



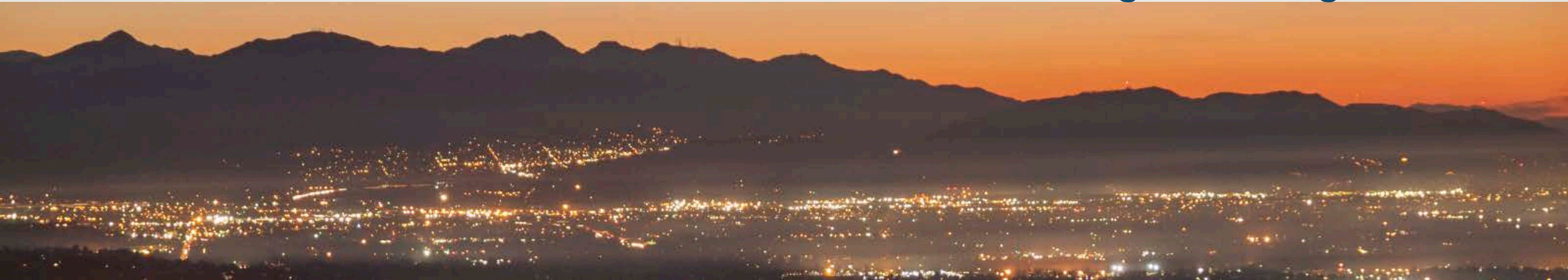
Department of
Toxic Substances
Control

Informational Seminar for Proposed Photovoltaic Modules Regulations

MARCH 25, 2019

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DTSC Policy and Program Support Branch
Hazardous Waste Management Program



Introduction

- Who we are
 - DTSC's hazardous waste management program (HWMP)
- Why we are here
 - DTSC's universal waste management standards
 - Photovoltaic modules as universal waste rulemaking
 - Photovoltaic modules / PV modules / Solar panels

Seminar Topics

- DTSC's oversight of universal waste management
- Proposed PV module regulation
- Rulemaking process projected timeline

Hazardous Waste (HW)

A waste is a hazardous waste if it

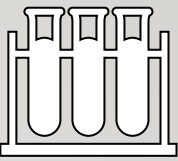
- is listed as a hazardous waste
- exhibits characteristic of a hazardous waste
 - Toxic
 - Reactive
 - Ignitable
 - Corrosive



Hazardous Waste

Two Sets of Hazardous Waste Classification		
	FEDERAL (U.S. EPA)	CALIFORNIA (DTSC)
LAW	Resource Conservation and Recovery Act (RCRA)	Health and Safety Code – Hazardous Waste Control Law
REGULATIONS	Code of Federal Regulations (CFR) Title 40	California Code of Regulations (CCR) Title 22

Generators are responsible for determining whether a waste is hazardous and to manage the waste according to the applicable management standards.



Hazardous Waste Testing for Toxicity

<ul style="list-style-type: none">FEDERAL	<ul style="list-style-type: none">CALIFORNIA
<ul style="list-style-type: none">Toxicity Characteristic Leaching Procedure (TCLP)	<ul style="list-style-type: none">Total Threshold Limit Concentrations (TTLC)Waste Extraction Test (WET)<ul style="list-style-type: none">Soluble Threshold Limit Concentrations (STLC)

What is Universal Waste (UW)?

- Hazardous wastes managed under an alternative management standard
- Universal waste criteria:
 - Hazardous
 - Low-risk
 - Generated by a wide variety of generators
 - Generated sporadically by a large number of generators



Benefits of Universal Waste Management

- Self implementing authorization
- Streamline UW management for diverse sets of generators
- Divert from solid waste landfills to proper treatment, recycling, or disposal
- Improve implementation of and comply with hazardous waste regulations program
- Conserve resources



California Universal Waste Rule

- Applies to
 - Handlers
 - Transporters
 - Destination facilities (Treatment, Recycle, or Disposal)
- **Categorizing as universal waste allows generators to manage the waste as universal waste without testing**

California Universal Waste Rule

- Presently includes
 - Batteries
 - Electronic devices
 - Mercury-containing equipment
 - Lamps
 - Cathode ray tubes (CRT) and CRT glass
 - Aerosol cans

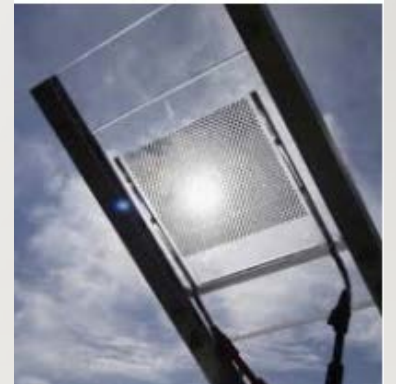


PV Modules as Universal Waste

- Use and demand for alternative energy sources are expanding in California
- California promotes renewable energy resources
 - Renewables Portfolio Standard
 - California Energy Commission's building standards
- PV module wastes generated now and more expected in the future
- PV module waste management - support and expectation

Photovoltaic Module

- A device consisting of photovoltaic cells designed to convert solar radiation into electrical energy.
- Includes parts - metal frames, junction boxes, batteries, inverters, wires, and cables
- Various technology (XSi, thin-film)
- Does not include concentrated solar power systems (glass mirrors)



How are PV Modules Hazardous?

