DEPARTMENT OF ECOLOGY
State of Washington

Chapter 173-408 WAC
Landfill Methane Emissions

May 4, 2023

Meet the Panel

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Bill Flagg – Rulemaking Lead

Catherine Lucke – Technical Lead

Philip Gent – Air Quality Engineer (Headquarters)

Bill Harris – Solid Waste Engineer (Southwest Regional Office)

Lynnette Haller – Air Quality Engineer (Central Regional Office)

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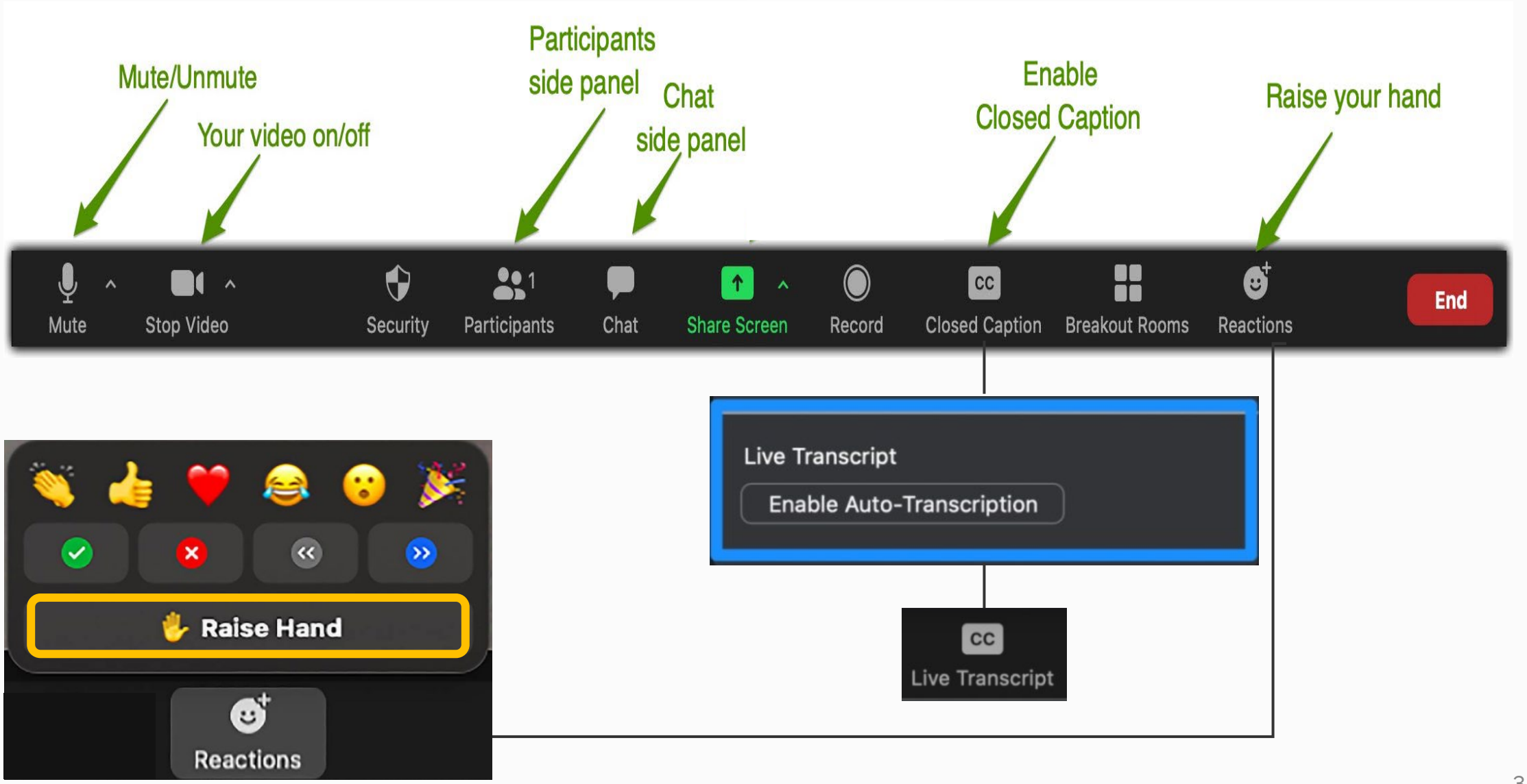
Zoom Navigation and Accessibility



