Regulations & Costs of Disposal of Wastes Generated from New Water Treatment Facilities & POE/POU Units

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Dr. Karl Longley, PE, BCEE
Chair, Central Valley Regional Water Quality Board

CV Regional Water Quality Control Board Mission

To preserve, enhance, and restore the quality of California's water resources and drinking water for the protection of the:

- **environment,**
- **public health, and**
- **all beneficial uses,**
- **and to ensure proper water resource allocation and efficient use, for the benefit of present and future generations.**

The above mission is carried out by:

- **The SWRCB allocating rights to the use of surface water and, with the RWQCBs, protecting surface, ground, and coastal waters throughout the state.**
- **The RWQCBs issuing permits which govern and restrict the amount of pollutants that can be discharged into the ground or a water body.**

Land Disposal Program Overview

- The regulations applicable to these discharges are found in Title 27, for nonhazardous wastes, or Chapter 15 of Title 23, for hazardous wastes, of the California Code of Regulations.
- These regulations have both prescriptive and performance standards for waste containment, monitoring, and closure.
- The requirements are implemented through the adoption of Waste Discharge Requirements for the disposal facilities.

Land Disposal Program Overview

Regulates the discharge to land of certain solid and liquid wastes including:

- municipal solid waste (MSW),
- hazardous wastes,
- designated wastes,
- and nonhazardous and inert solid wastes.

In general, these wastes cannot be discharged directly to the ground surface without impacting groundwater or surface water, and therefore must be contained to isolate them from the environment. Special requirements apply IAW Title 40, Chapter 1, Subchapter 1, Part 268 and California HSC requirements.

What is a RCRA hazardous waste?

- EPA defines solid waste as garbage, refuse, sludge, or other discarded material (including solids, semisolids, liquids, and contained gaseous materials).
- If a waste is considered solid waste, it must then be determined if it is hazardous waste (§262.11).
- Characteristics of Hazardous Waste
  - ✓ Ignitability (§ 261.21)
  - ✓ Corrosivity (§ 261.22)
  - ✓ Reactivity (§ 261.23)
  - ✓ Toxicity (§ 261.24)
- The California Health & Safety Code additionally designates a large number of constituents in both liquid & solid media.

RCRA 8 Metals

Heavy Metal	EPA Drinking *Water Stds,* mg/L	*EPA Land Disposal Trtmnt Stds, Title 40, Ch 1,* Subch 1, Part 268 mg/L .
Arsenic	0.01	5.0 and meet §268 stds
Barium	2.0	1.2 and meet §268 stds
Cadmium	0.005	0.69 and meet §268 stds
Chromium (Total)	0.1	0.60 and meet §268 stds
Lead (action level)	0.015	0.69 and meet §268 stds
Mercury (inorganic)	0.002	0.015 TCLP and meet §268 stds
Selenium	0.05	0.82 and meet §268 stds
Silver	None	0.43 and meet §268 stds

Constituents of Concern in San Joaquin Valley
(not a complete listing)

- Inorganics such as Arsenic, Nitrate, Chromium-6, etc.
- Organic pesticides & solvents such as 1,2,3-DCP, DBCP, Pyrethroids, TCE, PERC, etc.
- Radioactive elements such as Radon and Uranium

Human Right to Water

Every human being has the right to safe, clean, affordable, and accessible water

adequate for human consumption, cooking, and sanitary purposes.

Selection of Source Water

- In general, every effort should be made to select a source water of the best quality available preferably avoiding source water and treatment processes that result in the production of hazardous wastes.
- Selection of source water and the preferable treatment process(es) must be made through a competent and thorough engineering and cost and analyses.
- Where source water treatment results in the production of a RCRA considerable extra costs can be anticipated.

Treatment Process Selection

1. Thorough & Informed Engineering & Cost Analysis of Alternatives is Essential

2. Considerations
   - TMF Capability
   - Operation & Maintenance
   - Good Water Source
   - Fate of Residuals Stream (Is It A Hazardous Waste?)
   - Avoidance of Hazardous Waste Concentrations in Residual Stream?
   - Water Quality Requirements

Treatment Process Selection

3. Alternatives

- Blending
- Consolidating
- Connecting to Larger System
- Development of Regional System
- Use of POE/POU Devices (Oversight by Mgmt Entity Desired)

Residual Disposal Cost Factors

- Hazardous or Non-Hazardous Waste?
  - ✓ Concentration
  - ✓ Quantity
- Mixture and, if so, Hazardous Classification of Each Component?
- Solid, Slurry or Liquid?
- Transportation

Residual Disposal Cost Factors

- **Ohio EPA Study (**http://web.epa.ohio.gov/opp/planning/fact72.pdf **)**
  - ✓ 1990's Data
  - ✓ $200/55 gallon drum of Liquid Waste
  - ✓ $60/ton of Solid Waste
- Small Generators Generating Sufficient Waste for Pickup
- Disposal Costs Only About 15% of Total
- Other Costs
  - ✓ Labor
  - ✓ Sample Collection
  - ✓ Paper Work
  - ✓ Consulting
  - ✓ Other

Costs tend to be site specific due to numerous factors

COST EVALUATION OF POINT-OF-USE AND POINT-OF-ENTRY TREATMENT UNITS FOR SMALL SYSTEMS: COST ESTIMATING TOOL AND USER GUIDE

Office of Water (4607M) EPA 815-B-07-001 April 2007 www.epa.gov/safewater

Exhibit 2-1. Cost Estimates Generated by the POU/POE Model

Item	Description
Capital Costs[1]	
Treatment device purchase	Cost to purchase treatment devices (cost per device x number of devices)
Treatment device installation	Labor costs for time to schedule and install treatment units (hours per device x number of devices x wage rate)
Educational materials	Labor costs and material costs to prepare and distribute materials that explain the treatment program to customers (hours or items per task x task frequency x wage rate or unit cost)
Initial water quality monitoring	Labor, shipping, and analysis costs for the initial sample taken during the first year following equipment installation (hours or costs per sample x number of samples x wage rate)
Indirect capital costs	Costs for permitting, pilot study, engineering, legal, and contingency (either cost multipliers or fixed dollar values)
O&M Costs[2]	
Device maintenance	Labor time and material costs to replace treatment device parts such as filters (labor or material costs per replacement x replacements per year)
Educational materials	Labor time and material costs to update and distribute materials that explain the treatment program to customers (hours or items per task x annual task frequency)
Annual water quality monitoring	Labor time, shipping, and analysis costs for the annual samples taken to monitor water quality (hours or costs per sample x number of samples per year)

1. Capital costs occur in the initial year, but do not occur again until complete replacement of the treatment units.

2. O&M costs occur annually and include costs for regular equipment replacement such as filter cartridges.

Use of POU Devices

POU Pros

- Typically small and easy to install on a countertop or under sink
- Cost effective to maintain
- Generally produces high quality water

POU Cons

- Can only be installed for one tap (typically kitchen)
- Regular maintenance required – exchange materials and adsorbents exhaustion is function of water quality
- Safe disposal of exchange materials and adsorbents may be an issue for individual users

QUESTIONS?