Massachusetts Department of ENVIRONMENTAL PROTECTION

TOXICS USE REDUCTION PLAN AND PLAN UPDATE GUIDANCE

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Developed in collaboration with:

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1 INTRODUCTION

The Toxics Use Reduction Act (TURA, MGL c. 21I) and its regulations at 310 CMR 50.00 establish toxics use reduction as a central component in the Commonwealth's efforts to protect public health and the environment while promoting the competitive advantage of Massachusetts businesses by encouraging efficient materials use and management protecting health and the environment.

Toxics Use Reduction (TUR) planning is designed to reduce the amount of toxic chemicals used and generated as waste (byproduct) in a production process. These include toxics that are treated on-site, transferred off-site, or released to the environment. TUR planning helps a company identify toxics reduction measures that are implementable and cost-effective. While completing a TUR plan is mandatory, the decision to implement an identified TUR option is solely up to the facility.

TURA requires Large Quantity Toxics Users, defined as facilities that manufacture, process, or otherwise use chemicals on the regulated TURA Chemical List in amounts that exceed regulatory thresholds, to file annual Toxics Use Reduction (TUR) reports detailing their use and waste of these "covered toxics."

TURA also requires regulated facilities to complete a TUR Plan, including the submission to the Department of a Plan Summary, on even-numbered years. The purpose of the Plan is to:

- Evaluate how and why toxic substances are used at the facility;
- Quantify covered toxics used, generated as byproduct, treated, released onsite, and/or transferred to offsite waste management facilities during the manufacturing of each product;
- Evaluate the cost of using the covered toxics to make each product;
- Identify opportunities for reducing the use of covered toxics in production processes and/or products;
- Determine the technical and economic feasibility of implementing the identified opportunities; and
- Decide which options to implement, and which options require further evaluation before implementation.

TURA defines "toxics use reduction" as "in-plant changes in production processes or raw materials that reduce, avoid or eliminate the use of a toxic or hazardous substances or generation of hazardous byproducts per unit of product produced without substituting a more toxic chemical or shifting risks to workers, consumers, or parts of the environment." TUR can be accomplished through any of six defined techniques, which can be summed up in two ways:

1. **Switching to a less toxic substance (*input substitution*) or making the product itself less toxic (*product reformulation*).** An example would be changing the formulation of a process chemical from containing an organic solvent to containing water.

2. **Using the toxic substance more efficiently or ceasing the use of the substance.** This can be accomplished through:
    - *production unit modification* (changing the process to accommodate TUR) or
    - *modernization* (providing more control over an existing process to facilitate better efficiency) or
    - *improved operations and maintenance* (such as with routine preventive maintenance of equipment or housekeeping methods) or
    - *integral recycling* (conducted within the control of the process and its operators to minimize the potential for spills, leaks, or exposures) – for example changing painting methods to reduce overspray and increase transfer efficiency so that less of the paint ends up as hazardous waste.

Note: Reducing production levels are not considered toxic reduction, and neither the law nor the regulations require Massachusetts industries to take such a step. Furthermore, there is no requirement in the TURA statute mandating companies to eliminate or reduce the use of a covered toxic.

The regulations also allow for alternatives to Toxics Use Reduction Planning. Companies that have completed their initial TUR Plan and have submitted TUR Plan Updates for two consecutive planning cycles have the option of completing either a Resource Conservation (RC) plan or an Environmental Management Systems (EMS) plan. See Section 5, Alternative Planning Process, of this Guidance document for more information.

2 GENERAL TUR PLANNING GUIDANCE

2.1 Basic Requirements

There are three requirements for TUR planning:

- Required activities: Actions and analyses companies must undertake and decisions that must be made;
- TUR Plan: The Plan must include a description of the planning process used, the calculations, assumptions and supporting documentation associated with planning efforts, the results of the feasibility analyses conducted, the decisions made and their rationale, and the certification and signature of the Toxics Use Planner who worked with the facility during the process; and
- Documentation: Documents showing how the information was collected, analyses completed, decisions made, and documentation of the result of planning.