Topics of Discussion

1. March meeting recap
2. Proposed definitions
3. Proposed recordkeeping requirements
4. 10-minute break
5. Proposed reporting requirements
6. Landfill heat input capacity calculation
7. Next steps

March 30 Meeting Recap

- Purpose of this rulemaking
- Overview of Chapter 70A.540 RCW
- Rule applicability
- Exemptions: CERCLA regulated landfills and inert waste landfills

Purpose

- To reduce emissions of methane, a potent greenhouse gas, from Washington landfills.
- Washington will join California and Oregon in implementing more protective standards for decreasing emissions.
- This will help Washington achieve its commitment to reduce greenhouse gas emissions to 95 percent below 1990 levels by 2050.

Chapter 70A.540 RCW

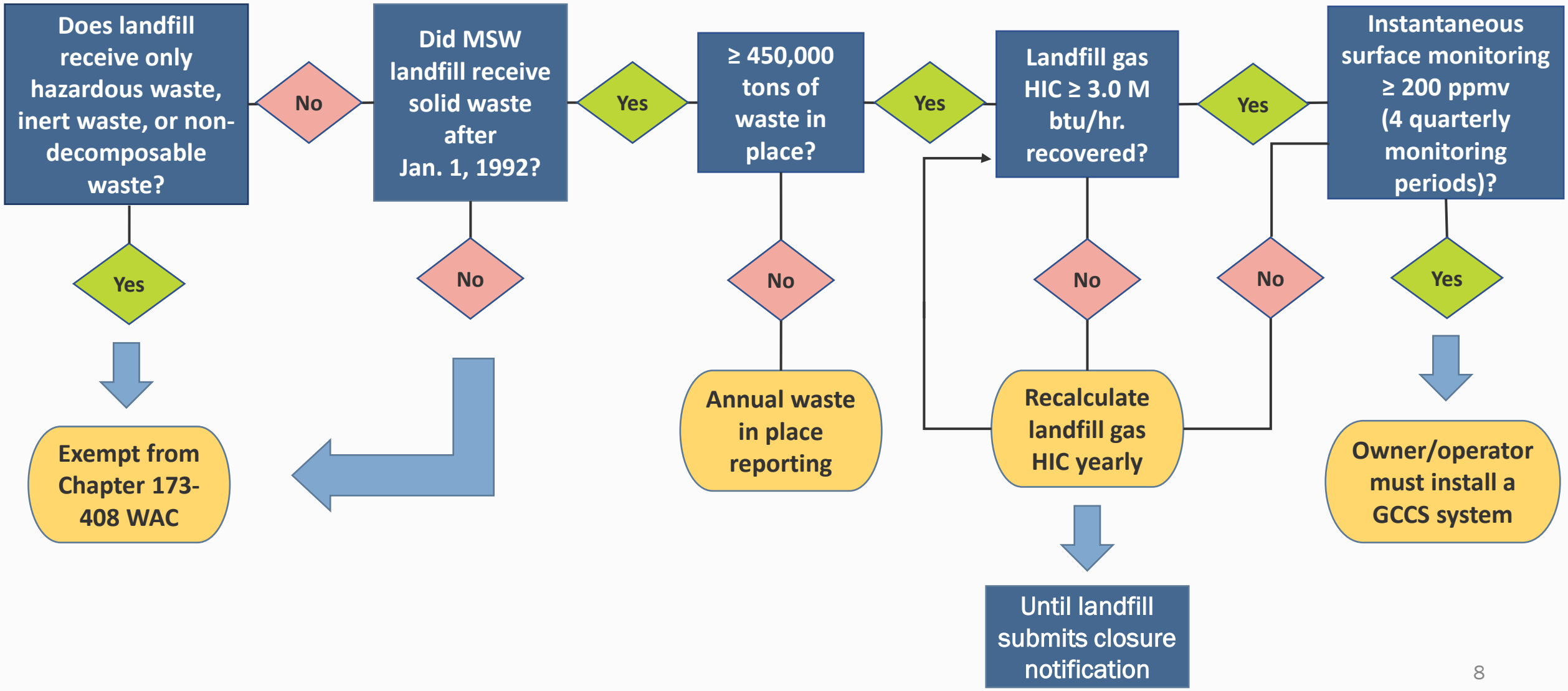
Who: MSW landfills that received solid waste after January 1, 1992

