



**Jared Blumenfeld**  
Secretary for  
Environmental Protection



## Department of Toxic Substances Control

Meredith Williams, Ph.D.  
Acting Director  
1001 "I" Street  
P.O. Box 806  
Sacramento, California 95812-0806



**Gavin Newsom**  
Governor

**TITLE 22**  
**45-DAY PUBLIC NOTICE AND COMMENT PERIOD**  
**Photovoltaic Modules (PV Modules) – Universal Waste Management**  
**Department Reference Number: R-2017-04**  
**Office of Administrative Law Notice File Number: Z-2019-0409-04**

**NOTICE IS HEREBY GIVEN** that the Department of Toxic Substances Control (DTSC) proposes to adopt amended California Code of Regulations, Title 22, Division 4.5, Chapters 10, 11, and 23, sections 66260.10, 66261.9, 66273.1, 66273.7.1, 66273.9, 66273.31, 66273.32, 66273.33.6, 66273.34, 66273.39, 66273.51, 66273.70, 66273.71, 66273.72, 66273.73, 66273.74, 66273.75, 66273.76, and 66273.77.

### **PUBLIC HEARING**

DTSC will hold one public hearing on the proposed regulation at the following time and location:

**DATE:** June 10, 2019  
**TIME:** 1:00 PM - 3:00 PM (PDT)  
**LOCATION:** Sacramento Regional Office  
Board Rooms 1 and 2  
8800 Cal Center Drive, Sacramento, California 95826

At the time and location listed above, any person(s) may present statements or arguments orally or in writing relevant to this proposal. The public hearing will convene at 1:00 PM and will remain open until 3:00 PM or until no attendees present testimony, whichever occurs first.

Representatives of DTSC will preside at the hearing. DTSC requests persons who wish to speak to please register before the hearing. Prehearing registration is conducted at the location of the hearing from 12:00 PM PDT until the hearing commences. Registered persons will be heard in the order of their registration. Anyone else wishing to speak at the hearing will have an opportunity after all registered persons have been heard.

All visitors are required to sign in prior to attending any meeting at the security desk, located just inside the building's public entrance. Please allow adequate time to sign in and receive a visitor badge before the public hearing begins.

### **NOTICE PERTAINING TO ACCESSIBILITY & REASONABLE ACCOMMODATION**

All documents related to this regulation can be made available in alternate format (i.e., Braille, large print, etc.) or in another language, as requested, in accordance with state and federal law. Further, to ensure the public has equal access to all available services and information, DTSC will provide disability-related reasonable accommodations and/or translator/interpreter needs, upon request. For assistance, please contact **Tara Barnes** at (916) 327-4500 or [Tara.Barnes@dtsc.ca.gov](mailto:Tara.Barnes@dtsc.ca.gov) as soon as possible, but no later than 10 business days prior to

the scheduled hearing. TTY/TDD/Speech-to-Speech users may dial 7-1-1 for the California Relay Service.

## **WRITTEN COMMENT PERIOD**

Any interested person(s) or their authorized representative(s) may submit written comments relevant to the proposed regulatory action to DTSC in either electronic or hard-copy formats.

Written comments may be submitted electronically through the DTSC regulations email address at [regs@dtsc.ca.gov](mailto:regs@dtsc.ca.gov); or please direct hard-copy written comments to:

Ms. Jackie Buttle, Regulations Coordinator  
Department of Toxic Substances Control  
P.O. Box 806  
Sacramento, California 95812-0806

The written comment period will close at 11:59 PM PDT on June 10, 2019. Only comments received at the DTSC office by that date and time will be considered.

## **AUTHORITY AND REFERENCE**

### **Authority**

These regulations are being proposed under the following authorities:

Health and Safety Code section **25141**. This section grants DTSC authority to adopt regulations to develop criteria and guidelines for the identification of hazardous wastes.

Health and Safety Code section **25150**. This section grants DTSC authority to adopt standards and regulations related to the management of hazardous waste.

Health and Safety Code section **25201**. This section grants DTSC the authority to require hazardous waste facilities that store, treat, transfer, recover resources from, or dispose of hazardous waste to obtain a hazardous waste facility permit or other grant of authorization.

Health and Safety Code section **25259**. This section grants DTSC authority to adopt regulations to designate end-of-life photovoltaic modules that are identified as hazardous waste as a universal waste and subject them to universal waste management.

