METRO

Executive Summary: Options for Establishing Material Recovery Facility Standards

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BACKGROUND

The Material Recovery Facility Standards Policy Development Project (MRF Standards Project) is a multi-year planning process led by the Metro Waste Prevention and Environmental Services department, at the direction of Metro Council, to modernize the MRFs regulated by Metro. The project advances the implementation of the 2030 Regional Waste Plan and aligns with statewide efforts to modernize Oregon's recycling system. Its intent is to improve the effectiveness, transparency, responsibility, and resilience of the Metro-area recycling processing system. This briefing paper presents the range of options for considering inbound and outbound quality standards and reporting requirements. It draws from examples found in best practice guidance and operating contracts between communities and MRFs and explores how these standards can be integrated into a regulatory framework for Metro's consideration.

RESEARCH OBJECTIVES

Metro asked the research team to identify three to five options for addressing each of the following objectives:

- Quality standards related to outbound materials (commodities and residual)
- Quality standards related to inbound materials,
- Facility-level measurement and reporting of inbound and outbound quality standards,
- Facility-level measurement and reporting of material destination, and,
- Facility-level reporting of workforce wages, benefits and demographics.

CONSIDERATION OF THE PASSAGE OF THE RECYCLING MODERNIZATION ACT

Metro intends to develop these performance standards and reporting requirements to complement and align with statewide efforts to modernize Oregon's recycling system through the Recycling Modernization Act, signed into law on August 6th. DEQ anticipates this rulemaking process to take place in 2023 and early 2024, with the MRF requirements becoming operational as of July 1, 2025. DEQ has confirmed its intention to coordinate closely with Metro during rulemaking and implementation.

Aspects of the Recycling Modernization Act that relate to options presented in this paper include:

- **Permit / Certification Program:** All MRFs handling Oregon materials will be subject to the same standards, with Oregon MRFs regulated through permits and out of state MRFs through certification. If DEQ standards are more stringent than Metro's, state standards would supersede local. If DEQ standards are less stringent, Metro standards would apply only to the regulated MRFs in its jurisdiction.
- **Operating Standards:** Permit and certification programs will establish operating standards related to inbound and outbound contamination, and responsible end markets.
- **Producer Fees:** The *Contamination Management Fee* created in the Act will be paid by a Producer Responsibility Organization (PRO) to a MRF to cover the costs of handling covered products that are contaminants. The *Commodity Risk Fee* will be paid by the PRO to the MRF to cover all eligible processing costs (net commodity revenue). If regulation allows for cost of compliance with DEQ or Metro rules to be part of the eligible processing cost, that added cost will be passed on to a PRO through the processor commodity risk fee.

CONTRACTING VS LICENSING

Metro regulates MRFs in their political geography through a common licensing process. The licensing process is an important tool because of the unique operational context in the Metro region in which local governments do not

contract with MRFs, and do not direct their materials to specific MRFs for processing. Most municipal recycling programs in North America extend their contractual oversight beyond collection to include MRF processing. Local governments and/or their franchise collection service providers could contract with MRFs. Setting performance standards through contracts opens additional tools for compliance Metro could support local governments by providing resources, such as a standardized contract template.

QUALITY STANDARDS FOR OUTGOING COMMODITIES AND RESIDUALS

Outbound standards can generally be categorized into two groups - Capture Rate and Purity Rate:

CAPTURE RATE OPTIONS

Capture Rate measures how well a MRF performs the core function of sorting recyclable materials into commodities. It is determined by measuring the quantity of incoming recyclable material that is properly sorted and shipped to end markets and compares it to the quantity of recyclable material that is received by the MRF. The following options for setting a capture rate standard are considered:

Name	Description	Ranges
Overall MRF Capture Rate	Measures the proportion of materials that are sold to recycling markets (as compared to residue) without distinguishing by material type.	• 90-98%
General Material Capture Rate	Materials grouped in general material categories. Standard may differ based on material type.	• 88-98% for paper, metal and plastic bottles • 80% for non-bottle plastics
General and Material-Specific Capture Rate	Materials grouped on general material categories and specific commodities for certain materials.	e.g., • OCC: 98% in fiber bales, 80% in OCC • Clear PET and HDPE 95% in plastic bales; 80% in PET/HDPE • UBC: 95% in metal bales, 90% in UBC • Mixed Plastic: 80% in plastic bales

Overall MRF capture rate provides a general sense of MRF performance. It is the least effort and cost of the three options but does not indicate whether material is missorted into another commodity as contamination. ***General material capture rate*** shows whether material is reaching end markets but does not reveal if material is sorted into bales with higher value and yield. ***General and Material-specific capture rate*** **is** the most detailed view of capture rate but requires the highest cost and effort to measure and track.