What:

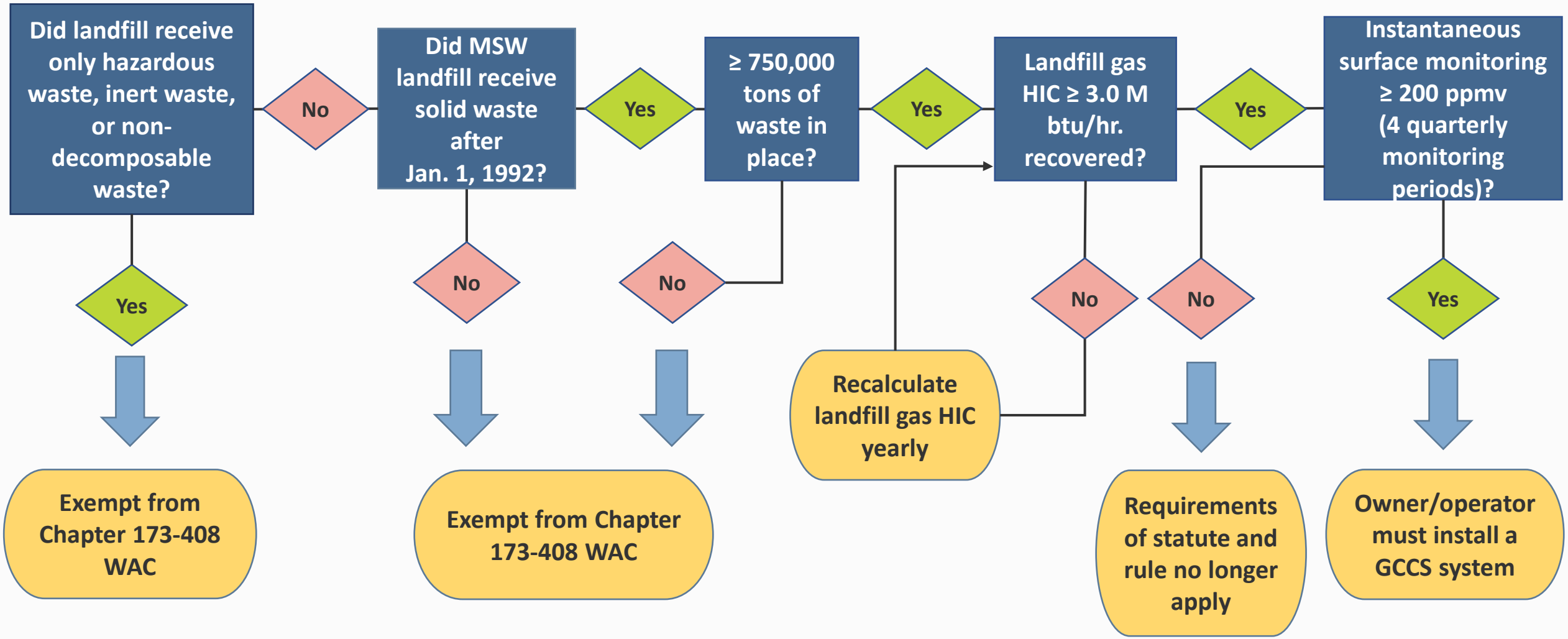
- Reporting and recordkeeping requirements
- Monitoring requirements
- Technology installation and performance requirements
- Penalties for violation of law and implemented rules
- Other possible requirements

When: Implementation of rule projected to start January 1, 2025

Applicability – Active MSW Landfills



Applicability – Closed MSW Landfills



CERCLA Definitions

- “CERCLA regulated landfill” means the portion of a municipal solid waste landfill that has been designated as on-site for purposes of a CERCLA response action(s).
- “CERCLA response action” means a removal or remedial action conducted pursuant to 42 USC Sections 9604, 9606, 9620, 9621, or 9622.

Inert Waste Landfills

“Inert waste or non-decomposable waste(s)” has the same meaning as "inert waste" in WAC 173-350-100.