- Heavy metals (Example: cadmium, lead, arsenic)
- Published literature test results
 - RCRA and non-RCRA
 - Metals above toxicity threshold concentrations
 - Not all PV modules wastes are tested hazardous
- Generators are responsible for the hazardous waste determination
- Universal waste rule applies to wastes that are hazardous
- Categorizing PV modules allows generators to manage the waste as universal waste without testing



A break?

PV Modules Draft proposed regulations

Chapter 10

Hazardous Waste Management System-General

PV Modules Draft proposed regulations

§ 66260.10 Definitions

- Photovoltaic cell / PV cell / solar cell
- Photovoltaic module / PV module / Photovoltaic panel / Solar panel

PV Modules Draft proposed regulations

Chapter 11 Identification and Listing of Hazardous Waste

PV Modules Draft proposed regulations § 66261.9 Requirements for Universal Waste

- Describes what hazardous wastes are
- Exempts PV modules from fully regulated hazardous waste requirements
- Allows PV modules to be managed as universal waste under chapter 23

PV Modules Draft proposed regulations

Chapter 23

Standards for Universal Waste Management

Article 1. General

§ 66273.1 Scope

- Subjects PV modules to universal waste regulations
- Establishes chapter 23 as an alternative set of management standards in lieu of hazardous waste management standards

Article 1. General

§ 66273.7.1 Applicability — PV modules

PV modules that are covered	PV modules are <u>not</u> covered
All PV modules that meet the definition of a universal waste	<ul style="list-style-type: none">• Not yet waste• Does not exhibit hazardous characteristic• Exhibits hazardous characteristic other than toxicity• Destined for recycling by being used in a manner constituting disposal• Destined for disposal as HW• That are managed as HW• No longer a waste• Integrated into electronic devices (Example: calculators)

Article 1 General

§ 66273.9 Definitions

- Photovoltaic cell / PV cell / solar cell
- Photovoltaic module / PV module / Photovoltaic panel / Solar panel



Article 3 Handlers

§ 66273.31 Prohibitions

- Universal waste PV modules handler is
 - Prohibited from disposing of PV module waste
 - may send the waste to a destination facility
 - Prohibited from diluting or treating PV modules except
 - responding to accidental releases
 - conducting treatment as specified in chapter 23



Article 3 Handlers

§ 66273.32(e) Notification

- For handlers who accept and accumulate PV modules
- Notify DTSC 30 days before accepting the wastes
- Notify for each location
- Submit in writing

- | | | |
|--------------------------|--------------------------|---------------------|
| • Name | • Contact's name | • PV module types |
| • ID number | • Contact's phone number | • PV modules source |
| • Handler's phone number | • Contact's email | • 5000 kg |
| • Mailing address | | |



Article 3 Handlers

§ 66273.32(f) Annual Reporting

- For handlers who generate more than 5000 kg or accept more than 100 kg of waste PV modules
- Submit by February 1 of the following year
- Submit in writing

- | | | |
|--------------------------|--------------------------|-----------------------------------|
| • Name | • Contact's name | • Shipped to info |
| • ID number | • Contact's phone number | • Shipment quantity |
| • Handler's phone number | • Contact's email | • Shipment location's description |
| • Mailing address | • PV module types | |
| | • PV modules quantity | |

Article 3 Handlers

§ 66273.33.6

UW Management Requirements for PV Modules

- A universal waste handler complies with
 - Applicability
 - Prohibition on disposal
 - Notification and reporting
 - Label/Marking
 - Accumulation time
 - Personal training
 - Response to prevent releases
 - Offsite shipments
 - Tracking shipments
 - Authorized treatments

Article 3 Handlers

§ 66273.34 Labeling/Marking

- Label each PV module or containers holding PV modules
- “Universal Waste-PV module(s)”
- Accumulation start date