PURITY RATE OPTIONS

Purity Rate measures the extent that each intended commodity grade produced by the MRF meets a certain level of quality. The rate is determined by measuring the percentage of contamination in outgoing shipments. The following purity rate standard options are considered:

Name	Description	Ranges
ISRI / APR	Current industry standard; developed through a robust process, including end market and MRF perspectives.	See ISRI Specifications Circular & APR Bale Specifications
Self-reported market-based	Custom specifications are determined by buyers, usually a derivative of the ISRI standards. Reflected in agreements between buyer and seller.	i. 80-95% **purity** ii. .5-5% **prohibitives**, with specific material thresholds defined. (e.g. less than .1% of metal or .5% PVC in a PET bale) iii. 2-15% **outthrows**
New regional standard	Metro could initiate a process to set independent general purity standard with specific prohibitive tolerance.	i. 80-95% **purity** ii. .5-5% **prohibitives**, with specific material thresholds defined. (e.g. less than .1% of metal or .5% PVC in a PET bale) iii. 2-15% **outthrows**

Purity rate standards are more costly to measure and track than capture rates. Adopting an existing standard, such as ***ISRI*** / ***APR*** is the most prominent "language" in the marketplace and reflects collaboration between the MRF industry and end markets, though it may not perfectly reflect local market conditions or Metro values. ***Market-based standards*** are challenging to capture as they would be self-reported and may not reflect Metro's values. ***A new regional standard*** can best align with the local market and capture Metro values but would be a costly and lengthy process to develop.

All outbound options could include requiring MRFs to track and report outbound quality and adhere to a set standard. Metro can enforce these options through penalties or fines for violations, or license revocation.

If local governments or their franchise haulers contracted with MRFs there would be additional opportunities to incentivize compliance including:

- Payment for processing could be contingent on adherence to the requirements
- Flow of material could be contingent on adherence to the requirements
- Revenue sharing could be integrated into processing fee structure

QUALITY STANDARDS FOR INBOUND MATERIALS

The quality of material deposited on the tipping floor impacts the ability of the MRF to achieve outbound quality standards. Setting inbound standards and reporting requirements creates a feedback loop to help guide contamination reduction efforts. It is important to note that these standards need to be put in place along with education and outreach methods to reduce contamination at the curb. The following are options for setting inbound material standards:

Name	Description	Ranges
General Inbound contamination rate	Measures the amount of incoming material that is not program material. Target describes the desired outcome; can be configured with interim goals.	6-10% in five years reflects best achievable practices
Continual improvement-based standard	Focuses on improvement, rather than a set targeted rate.	5-10% reduction over a 5-year period, with interim goals of 1 % per year.
Load rejection standard	A standard for contamination levels above which MRFs are required to reject loads.	30% (typically set higher than the inbound target)
Residue rate standard	Percent of total materials received at the MRF that is sent to disposal as residue.	15% - 30% of total material processed sent to disposal. Can be adjusted depending on the inbound contamination rate.

The ***general inbound contamination rate*** sets a strong and measurable target. Enforcement may be challenging, since MRFs don't operate in the part of the system where contamination is generated. The ***continuous improvement rate*** provides a pathway to achieve target inbound contamination rates but may not be effective enough and has the same enforcement issues. The **load rejection standard** can be implemented along with other standards for inbound contamination. It provides a feedback loop for routes that consistently see contamination and can reduce unsafe material from entering the sort line. It may be a competitive disadvantage to MRFs in the Metro region if this standard does not apply to all MRFs handling Oregon materials. ***Residue rate* standard** relies on the same measurements as the overall MRF capture rate. There is a risk that it may lead to a perverse incentive to market contamination in commodity bales.

Inbound standards are challenging for MRFs as they are not responsible for recycling education, access and collection, and therefore removed from the point of generation of contamination. Inbound standards could require MRFs to:

1. Track and report inbound quality.
2. Set tiered pricing based on inbound contamination rates.
3. Reject loads that surpass the load rejection standard.
4. Adust outbound capture rate and/or residue rate standard relative to the inbound standard.