Examples:

Cured concrete

Asphaltic materials

Brick and masonry

Ceramic materials

Glass

Stainless steel and aluminum

Meeting Purpose and Objectives

- Answer any of your questions about this statute and rulemaking
- Seek your input about proposed definitions
- Seek your input about key decision points for reporting and recordkeeping requirements of this rulemaking

Terms Defined in the Law

“Active municipal solid waste landfill”
"Air pollution“
"Ambient air"
"Authority" or “local authority”
"Closed municipal solid waste landfill"
"Department“
"Emission"
"Gas collection system"
"Gas control device"
"Gas control system"
"Municipal solid waste landfill“
"Person"

RCW 70A.540.010: Definitions

Proposed Definitions

“Component”
“Component leak”
“Continuous operation”
“Destruction efficiency”
“Energy recovery device”
“Facility”
“Facility boundary”
“Landfill”
“Landfill gas”
“Landfill surface”
“Municipal solid waste (MSW)”
“Solid waste”
“Working face”

Component Leak

“Component leak” means the concentration of methane measured one half of an inch or less from a component source that exceeds 500 parts per million by volume (ppmv), other than non-repeatable, momentary readings. Measurements from any vault must be taken within 3 inches above the surface of the vault exposed to the atmosphere.

Non-repeatable, Momentary Readings

“Non-repeatable, momentary readings” means indications of the presence of methane, which persist for less than five seconds and do not recur when the sampling probe of a portable gas detector is placed in the same location.

Exceedance

"Exceedance" means the concentration of methane measured within 3 inches above the landfill surface that exceeds 500 ppmv, other than non-repeatable, momentary readings, as determined by instantaneous surface emissions monitoring; or the average methane concentration measurements that exceed 25 ppmv, as determined by integrated surface emissions monitoring.

Heat Input Capacity (HIC)

"Heat input capacity (HIC)" means the hourly heat content available on a steady state basis in the form of landfill gas generated from a landfill's waste source material.

Recordkeeping Requirements

Chapter 70A.540 RCW

The owner or operator of a municipal solid waste landfill must maintain records related to monitoring, testing, landfill operations, and the operation of the gas control device, gas collection system, and gas control system. The records must be provided by the owner or operator to the department or local authority within five business days of a request from the department or local authority.

Proposed Recordkeeping Requirements

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Landfill Operations

- Waste in place
- Annual solid waste acceptance rate/current WIP
- Areas excluded from collection system
- Nature, location, amount, and date of deposition of non-degradable waste
- Landfill surface disturbance
- Records of disturbance activities, time/date, location, mitigation measures

Methane

- Methane exceedances
- Instantaneous surface readings of 200 ppmv or greater
- 500 ppmv instantaneous, 25 ppmv integrated, leak location, leak concentration, date/time, mitigation measures, re-monitoring (ppmv concentration), wind speed during sampling
- Monitoring
- Quarterly instantaneous surface monitoring records

GCCS

- Well heads
- Positive gauge pressure wellhead measurements and corrective actions
- Operating parameters
- Combustion temperatures, 50 degrees F or below stack test for 3+ hours
- Individual well shutdowns
- Control device
- Destruction efficiency, stack tests, and source tests