**UNIVERSAL
WASTE**

CONTENTS _____
Universal Waste - PV modules

ACCUMULATION START DATE 5/4/2019

SHIPPER BB-8

ADDRESS D'Qar

CITY, STATE, ZIP Outer Rim Planet



Article 3 Handlers

§ 66273.39 Tracking Universal Waste Shipments

- Handler shall keep record of each shipment received and sent
 - Name and address of sender/receiver
 - Quantity
 - Date of receipt/departure

Article 5 Transporters

§ 66273.51 Prohibitions

- Prohibited from transporting more than 100 kg of PV modules unless they are contained to prevent releases



Article 7. Treatment

§ 66273.70 Applicability

- Self authorized for certain treatment activities
 - Removal activities (Level I)
 - Dismantling activities (Level II)
 - Treatment/processing activities (Level III)



Article 7. Treatment

§ 66273.71 Authorization for Removal Activities (Level I)

- Self authorized for certain removal activities

Example: Remove battery or inverter

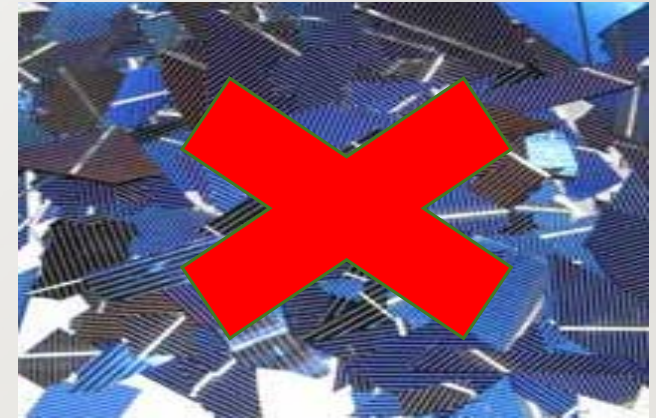
- Remove as prescribed in the operating manual
- Exempt from § 66273.74 - 66273.77

OPERATING
MANUAL

Article 7. Treatment

§ 66273.72 Authorization for Disassembling/Draining Activities (Level II)

- Dismantle, remove, or segregate components without breaking the glass
- Recycle “scrap metal”
- Comply with notification/reporting/recordkeeping requirements specific to treatment activities

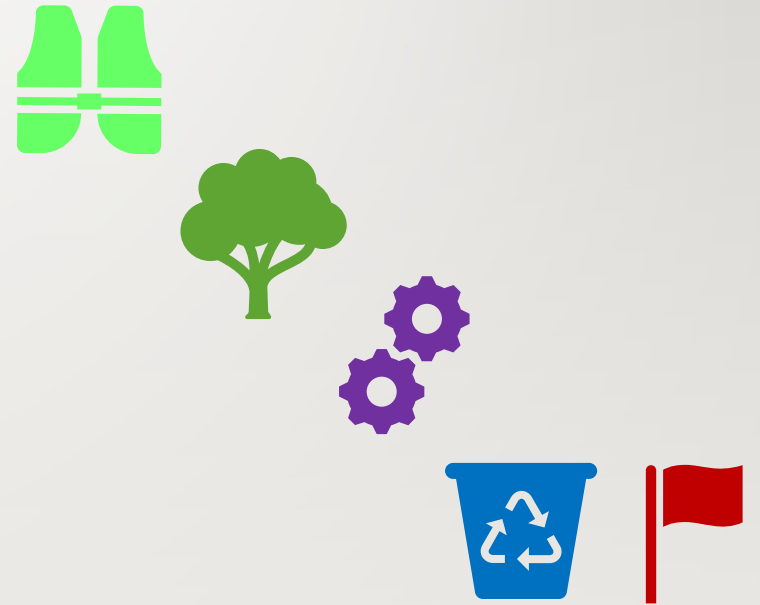


Level II continued...

Article 7. Treatment

§ 66273.72 Authorization for Disassembling/Draining Activities (Level II - Compliance)

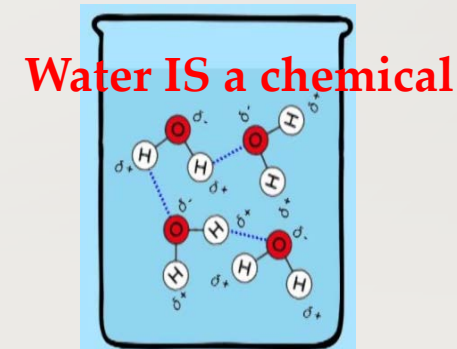
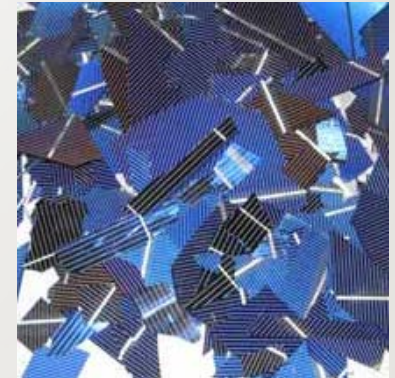
- Protect the person managing the activities
- Prevent release to the environment
- Send for further treatment
- Recycle or dispose of at a HW disposal facility



