th>CAS #</th>
<th>Analysis Date</th>
<th>By</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium, Cd</td>
<td>&lt; 10.00</td>
<td>mg/kg</td>
<td>10.00</td>
<td>7440-43-9</td>
<td>06/24/15</td>
<td>amyers</td>
</tr>
</tbody>
</table>
Sampling/Monitoring Options

- Soil sampling only on site of Owner
- Air monitoring as needed
- Preliminary testing during tank evaluation to determine presence of toxic heavy metals
- Spent cleaning debris determined to be hazardous then define: storage, labeling, transport, manifest, accidental release and disposal
New Tank Construction
Zinc as a primer

- Overall excellent primer on steel tanks
- CA Regulated Toxic Heavy Metal
- Air
- Water
- Soil
- Waste stream
Regulations Impact New Tanks

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Environmental Controls

- Environmental Stewardship
- Risk Control
- Financially Responsible
California Hazardous Waste

- In the Title 22 CCR, a waste is defined as any **discarded** material (in any form, such as solid, liquid, semi-solid, or contained gas) that is not excluded by Section 66261.4(a), 66261.4(e), or 25143.2(b) or 25143.2(d).
Recycling HSC 25143.2

- Has many provisions so read carefully

- (A) The material is a product that has been processed from a hazardous waste, or has been handled, **at a facility authorized by the department** pursuant to the facility permit requirements of Article … to process or handle the material, if the product meets the following conditions…

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Documentation

- Proper Labeling (Excluded Recyclable Material)
- Statement of Waste Designation
- Non-RCRA ERM (25143.2)
- CCR Title 22: Chapter 11 (66261.2-66261.9), Hazardous Wastes
- Manifest Record Keeping
- 3 years, not eternity
KLEEN INDUSTRIAL SERVICES

2015

Certificate of Recycling

TO:
Construction

For:
Recycling 40.69 Tons of Spent Abrasives as Excluded Recyclable Material
Under HSC 25143.2 for Alternate Raw Materials Program
January 15, 2015 under
Customer Project Number 140407,
KIS Job No SFO-14-225.

[Signature]

Frank L. O’Neill, Director of Operations
EPA - Define Hazardous Waste

- EPA released on January 13, 2015, New Definition of “Solid Waste”
- Beware of sham recyclers
- The purpose of these revisions is to ensure that the hazardous secondary materials recycling regulations, as implemented, encourage reclamation...
Questions or Comments?

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