Health and Safety Code section **58012**. This section grants DTSC authority to adopt and enforce rules and regulations to execute its duties. Added by Governor's Reorganization Plan No. 1, §146, eff. July 17, 1991. See

[http://www.dtsc.ca.gov/LawsRegsPolicies/upload/OEARA\\_REG\\_GRP1.pdf](http://www.dtsc.ca.gov/LawsRegsPolicies/upload/OEARA_REG_GRP1.pdf).

### **Reference**

These regulations implement, interpret, or make specific the following statute:

Health and Safety Code section **25141**. This section grants DTSC authority to adopt regulations to develop criteria and guidelines for the identification of hazardous wastes.

Health and Safety Code section **25141.5**. This section grants DTSC authority to make determination if wastes are hazardous by following criteria and procedures specified for identification and regulation of a hazardous waste.

Health and Safety Code section **25150**. This section grants DTSC authority to adopt standards and regulations related to the management of hazardous waste.

Health and Safety Code section **25159.5**. This section specifies that DTSC shall, insofar as practicable, make the standards and regulations conform to corresponding federal regulations. This section does not prohibit DTSC from adopting standards or regulations that are more stringent than federal regulations.

Health and Safety Code section **25201**. This section grants DTSC the authority to require hazardous waste facilities that store, treat, transfer, recover resources from, or dispose of hazardous waste, to obtain a hazardous waste facility permit or other grant of authorization.

Health and Safety Code section **25259**. This section grants DTSC authority to adopt regulations to designate end-of-life photovoltaic modules that are identified as hazardous waste as a universal waste and subject them to universal waste management.

Health and Safety Code section **58012**. This section grants DTSC authority to adopt and enforce rules and regulations to execute its duties. Added by Governor's Reorganization Plan No. 1, §146, eff. July 17, 1991. See

[http://www.dtsc.ca.gov/LawsRegsPolicies/upload/OEARA\\_REG\\_GRP1.pdf](http://www.dtsc.ca.gov/LawsRegsPolicies/upload/OEARA_REG_GRP1.pdf).

## **INFORMATIVE DIGEST/POLICY STATEMENT OVERVIEW**

### *Policy Statement Overview*

As demands for alternative forms of electricity grow in California, photovoltaic modules (PV modules, also referred to as solar panels) become more widely used by utilities, businesses, and households. When PV modules are discarded as waste, it is important that they are managed in a safe and effective manner. In 2015, Senate Bill 489, Monning, chapter 419, statutes of 2015 added article 17 (section 25259 et seq.) to chapter 6.5 of the California Health and Safety Code, authorizing DTSC to adopt regulations to designate end-of-life PV modules that are hazardous wastes as a universal waste. This proposed regulation package allows PV modules that are determined by generators to be hazardous waste to be managed according to universal waste management standards in California Code of Regulations, title 22, division 4.5, chapter 23.

### *Background*

PV modules consist of an array of semiconducting photovoltaic cells (PV cells) that convert solar energy into electrical energy. PV cells are made of mostly silicon materials and connected via electrical contacts. The electrical contacts are made of metals such as palladium, silver, nickel, copper, or cadmium. Some PV cells, referred to as "thin-film" cells, consist of non-siliceous materials such as copper indium diselenide, cadmium telluride, or gallium arsenide. PV cells are encased in a transparent laminate, such as tempered glass, to protect the cells from environmental damage. The term PV modules in this proposed regulation also includes the metal frames that are used to support the panels, junction boxes, batteries, inverters, and cables.

Some PV modules exhibit the hazardous waste characteristic of toxicity due to the presence of metals. Many households and businesses are unaware of the potential hazards associated with PV modules, resulting in these wastes being illegally and improperly handled and disposed of as municipal solid waste.

PV modules have an expected service life of 30 years and are designed to maintain their performance and functionality under varying environmental conditions. However, PV modules could become a waste at various stages, including manufacturing, installation, or replacement. In the absence of government intervention, businesses that generate waste PV

modules would likely send them for disposal at municipal solid waste landfills. Municipal solid waste landfills provide less protection to human health and the environment against the hazards that PV modules contain than a permitted hazardous waste disposal facility.