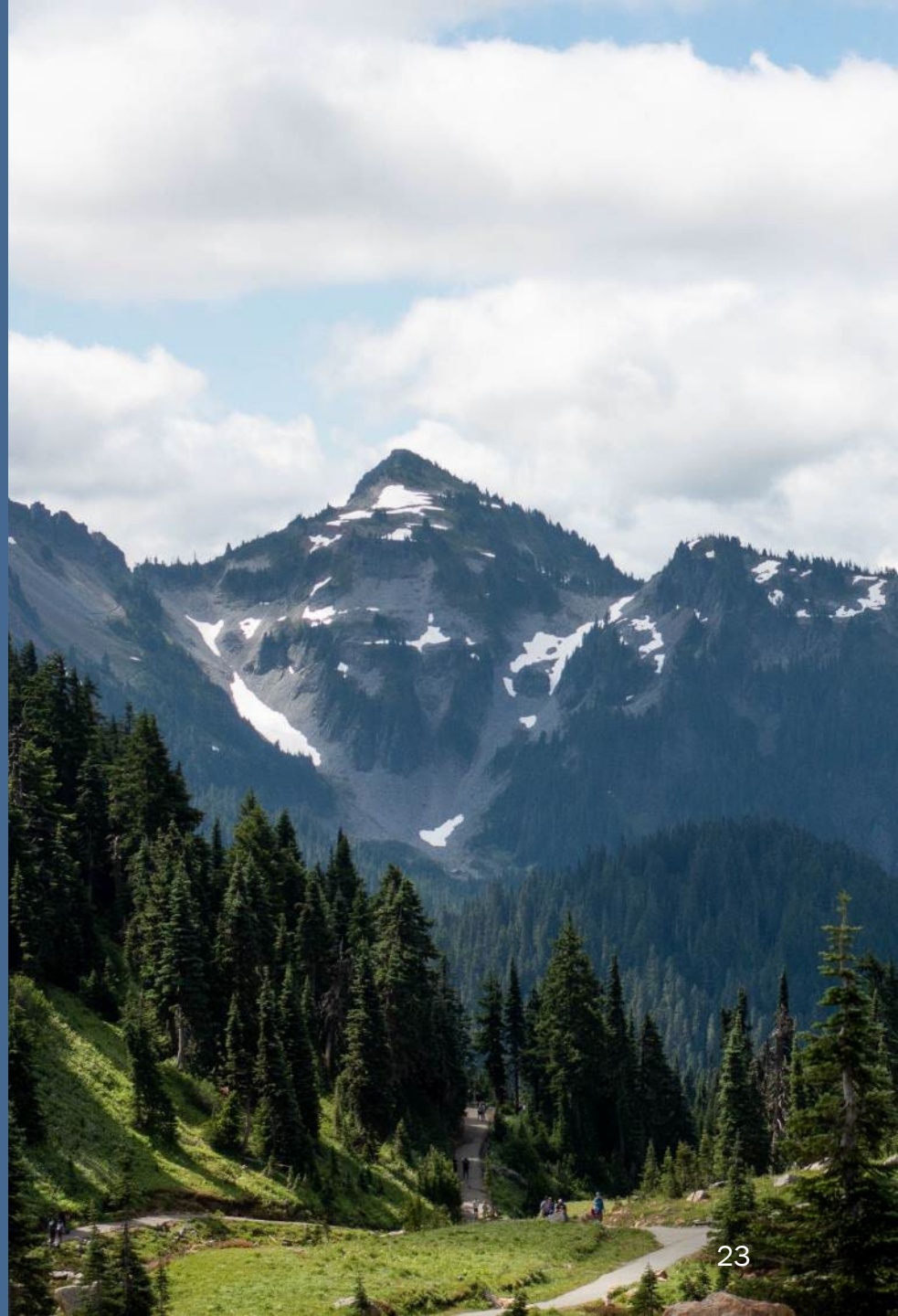
Proposed Gas Control Device Recordkeeping

The owner or operator must maintain the following records for the life of each gas control device, as measured during the initial source test or compliance determination:

- Control device vendor specifications
- Expected gas generation flow
- Percent reduction of methane achieved by control device
- Boiler or process heater performance test
- Open flares
  - Visible emission readings
  - Heat content determination
  - Flow rate or by-pass flow rate
  - Exit velocity determinations
  - Flare pilot flame monitoring
  - Pilot flame or flare flame absence

Questions

10-minute break



Reporting Requirements from the Law

- Active MSW landfills with fewer than 450,000 tons of waste in place must submit a waste in place report to the department OR local authority.
- Active MSW landfills with 450,000 or more tons of waste in place or a closed MSW landfill with 750,000 or more tons of waste in place must prepare an annual report for the period of January 1 through December 31 of each year. The annual report must include a calculation of landfill gas heat input capacity. Each annual report must be submitted **to the department AND local authority** during the subsequent calendar year, with the date of submission to be established through rules adopted by the department.
- MSW landfills must submit a GCCS equipment removal report to the department OR local authority within 30 days of well capping or the removal or cessation of operation of the gas collection, treatment, or control system equipment.
- MSW landfills that cease to accept waste must submit a closure notification to the department OR local authority within 30 days of ceasing to accept waste.

Required Reports

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- Equipment Removal Report
- Annual Report
  - Waste in Place Report
  - Landfill Gas Heat Input Capacity
  - Instantaneous Surface Monitoring
  - GCCS Operations
- Closure Notification Report

Proposed Annual Reporting Requirements

The owner or operator of a municipal solid waste landfill must prepare the following reports as required pursuant to subsections (a) through (e) of this section. The reports must be prepared for the period of January 1 through December 31 of each year, and be submitted as part of an annual report on April 1 of the subsequent year. In each report, the following information must be included:

- MSW landfill name, owner and operator, address, and Facility/Site ID (FS ID) number.
- Most recent topographic map of the site showing the areas with final cover and a geomembrane and the areas with final cover without a geomembrane with corresponding percentages over the landfill surface.