FACILITY-LEVEL MEASUREMENT AND REPORTING

Several measurement and reporting options are considered for monitoring and validating performance at a facility-level. Many of these can complement one another.

VISUAL INSPECTION

Name	Description/Frequency	Reporting	Validation	Cost
Visual / Photo Inspection of All Inbound Loads	Visual inspection and "grading" of each inbound load	Log each inbound load grade on scale ticket or Metro template. Rejected loads require supporting photos.	Observe visual inspection processes and inspection logs / scale tickets.	MRF covers costs of inspection, tracking and reporting. Metro covers validation.
Visual / Photo Inspection of Outbound Material Prior to Baling	MRF random visual inspection of each commodity on established frequency	Log each inspection in Metro template. Include self-determination of the success of meeting standards. Photo support of each entry.	Metro or designated 3rd party site visit to observe process and review inspection log.	MRF covers cost of inspection, tracking, and reporting. Metro covers validation.

Visual inspections are the least invasive and costly to the operation, but not as statistically rigorous. ***Inbound visual inspections*** require grading of each load. This is directly connected to contamination reduction efforts across the system by pinpointing the route where contamination is generated and aims to improve safety of materials entering the sorting stream. This option has greater impact if related to a load rejection standard, as that is a direct tool for preventing contamination from getting into the sort line and for targeting routes and materials to focus contamination reduction efforts upstream. MRFs need to add staff to perform the visual measurement requirements.

MANUAL AUDITS

Name	Description/Frequency	Reporting	Validation	Cost
Manual Auditing of Inbound Loads Graded Above the Rejection Threshold	Loads graded for rejection require sample audit by MRF staff. Any time a load is graded for rejection.	Sampling audit results tracked in inspection log	Set audit protocol; observe audit process and inspection log.	MRF covers costs of audit and reporting (may pass on to rejected hauler) Metro covers validation.
Random Manual Inbound Composition Audit	Random manual audit protocol set by metro and performed either by MRF, Metro or contracted 3rd party on set frequency.	Results published using a designated reporting template provided by Metro. Trends are analyzed in an annual report.	Set audit protocol; Metro or a contracted 3rd party observes and validates the methodology during the sort.	Cost covered by either MRF, or Metro
Ongoing "Grab Audits" of inbound or outbound Materials Prior to Baling	Periodic sampling of each material stream either inbound or prior to baling baler on established frequency.	Log each audit in Metro template. Include self-determination of the success of meeting standards. Photo support of each entry.	Metro or designated 3rd party site visit to observe process and original audit reports.	MRF covers cost of inspection, tracking, and reporting. Metro covers validation.
Full System Performance Test at MRFs	Clear MRF, isolate batch of "program material" and process it through the plant. "Grab samples" from each commodity/residue stream.	Record each performance test in Metro template. Photo support of each entry.	Metro or a 3rd party representative observe any of the performance tests.	MRF covers cost of performance test and reporting.

Manual audit of rejected loads validates the decision to reject a load and can provide data on problem materials and geography that contamination reduction efforts can target. ***Random Manual Inbound Audits*** have been performed by Metro periodically. These are costly and can be challenging logistically at some area MRFs. ***Ongoing outbound grab audits*** have lower operational impact than ***full system performance test*** and can provide a

reasonable level of rigor. Transparency is lower for the ***full system test***, as it is the most invasive and less frequent. MRFs need to add staff to meet manual audit requirements.

DESIGNATED AUDIT TEST SITE

Name	Description/Frequency	Reporting	Validation	Cost
Central Manual Audit Test Site	A test site established at a central location to audit materials from all MRFs on a set frequency.	Metro reporting template. Test site staff or Metro provides an annual report showing trends and progress against standards.	Metro observes audits and reviews original reports as appropriate.	Metro establishes and funds the test site
Central Audit Test Site with automated artificial intelligence visual recognition software	A test site at central location using artificial intelligence (AI) visual recognition to audit materials from all MRFs on a set frequency.	Metro reporting template. Test site staff or Metro provides an annual report showing trends and progress against standards.	Option to view video of automated testing. Site visit and accesses the collected data.	Metro establishes and funds the test site

The ***central audit testing options*** provide an ongoing picture of quality and bring Metro into an industry leading position. Funding and staffing of these sites falls to Metro. Effectiveness of ***central automated test site*** is unknown, as there are no existing use cases, though industry experts indicate that it is close to being commercially ready. The automated site requires more up-front cost with less ongoing staffing requirements.