While full hazardous waste regulations reduce the risks associated with PV modules, businesses that generate PV modules do not always manage these wastes in compliance with hazardous waste management regulations. For those generators that know or suspect that PV modules are hazardous waste, complying with lawful management requirements may be complex and costly. These burdens serve as a disincentive for generators to make a hazardous waste determination and manage this waste stream. Additionally, the low risks posed by PV modules are not commensurate with the level of regulatory oversight and protection provided by full hazardous waste regulation.

### Proposed Regulation

Health and Safety Code section 25259 specifies that DTSC is authorized to add PV modules to universal waste regulations, which will apply to those businesses that generate, transport, handle, and treat or dispose of PV modules in California. These regulations establish alternative to full hazardous waste management for PV modules, similar to existing standards for electronic waste. This will decrease the mismanagement of hazardous waste PV modules.

The proposed regulation affects how waste PV modules are contained, transported, and treated through the following standards:

- Applying the same transportation standards as all other universal wastes (*i.e.*, a business may only transport the wastes to a destination facility or to another universal waste handler);
- Allowing treatment methods for PV modules that primarily change only the physical shape of the waste (*e.g.*, breaking, shredding, crushing, compacting) and that separate processed material by its physical properties (*e.g.*, size, color, density); and
- Specifying the appropriate management standards for the different levels of treatment to ensure that treatment is performed safely by handlers that do not have a hazardous waste facility permit that they would otherwise be required to obtain. DTSC establishes this form of self-implementing authorization because a full or standardized hazardous waste facility permit is not commensurate with the hazards posed by treating PV modules.

A universal waste handler that does not follow the universal waste standards and disposes of the PV modules becomes a hazardous waste generator and must comply with all the hazardous waste management requirements outlined in California Code of Regulations, title 22, division 4.5, chapters 12 through 16, 18, 20, and 22.

### Anticipated Benefits

DTSC determined that the proposed regulation increases protection to public health and the environment by creating a regulatory framework to manage these hazardous wastes in a way that is commensurate with their low risks. DTSC witnessed similar improved waste management practices with the addition of electronic waste to California's universal waste program. DTSC estimates<sup>1</sup> that the proposed regulation reduces costs for PV module waste management compared to the costs for having to manage PV modules as a fully regulated hazardous waste.

---

<sup>1</sup> Economic and Fiscal Impact Statement – Form 399 – PV modules – Universal Waste Management.

The proposed regulation allows generators to send their waste PV modules to a universal waste handler to manage the hazardous waste PV modules without a hazardous waste facility permit. Incorporating PV modules as a universal waste into the existing universal waste standards will streamline the collection, transportation, and treatment of PV modules and deter the abandonment of hazardous waste PV modules in California.

#### Summary of Existing Statutes and Regulations

Health and Safety Code section 25259 authorizes DTSC to adopt regulations to designate end-of-life PV modules that are identified as hazardous waste as universal waste and subject them to universal waste management. That provision is discussed in the Policy Statement Overview section of this document. In addition, California Code of Regulations, title 22, division 4.5, chapter 23, governs management standards for universal waste. Universal waste handlers (including those authorized to treat universal wastes), universal waste transporters, and destination facilities are subject to universal waste regulations.

Finally, Health and Safety Code sets out a basic framework and requirements for hazardous waste management in California. Those provisions are set out in the Health and Safety Code, division 20, chapter 6.5. Specifically, Health and Safety Code section 25150 grants DTSC authority to adopt standards and regulations related to the management of hazardous waste and governs all aspects of the generation, management, treatment, storage, and disposal of hazardous waste in California.

#### Relation to Existing Federal Regulations

PV modules that meet the criteria of a characteristic hazardous waste under 40 Code of Federal Regulations, subpart B must be managed as a Resource Conservation Recovery Act (RCRA) hazardous waste. Likewise, in California, PV modules that meet the criteria of a hazardous waste as outlined in California Code of Regulations, title 22, division 4.5, chapter 11, article 3 must be managed as a California hazardous waste. DTSC is proposing to add PV modules to its universal waste regulations, which is commensurate with the low risks posed by these wastes.

DTSC currently seeks authorization from the U.S. Environmental Protection Agency for its universal waste management program. Once authorized, a state can designate additional waste streams as universal waste at the same time that it creates its own universal waste rule. DTSC analyzed PV modules under the criteria found in California Code of Regulations, title 22 section 66260.23, which is analogous to the criteria in 40 Code of Federal Regulations section 273.81. The reasons for including RCRA regulated PV modules as universal waste under California's universal waste regulations are explained in the Initial Statement of Reasons for these proposed regulations.