Proposed Annual Reporting – WIP

Waste in Place Report: Any owner or operator of a MSW landfill subject to the requirements of **WAC 173-408-050** must report the following information:

- The landfill's status (active or closed), and the estimated waste-in-place, in tons.

WAC 173-408-050

Each owner or operator of an active MSW landfill having fewer than 450,000 tons of waste in place must submit an annual waste in place report pursuant to section **WAC 173-408-110(2)(b)** until either:

- The active MSW landfill reaches a size of greater than or equal to 450,000 tons.
- The owner/operator submits a closure notification pursuant to **WAC 173-408-110(2)(f).**

Proposed Annual Reporting – HIC

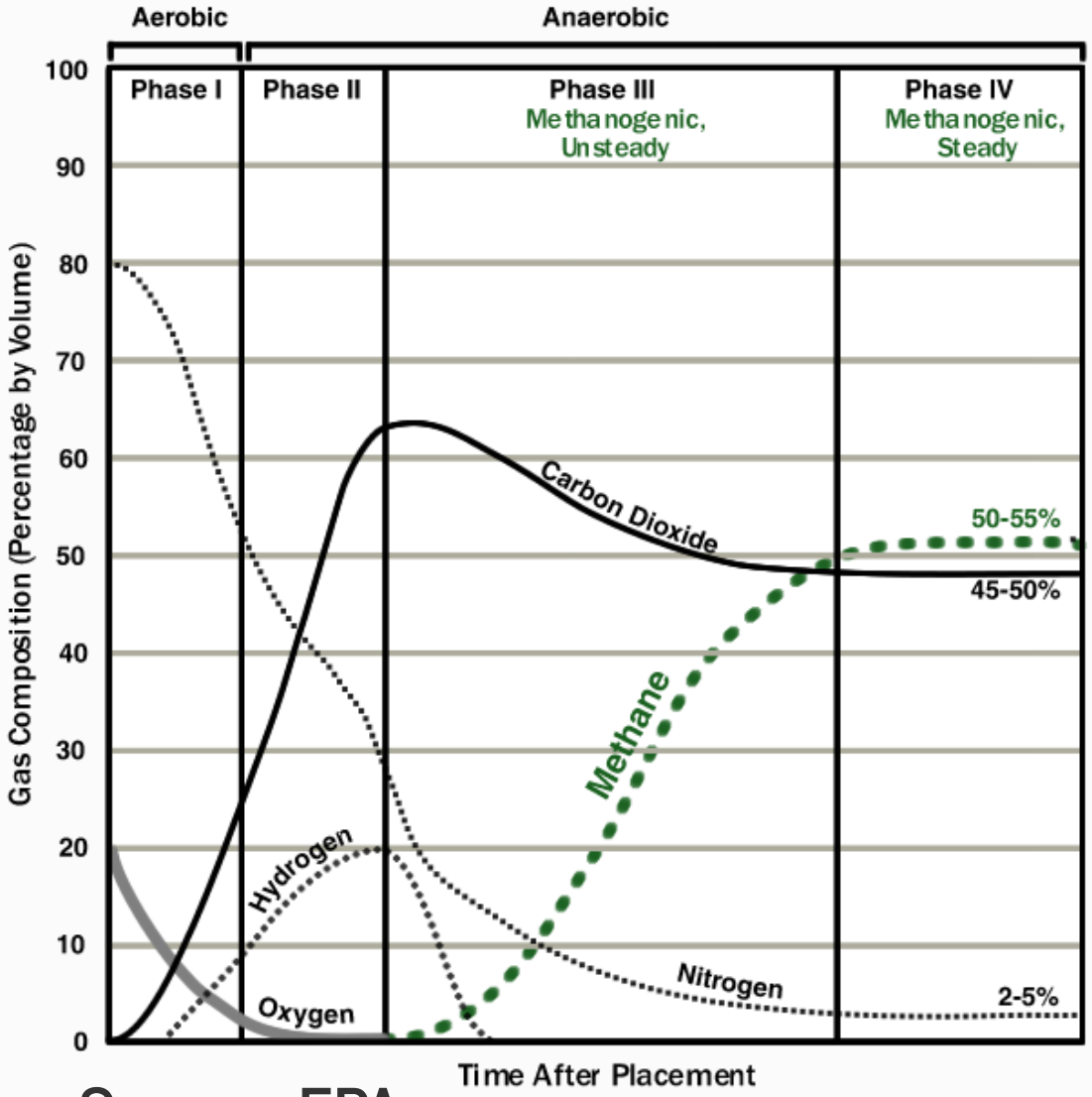
Landfill Gas Heat Input Capacity Calculation*:* Any owner or operator subject to the requirements of section **WAC 173-408-060(1)** must calculate the landfill gas heat input capacity using the procedures specified in _____. The report must be submitted within 90 days of the effective date of this chapter or upon reaching 450,000 tons of waste-in-place for active MSW landfills.