Article 7. Treatment

§ 66273.73 Authorization for Treatment (Processing) Activities (Level III – Activities)

- Treatments allowed
 - Treat by intentionally breaking PV modules
 - Removal and dismantling activities
 - Physical treatment (Example: cutting, breaking)
 - Physical separation (Example: color, density)
- Treatments NOT allowed under chapter 23
 - Use of chemicals
 - Use of heat



Level III continued...

Article 7. Treatment

§ 66273.73 Authorization for Treatment (Processing) Activities (Level III – Compliance)

- Comply with notification/reporting/record keeping requirements
- Comply with safety standards
- Comply with closure plan and financial assurance requirements
- Hazardous waste disposal



Article 7. Treatment

§ 66273.74 Notification

- Notification for authorized treatment:
 - Apply to any handler that dismantles or processes PV modules
 - Submit in writing
 - Notify DTSC 30 days before treating PV modules

- | | | |
|--------------------------|--------------------------|---------------------|
| • Name | • Contact's name | • Treatment methods |
| • ID number | • Contact's phone number | • After treatment |
| • Handler's phone number | • Contact's email | |
| • Mailing address | | |



Article 7. Treatment

§ 66273.74 Notification

- Notification for disposal:
 - Apply to any handler that dismantles or processes PV modules
 - Submit in writing
 - Notify DTSC 15 days before the disposal
- ID number of the handler's facility
- Treatment methods used to generate PV modules to be disposed of
- Name of the HW disposal facility
- ID number of the HW disposal facility
- Address of the HW disposal facility



Article 7. Treatment

§ 66273.74 Annual Reporting

- Any handler that dismantles or processes PV modules
- By February 1 of the following year of treating PV modules
- In writing

- | | | |
|-----------------------------|---------------------------------|---|
| • Handler's name | • Contact's name | • Shipped to info (Name, address, phone number) |
| • Handler's phone number | • Contact's phone number | • Shipment quantity |
| • Handler's mailing address | • Contact's email | |
| • Facility's ID number | • Treatment methods | |
| • Days facility operated | • Total quantity of PVM treated | |



Article 7. Treatment

§ 66273.74 Recordkeeping

- Maintain onsite at handler's facility a copy of
 - notification
 - most recent annual report submitted to DTSC
 - other relevant permits as required
- Must be available onsite upon request
- Send to DTSC by certified mail upon written request



Article 7. Treatment

§ 66273.75 Treatment (Processing) Standards

- Apply to handlers that process PV modules:
 - Only perform authorized treatments
 - Do not accept HW PV modules for treatment
 - Contain residuals and clean up immediately
 - Comply with worker safety requirements
 - Comply with local zoning requirements



Article 7. Treatment

§ 66273.76 Closure Plan and Financial Requirements

- Apply to handlers that process PV modules
- Demonstrate financial responsibility
- Notify DTSC 30 days before treating PV modules
- Make annual adjustment or revise
- Keep the latest closure cost estimate at the facility



Article 7. Treatment

§ 66273.77

Closure of Universal Waste Treatment Facilities

- Notify DTSC in writing if the treatment facility is closing
- Include
 - Date of the last day for treatment activities
 - Date of the last day for handling activities
 - Date of closure activities completion
- Submit to DTSC within 30 calendar days of last treatment activities

PV Modules Rulemaking Timeline

Prepare
proposed
rulemaking
package for
public notice
(done)

Submit
package to
OAL

45-day
comment
period

Comments
review 1

Comments
review 2

March '19

Info
seminar

April '19

April '19

Initial
rulemaking
public notice

June '19

Public
Hearing

July '19

August '19

Additional
15-day
public
comment if
needed

Sept. '19

Oct. '19

Prepare
final
package

Comment period begins.

Contact Information and Web Links

- PVModules@dtsc.ca.gov
- Chosu Khin
(916)324-2428
Chosu.Khin@dtsc.ca.gov

- Web links:

<https://www.dtsc.ca.gov/HazardousWaste/PVRegs.cfm>

<https://www.dtsc.ca.gov/LawsRegsPolicies/Regs/Photovoltaic-PV-Modules-Universal-Waste-Management.cfm>

<https://dtsc.ca.gov/ContactDTSC/ELists.cfm>

Thank You