#### Evaluation of Inconsistency or Incompatibility with Existing State Regulations

DTSC has evaluated whether the proposed regulations are inconsistent or incompatible with existing state regulations, regarding the management of hazardous waste PV modules as universal waste. DTSC is the only state agency that regulates and governs hazardous waste management in general and the alternative management standards for certain categories of hazardous waste under universal waste regulations in particular. The proposed regulations are neither inconsistent nor incompatible with existing state regulations. The proposed regulations amend existing regulations in California Code of Regulations, title 22, division 4.5, chapter 23, Standards for Universal Waste Management to include PV modules.

Incorporated by Reference

The regulations do not include any items incorporated by reference.

**DISCLOSURE REGARDING THE PROPOSED ACTION**

Mandates on Local Agencies or School Districts

DTSC determined that the proposed regulations will not impose a local mandate or result in costs subject to reimbursement pursuant to part 7 of division 4, commencing with section 17500, of the Government Code or other nondiscretionary costs or savings to local agencies.

Cost or Savings to State or Local Agencies, or School Districts Subject to Reimbursement

DTSC determined that the proposed regulations will not result in costs or savings for any state or local agency or school district that is required to be reimbursed pursuant to part 7 of division 4, commencing with section 17500 of the Government Code. The proposed regulations are not anticipated to result in any other nondiscretionary costs or savings imposed on local agencies or to change any federal funding to the state.

Cost or Savings in Federal Funding to the State

DTSC determined that the proposed regulations will not result in any changes to federal funds that the state of California receives.

Determination of No Significant Statewide Economic Impact

DTSC made an initial determination and found through the economic analysis assessment that the proposed regulation will not have a significant statewide adverse economic impact directly affecting businesses, including the ability to compete with businesses in other states.

Cost Impacts on Representative Private Persons or Businesses

DTSC conducted an economic impact assessment of the proposed regulations for generators and universal waste handlers of waste PV modules.<sup>2</sup> DTSC estimates annual cost savings of \$11,735,928 for PV modules waste generators in California under the proposed regulation, since the generators do not need to use a manifest or fulfill certain transportation requirements when shipping these wastes to a universal waste handler.

As for the universal waste handlers that manage waste PV modules, DTSC estimates additional annual costs of \$154,770 (spread among 10 handlers) for complying with the proposed regulation, due to having added a new waste stream under universal waste management. DTSC anticipates that the rates that universal waste handlers will charge to handle PV modules will be adjusted to account for all variable costs and will be passed back to the generators. Under the proposed universal waste regulations, the universal waste handlers do not have to obtain a permit to store and treat PV modules. Once the universal waste handler decides to dispose of the PV modules, the universal waste handler becomes the hazardous waste generator and must comply with full hazardous waste requirements.

Effect on Small Businesses

The proposed regulation may affect small businesses. DTSC determined that small businesses may experience cost savings by managing PV modules as universal waste. Although the proposed regulations would require small businesses to incur some costs pertaining to requirements such as universal waste rule familiarization, notification,

---

<sup>2</sup> Economic and Fiscal Impact Statement – Form 399 – PV Modules – Universal Waste Management.

recordkeeping, reporting, and employee training, costs associated with obtaining a permit to accept, store, treat, and dispose of PV modules as hazardous waste will be avoided.

#### Effect on Housing Costs

DTSC has determined that the proposed regulations do not impact housing costs.

#### Results of the Economic Impact Analysis

DTSC conducted an economic impact assessment, as required by Government Code section 11346.3(b), and found that no businesses or jobs would be eliminated in California as a result of the proposed regulation. The number of businesses or jobs that could be created or expanded is not known. DTSC determined that proposed regulation creates a regulatory framework that streamlines for the proper management and disposal of hazardous waste PV modules, which would be of benefit to California's public health and the environment. DTSC also estimated that the proposed regulation would reduce waste management costs for generators of hazardous waste PV modules under universal waste management, compared to costs associated with fully regulated hazardous waste management requirements. The proposed regulation also ensured the safety and well-being of workers that manage waste PV modules by requiring universal waste handlers of PV modules to comply with all applicable health and safety laws and regulations.