WAC 173-408-060(1)

Each owner or operator of an active MSW landfill having greater or equal than 450,000 tons of waste in place or a closed MSW landfill having greater than or equal to 750,000 tons of waste in place must submit an annual landfill gas heat input capacity (HIC) report pursuant to section **WAC 173-408-110(2)(c)** until either:

- The MSW landfill reaches a HIC of greater than or equal to 3,000,000 British thermal units per hour recovered.
- Submits a closure notification pursuant to WAC 173-408-110(2)(f).

Landfill Waste Decomposition – Energy Generation



Source: EPA

- Waste decomposes in four phases:
  - Aerobic – forms more CO_2
  - Anaerobic (transitory/unsteady/steady) – increasing methane production as oxygen decreases in landfill
- Phases can occur simultaneously in different areas of the landfill
- Anaerobic decomposition depends on landfill conditions (moisture, temperature etc.)

Heat Input Capacity Calculation Methodology

- First-order decay model
  - Assumes a certain percentage of waste will decompose
  - Methodology used by CARB
- Inputs
  - Waste-in-place data
  - Waste characterization data
  - Decomposition rates (variable with moisture)

Proposed Annual Reporting – Surface Monitoring

Quarterly instantaneous surface monitoring: Any owner or operator who conducts instantaneous surface emissions monitoring pursuant to **WAC 173-408-060(2)(b)** must provide the following information:

- Date of monitoring
- Location of monitoring
- Measured concentration of methane in ppmv

Proposed Annual Reporting – GCCS

GCCS operations: Any owner or operator of a MSW landfill that has a gas collection and control system must report following:

- Total volume of landfill gas collected (reported in standard cubic feet).
- Average composition of the landfill gas collected over the reporting period (reported in percent methane and percent carbon dioxide by volume).
- Gas control device type, year of installation, rating, fuel type, and total amount of landfill gas combusted in each control device.
- The date that the gas collection and control system was installed and in full operation.
- The percent methane destruction efficiency of each gas control device(s).
- Type and amount of supplemental fuels burned with the landfill gas in each device.
- Total volume of landfill gas shipped off-site, the composition of the landfill gas collected (reported in percent methane and percent carbon dioxide by volume), and the recipient of the gas.

Proposed Closure Notification Report

Closure Notification Report*:* The owner or operator of a municipal solid waste landfill that ceases to accept waste must submit a closure notification within 30 days of ceasing to accept waste.

The closure notification must include the last day solid waste was accepted, the anticipated closure date of the MSW landfill, and the estimated waste-in-place.