As described in 310 CMR 50.00, there are specific factors that dictate how and when TUR Plans are completed. Large quantity toxics users (LQTUs) of TURA chemicals are required to develop biennial Toxics Use Reduction Plans (every even-numbered year is a planning year) that evaluate technically, and economically feasible toxics use reduction opportunities are available to the facility. Please refer to the TURA Reporting Instructions.

A facility is an LQTU if it meets all three of the following criteria:

- Conducts any of the business activities described by Standard Industrial Classification (SIC) codes (or its NAICs equivalent) 10 - 14, 20 - 39, 40, 44 - 51, 72, 73, 75 and 76;
- Employs the equivalent of at least 10 full-time employees (FTEs); and Manufactures, processes, or otherwise uses a TURA-listed toxic substance (see Complete List of TURA Chemicals) in excess of the applicable reporting threshold.

The TUR Plan Summary being submitted on July 1 of each planning year MUST include:

- All covered toxics for which the company is required to submit a state Form S and a federal Form R; **AND**
- Each covered toxic that was *also* reported at least once in any previous year.

EXCEPTION: If a facility is reporting a chemical for the first time in a planning year, it is not required to include this chemical in the Plan.

Timing of TUR Options:

While the TUR Plans must be completed and certified by a Senior Management Official and Toxic Use Reduction Planner by July 1 of each planning year, the identification, evaluation, and implementation of TUR options may not fit into the standard two-year planning cycle. For example, some product or production process modifications may require several years of work, while others may be identified, analyzed, and put in place very quickly. Possible issues and suggested solutions would include:

- It may not be possible to complete implementation of a selected TUR technique until after the Plan due date. However, the plan is required to include an implementation schedule.
- If it is not possible to complete a full technical evaluation and economic evaluation of a TUR technique identified in the current Plan by the Plan Summary due date, the Plan must include a schedule for completion of the evaluation and decisions on implementation.
- If a Facility identifies and evaluates and/or implements "new" TUR techniques at any time between the completion of their prior Plan and the start of the current planning cycle, the new options must be

described and included in the current TUR Plan/Plan Summary.

The Toxics Use Report is submitted annually on or before July 1 using the MassDEP online system (eDEP). The Annual Report includes the state Form S which covers toxics used in the prior calendar year. In a Planning Year (every even-numbered year), the Annual report and the Plan Summary are combined into one submittal and must also be submitted using eDEP. The Plan Summary must also have the TUR Planner and Senior Manager Certification statements submitted with the Annual Report/Plan Summary. PLEASE NOTE – the TUR Planner certification statement is a SEPARATE form within eDEP. The MassDEP website can be reached at Toxics Use Reduction (TUR) Online Reporting.

2.2 Where the Completed Plan is Kept / Recordkeeping Requirements

Plans must be kept at the facility as either a paper document or in an electronic format for at least five years after the Plan completion date. The referenced supporting documentation need not be kept together or with the TUR Plan itself if the Plan references the supporting documentation and states where it is located with sufficient specificity to allow the TUR Planner or others reviewing or updating the Plan to easily access it. TUR Plans must be made readily available for review by a MassDEP inspector or the TUR Planner.

Note that Plan Updates involve reviewing decisions made in prior planning years, particularly the decisions regarding the technical and economic feasibility of potential TUR options. Supporting documentation describing how conclusions were reached must be retained for as long as the technique is still deemed possible, therefore, techniques fitting this description must continue to be included in future Plans until it is determined the techniques are not feasible. See Section 3 (The Required TUR Plan Elements) for a more in-depth discussion.

While the TUR Plans are not public information, MassDEP has the authority to review the TUR Plan. This review may be performed on site by an inspector or following a formal "Request for Information" by MassDEP for the facility to submit the plan for a compliance review. Inspectors have received special training in confidentiality and therefore must be allowed to review the TUR Plans and supporting documentation in their entirety.

