Informational Seminar for Proposed Photovoltaic Modules Regulations

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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

<table>
<thead>
<tr>
<th></th>
<th>FEDERAL (U.S. EPA)</th>
<th>CALIFORNIA (DTSC)</th>
</tr>
</thead>
</table>
| 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

<table>
<thead>
<tr>
<th><strong>FEDERAL</strong></th>
<th><strong>CALIFORNIA</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Toxicty Characteristic Leaching Procedure (TCLP)</td>
<td>• Total Threshold Limit Concentrations (TTLC)</td>
</tr>
<tr>
<td></td>
<td>• Waste Extraction Test (WET)</td>
</tr>
<tr>
<td></td>
<td>- Soluble Threshold Limit Concentrations (STLC)</td>
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</table>
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
  o RCRA and non-RCRA
  o Metals above toxicity threshold concentrations
  o 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**

<table>
<thead>
<tr>
<th>PV modules that are covered</th>
<th>PV modules are not covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>All PV modules that meet the definition of a universal waste</td>
<td>• Not yet waste</td>
</tr>
<tr>
<td></td>
<td>• Does not exhibit hazardous characteristic</td>
</tr>
<tr>
<td></td>
<td>• Exhibits hazardous characteristic other than toxicity</td>
</tr>
<tr>
<td></td>
<td>• Destined for recycling by being used in a manner constituting disposal</td>
</tr>
<tr>
<td></td>
<td>• Destined for disposal as HW</td>
</tr>
<tr>
<td></td>
<td>• That are managed as HW</td>
</tr>
<tr>
<td></td>
<td>• No longer a waste</td>
</tr>
<tr>
<td></td>
<td>• Integrated into electronic devices (Example: calculators)</td>
</tr>
</tbody>
</table>
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
- ID number
- Handler’s phone number
- Mailing address
- Contact’s name
- Contact’s phone number
- Contact’s email
- PV module types
- PV modules source
- 5000 kg
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
- ID number
- Handler’s phone number
- Mailing address
- Contact’s name
- Contact’s phone number
- Contact’s email
- PV module types
- PV modules quantity
- Shipped to info
- Shipment quantity
- Shipment location’s description
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
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
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
  o Treat by intentionally breaking PV modules
  o Removal and dismantling activities
  o Physical treatment (Example: cutting, breaking)
  o Physical separation (Example: color, density)

• Treatments NOT allowed under chapter 23
  o Use of chemicals
  o Use of heat
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
- ID number
- Handler’s phone number
- Mailing address

- Contact’s name
- Contact’s phone number
- Contact’s email

- Treatment methods
- After treatment
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
- Handler’s phone number
- Handler’s mailing address
- Facility’s ID number
- Days facility operated
- Contact’s name
- Contact’s phone number
- Contact’s email
- Treatment methods
- Total quantity of PVM treated
- Shipped to info (Name, address, phone number)
- Shipment quantity
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:
  o Only perform authorized treatments
  o Do not accept HW PV modules for treatment
  o Contain residuals and clean up immediately
  o Comply with worker safety requirements
  o 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

April ‘19

March ‘19

Info seminar

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