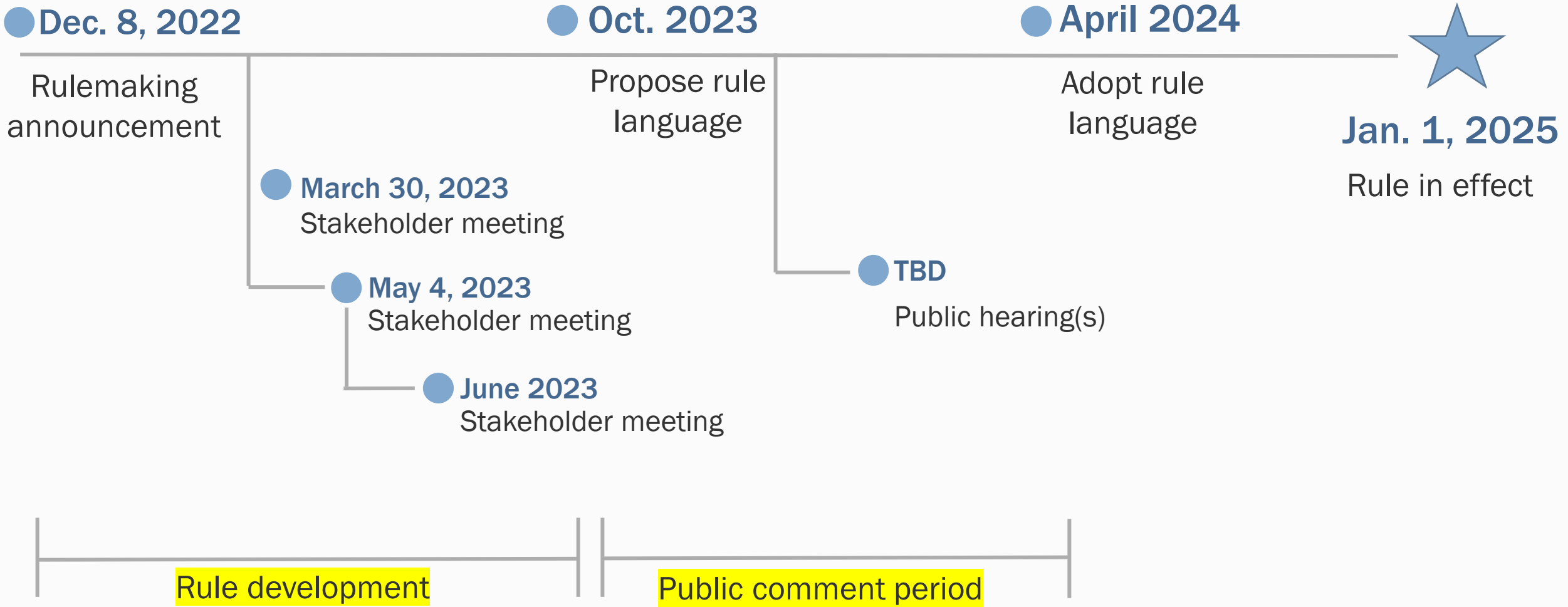
- If a MSW landfill with ≥ 450,000 tons of waste in place submits a closure notification pursuant to this section, the owner or operator of the landfill must submit a 30-year projection of their estimated heat input capacity calculation as part of this report.
- The ____ may request additional information as necessary to verify that permanent closure has taken place in accordance with the requirements of any applicable federal, state, local, or tribal statues, regulations, and ordinances in effect at the time of closure.
- If a closure report has been submitted, no additional wastes may be placed into the landfill without filing a notification to the local authority.

Proposed Equipment Removal Report

Equipment Removal Report*:* The owner or operator of a municipal solid waste landfill must submit a gas collection and control system equipment removal report within 30 days of well capping or the removal or cessation of operation of the gas collection, treatment, or control system equipment. The report must contain the following information:

- A copy of the closure notification report submitted pursuant to section **WAC 173-408-110(2)(f).**
- A copy of the initial source test report, pursuant to section _____, or other documentation demonstrating that the gas collection and control system has been installed and operated for a minimum of 15 years, unless the owner or operator can demonstrate to the satisfaction of the local authority that due to declining methane rates, the landfill is unable to operate the gas collection and control system for a 15-year period.
- Instantaneous or integrated emissions monitoring results needed to verify that landfill surface methane concentration measurements do not exceed the limits specified in section _____ after equipment removal.

173-408 Rulemaking Timeline



Note: Dates are subject to change

Next Steps

Stakeholder Meeting: June 2023 (date/time TBD)

- Input on draft rule language
- Monitoring methods
- GCCS requirements

Stakeholder Meeting: TBD, if needed

- Input on draft rule language
- GCCS requirements

Ecology Contacts

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More Information

Rulemaking

https://ecology.wa.gov/Regulations-Permits/Laws-rules-rulemaking/Rulemaking/WAC-173-408

Statute

https://app.leg.wa.gov/RCW/default.aspx?cite=70A.540&full=true

Informal comments

https://aq.ecology.commentinput.com/?id=CsSje

Questions

Thank you