The Plan Summary, consists of the following elements:

- two-year projected changes in use and byproduct generation,
- options considered for implementation,
- options selected for implementation, and
- options implementation in prior years.

All the above elements must be submitted to MassDEP in conjunction with the annual Form S report. The Plan Summary is public information; however, portions may be claimed confidential. If your facility submits confidential information, MassDEP will maintain a "sanitized" version (one that does not contain confidential information) for public review. (See MassDEP's confidentiality regulations at 310 CMR 3.00.)

2.3 Exceptions to the Planning Requirement

2.3.1 General Exceptions

Although the following circumstances exempt facilities from planning for certain chemicals, facilities are still required to report that these exemptions apply on the "Plan Submittal Selection Form" that must be submitted with the annual Form S report. TUR planning is not required for a chemical under the following circumstances:

2.3.1.1 Planning is not required when the planning year is the first year in which an annual Form S report will be required for the covered toxic substance.

Planning is only required on chemicals that have been reported in a year ***prior*** to the planning year. If the facility is only reporting on chemicals that have never been reportable in any prior year, it is not required to prepare a TUR Plan in that planning year.

2.3.1.2 Planning is not required when chemical use has been eliminated or reduced below the reporting threshold in the planning year.

If a facility knows that it will not exceed the reporting threshold for a chemical in a particular planning year and will therefore not be reported on the annual report the following year, the facility does not need to include that chemical in its TUR Plan for that planning year. The facility must certify that the chemical use will be below the reporting threshold in Section 3.b. of the Plan Summary Selection Form.

EXAMPLE:

Company A used more than 10,000 pounds of toluene in CY 2022 and CY 2023. Company A adopted TUR methods reducing total use below the 10,000-pound threshold in CY 2024. Company A would not be required to complete a 2024 TUR Plan for toluene, even though the facility included toluene in its Reporting Year 2023 Annual Form S Report due to MassDEP by July 1, 2024.

Caution: Use this exemption carefully. Companies are subject to enforcement for failing to complete a TUR Plan if the TUR is not as successful as expected, resulting in actual use exceeding the reporting threshold.

2.3.1.3 Planning is not required when the facility is scheduled to close.

If a facility is scheduled to shut down during the planning year, planning is not required. Note that TUR Plans and annual reports are conducted for a single facility. For example, if a company is anticipating closing their Massachusetts operations and moving to another state, there is no TURA planning required for the closing facility. If a facility is scheduled to move its production operations to a different and separate Massachusetts facility, the closed Massachusetts facility would not need to produce a TUR Plan. However, if the different and separate Massachusetts facility meets the requirements for TURA filing, this facility would need to prepare a TUR Plan in the following planning year after its first year of TURA reporting.

Caution: Use this exemption carefully. Companies are subject to enforcement for failing to complete a Plan if the facility does NOT close in the planning year.

2.3.2 Partial Exceptions: Only Facility-Wide Planning is Required.

As with annual Form S reports, some portions of the Plan are done for the facility as a whole, whereas other portions of the Plan apply to individual production units. Sections 3.1 and 3.3 describe the facility-wide requirements. These include waste treatment, pilot plants, start-up production units and chemicals used in laboratories, and are discussed below.

> ***Note***: Although the following circumstances exempt facilities from planning for certain chemicals, these facilities are still required to report that these exemptions apply on the "Plan Summary Selection Form" that must be submitted with the annual Form S report.

Only Facility-Wide Planning is required for certain toxic chemicals used in the following situations:

2.3.2.1 Waste treatment chemicals

A chemical used solely for the purpose of waste treatment is not required to report on a production unit level for that chemical, and only the facility-wide portions of the Plan must be completed. However, if the chemical is also used in other processes such as cleaning, production unit level planning is required for the cleaning process and all non-waste treatment processes in which the chemical is used.