### **CONSIDERATION OF ALTERNATIVES**

DTSC held two public workshops in Sacramento to present the regulatory concepts under consideration and solicit comments from stakeholders and the public on the draft regulations to allow PV modules to be managed as a universal waste. Multiple stakeholder comments were received on the draft regulations. DTSC has since revised the draft regulation text reflecting the stakeholder feedback. Additionally, DTSC held an informational seminar to educate stakeholder's on DTSC's universal waste program and the proposed regulations prior to public notice, although revisions were not made to the regulation.

A detailed discussion of the proposed regulations, including the Consideration of Alternatives, is presented in the Initial Statement of Reasons for these regulations – Photovoltaic (PV) Modules – Universal Waste Management.

Pursuant to Government Code section 11346.5(a)(13), DTSC must determine that no reasonable alternative it considered or that has otherwise been identified and brought to its attention would be more effective in carrying out the purpose for which the action is proposed, would be as effective and less burdensome to affected private persons than the proposed action, or would be more cost-effective to affected private businesses and equally effective in implementing the statutory policy or other provision of law.

### **OTHER APPLICABLE REQUIREMENTS PRESCRIBED BY STATUTE**

#### California Environmental Quality Act (CEQA) Compliance

DTSC has found this rulemaking project to be exempt under CEQA (Pub. Resources Code, sec. 21000 et seq.). This rulemaking meets the Categorical exemption (CEQA Guidelines, California Code of Regulations, tit. 14, sec. 15308). A draft Notice of Exemption is available for review with the rulemaking file and will be filed with the State Clearinghouse when the regulations are adopted.

## CONTACTS

Inquiries regarding technical aspects of the proposed regulation may be directed to Dr. Chosu Khin of DTSC at (916) 324-2428. If Dr. Khin is unavailable, you may contact the regulations coordinator, Jackie Buttle, at (916) 324-8286. However, such oral inquiries are not part of the official rulemaking record.

A 52-day public comment period for this rulemaking file, as described above, will commence on April 19, 2019 and close on June 10, 2019 at 11:59 PM PDT. During this time, DTSC will accept statements, arguments, or contentions and/or supporting documents regarding this rulemaking that must be submitted in writing or may be presented orally or in writing at the public hearing. Comments must be received by the deadline in order for them to be considered before DTSC adopts, amends, or repeals these regulations.

## AVAILABILITY OF TEXT OF PROPOSED REGULATIONS and INITIAL STATEMENT OF REASONS

Copies of the Notice, Initial Statement of Reasons, the text of the proposed regulations, all the information upon which its proposal is based, and the express terms of the proposed regulation are posted to DTSC's Internet site at:

<http://www.dtsc.ca.gov/LawsRegsPolicies/Regs/index.cfm> or may be obtained from Ms. Jackie Buttle of DTSC as specified below.

After the close of the comment period, DTSC may adopt the proposed regulation. If substantial changes are made, the modified full text will be made available for comment for at least 15 days prior to adoption. Only persons who request the specific proposed regulation, attend the hearing, or provide written or oral comments on this specific regulation will be sent a copy of the modified text if substantive changes are made.

Once the regulation has been adopted, DTSC prepares a Final Statement of Reasons which includes an update the Initial Statement of Reasons, DTSC's summaries and responses to all timely public comments, and includes other materials required by Government Code section 11346.9. Copies of the Final Statement of Reasons may be obtained from Ms. Jackie Buttle at the address listed below. A copy of the Final Statement of Reasons, along with the date the rulemaking, is filed with the Secretary of State and the effective date of the regulation will also be posted on DTSC's Internet site at:

<http://www.dtsc.ca.gov/LawsRegsPolicies/Regs/index.cfm>

To be included in this regulation package's mailing list and to receive updates of this rulemaking, please visit <http://www.dtsc.ca.gov/ContactDTSC/ELists.cfm> and subscribe to the Photovoltaic modules (solar panels) Regulations E-List, or email: [regs@dtsc.ca.gov](mailto:regs@dtsc.ca.gov).

Please direct all written comments, procedural inquiries, and requests for documents by mail, email, or fax to:

Ms. Jackie Buttle  
Regulations Coordinator  
Department of Toxic Substances Control  
P.O. Box 806  
Sacramento, CA 95812-0806  
Email address: [regs@dtsc.ca.gov](mailto:regs@dtsc.ca.gov)  
Phone number: (916) 324-8286

If Ms. Buttle is unavailable, please call Dr. Chosu Khin at (916) 324-2428.