FACILITY-LEVEL REPORTING ON MATERIAL DESTINATION

Metro seeks to added transparency of the destination markets for recyclable materials processed in the region. The destination data currently reported through the Solid Waste Information System (SWIS) is limited in detail and consistency. Several options exist for reporting recyclable commodity material destinations. It is important to note that MRFs may view their end market relationships as proprietary, and therefore any company-specific market reporting should consider confidentiality. Where regional destinations are reported publicly on aggregate the confidentiality concerns diminish significantly.

Name	Description/Frequency	Reporting	Validation
Reporting by Geographic Area	Monthly Reporting of each shipment more consistent with the current reporting to Metro. Slight updates to categories.	Report through SWIS. Add specific country and whether it is OECD or not.	Periodic audit of physical records (e.g., bills of lading/scale tickets)
Company-Level Reporting of All Shipments	Monthly report of each shipment including company name and unique ID for all inbound & outbound shipments.	Report through SWIS. Register and add company destinations.	Periodic audit of physical records (e.g., bills of lading/scale tickets)
Aggregate Mass Balance Reporting	Semi-annual reporting of aggregate inbound and downstream shipments including commodity type and company name.	Metro reporting template including information on tonnages received, recycled, disposed, rejected and stored.	Periodic audit of physical records (e.g., bills of lading/scale tickets)
Bill of Lading Reporting	Every transaction is reported and supported by a bill of lading, submitted every 6 months.	Metro reporting template including each transaction, scale ticket # (inbound), bill of lading (outbound), type of material and weight.	Periodic audit of physical records (e.g., bills of lading/scale tickets)

Obtaining information from brokers is a challenge for tracking destination of materials. Current ***regional reporting*** is not detailed or consistent enough to get a clear picture. It could be improved by setting more specific options to choose from and validating results. ***Company level reporting*** can be challenging given business sensitivities. Some MRFs' competitive advantage is linked to market niches fostered over many years. ***Mass balance reporting*** is less burdensome than the other three as it is reported on aggregate, as opposed to each load. It still requires identification of specific markets and reporting of material sent there on aggregate. ***Bill of lading reporting*** is time consuming and challenging both for the MRF and to for Metro.

FACILITY LEVEL REPORTING ON WORKFORCE WAGES AND DEMOGRAPHICS

Metro seeks to ensure that all jobs in the recycling industry pay living wages and aims to increase diversity in all occupations. Currently there is limited information on MRF workforce demographics and wages from which to inform future policy. The following options for facility-level reporting on workforce demographics, wages, and benefits at licensed MRFs to fill this data gap are considered:

Name	Description	Reporting Details
Annual Aggregate Reporting: EEOC-1 Report With *Component 2* Wage Information	Licensed MRFs are required to submit an annual Employer Information Report (EEO-1) with component 2 reporting requirements. Component 2 reporting includes information on pay data by job category, gender, ethnicity, and race.	MRFs submit an annual report including the aggregate number of employees by race, ethnicity, and sex separated into the 12 pay bands used by the U.S. Bureau of Labor Statistics in the Occupational Employment Statistics Survey.
Annual Detailed Workforce Indicator Report by Individual	Licensed MRFs submit monthly reports with employee-specific information on workforce demographics and wages. Each report includes details of each employee using a unique employee ID number to preserve personal information.	Standard template to collect the following: sex/gender, age, race/ethnicity, full or part time, status (regular/temp), job category, FLSA status (hourly or salary), hourly wages or salary, average weekly hours, non-cash benefits, length of service.
Annual Workforce Survey	Conduct an annual survey to obtain similar information to that detailed in Options 1 and 2. Participation can be optional or required as a condition of the facility license.	Details drawn from examples noted in Options 1 and 2

Aggregate EEOC reporting on demographics alone is common. This option adds wage details. It was briefly a national requirement for businesses over 100 employees (prior to 2017) and is now required in California. This option has more precedence, and the format is familiar to HR staff. It is not as burdensome to report as a report including each employee, though it is less detailed than the ***annual detailed indicator report by individual.*** That option is similar to Metro requirements for transfer station operators. It requires reporting of each individual employee, as opposed to reporting on aggregate. It requires more effort but results in more data to support understanding and decision making around equity. ***The annual workforce survey*** is a different method for data collection.