2.3.2.2 Pilot plants

A pilot plant is a pre-commercial production system that employs new production technology and/or produces small volumes of new technology-based products, mainly for the purpose of testing the new technology. As with chemicals used in waste treatment, chemicals used in pilot plants need not be included in production unit level reporting unless also used in other processes.

2.3.2.3 Startup production units

The exemption also applies to chemicals used in startup production units. Note, however, that the exemption for production unit level reporting and planning only applies to the time it takes to get the production working at the desired efficiency or two years from initial operation, whichever is shorter.

2.3.3 Chemicals Used in Laboratories

Chemicals used in laboratories under the direction of a technically qualified individual as defined under the federal EPCRA program (40 CFR Part 720.3(ee)) are not counted toward facility-wide use of those chemicals. Therefore, the TUR Plans and annual Form S reports do not need to cover the use of a chemical in a laboratory that meets this condition.

> ***Caution***: The laboratory exemption does NOT apply to specialty chemical production or to the manufacture, processing, or use of toxic substances in pilot plant scale operations, or activities conducted outside of the laboratory.

2.4 Is Implementation of TUR Options Mandatory?

No, implementation of TUR options is not mandatory. While planning is mandatory, facilities are not required to implement any identified techniques; however, an explanation as to why they have chosen not to implement those that are technically and economically feasible must be provided.

Facilities that have selected TUR options to implement will not face enforcement actions from MassDEP if they can demonstrate that efforts have been made to meet their self-determined implementation schedules or project milestones.

Changing market conditions or new information may cause a company to reassess its Plan. If a facility decides to alter or abandon an implementation schedule, the decision must be explained in the subsequent TUR Plan and Plan Summary submitted to MassDEP.

2.5 The Physical TUR Plan

The physical TUR Plan is the compilation of documents that describe:

- The actions undertaken;
- The analyses conducted, along with the calculations, assumptions, and methodologies used;
- The decisions made; and
- Explanation of the decisions.

References to, and the location of, other supporting documentation that informed the analyses, calculations, assumptions, and decisions are also part of the physical TUR Plan.

Exhibit 1 of the Appendix provides a checklist for the physical Plan that should be used by both the TUR Planner and the Senior Manager to review the Plan and ensure that it meets the regulatory requirements. Refer to Section 3 for a more in-depth explanation of each of the items on the checklist.

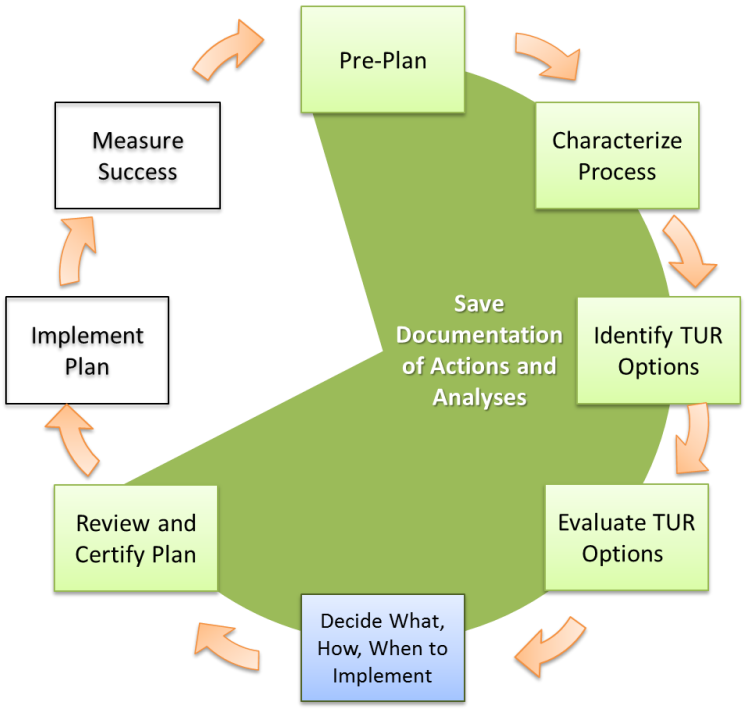
2.6 The TUR Planning Process

Figure 1 presents an overview of the TUR planning process. Decisions and analyses need to be documented throughout the process. While not required by the regulations, many companies find it to their advantage to measure progress and identify and evaluate TUR options on a continuous basis. The Plan then becomes a mechanism to report back on the various options considered and evaluated since completion of the prior Plan.

Figure 1:

Elements and sequence of a TUR Plan

Shaded elements are required by TURA



Considerations relative to the planning process in Figure 1 include:

1. **The options identification, evaluation, and decision-making process is not likely to occur in a linear fashion.**
   Examples:
   - During the planning process, new techniques may be brought to light and evaluated, while others may be discarded once it is determined that they are not TUR, would violate other environmental regulations, or are technically or economically infeasible.
   - Evaluating various approaches may give rise to new ideas.
   - Some options may take extensive research or testing to determine if they are feasible and move the option to the next planning cycle.
   - It is unlikely that all the options will be in the same phase of the process at the same time.

2. **The options identification, evaluation, and decision-making process need not occur entirely within the six-month planning period from employee notification on or before January 1 through July 1 of the planning year.**

   Examples:
   - Options may have been identified, evaluated, and/or implemented in the 24 months since the last Plan was completed.
   - Others may take several years to fully evaluate or implement.
   - Options that were implemented since the last Plan can be added to the Plan with inclusion of the analyses that lead the company to the implementation.
   - A detailed implementation schedule suffices for options already being implemented.

- Options requiring further evaluation need an implementation plan describing the further evaluation and an explanation of why the additional time is needed.

3. **The technical and economic evaluations are "complete" and can be stopped as soon as the company has enough information to determine that the evaluation has been done in "good faith"**

   A technical evaluation of an option is complete when the TUR Planner deems in good faith that further evaluation may not improve the option's value to the process. For example, a participant in the planning process might note that the proposed substitute chemical or process change poses greater health and safety risks than the chemical under evaluation. Another example would be if someone on the team knows that the chemical and/or technique was tried previously but could not be implemented due to product quality issues. In other situations, the facility may need to do additional research into the effects on product quality or customer acceptance before it can assess the option's technical feasibility.

   As with the technical evaluation, the economic evaluation may involve extensive research or analysis, or it may be relatively simple. For example, a technique could be deemed "clearly" economically infeasible based on a rough estimate that showed the annual cost of implementing the change would exceed by orders of magnitude the total annual current costs of using the toxic. The economic analysis would be complete with the calculation of the current cost of using the technique and the rough (but good faith) estimate of the cost of implementing the new technique. In other situations, the facility may need to do some research into the operating or capital costs before it can determine economic feasibility.

2.7 TUR Plan Development Standards

The TURA planning regulations are flexible, leaving companies free to use whatever process and format works best for them provided that the essential elements are included in the Plan. The process is designed to complement a facility's existing management, planning, and decision-making processes.

There are five standards to which companies must adhere in preparing a TUR Plan or Plan Update:

1. Use good engineering practices;
2. Use standard accounting practices;
3. Develop sufficient information to complete the Plan in accordance with the regulations;
4. Demonstrate a good faith and reasonable effort to identify and evaluate TUR options; and
5. Use economic feasibility assessment practices that are consistent with the facility's current economic decision-making practices. A company may choose to modify its practices to adopt an identified TUR technique.

The amount of economic analysis required will vary depending on the TUR option under consideration. The analysis conducted must be sufficient to make informed business decisions, in accordance with existing company decision-making practice. Analyses and calculations developed must be presented in the Plan, and can include handwritten calculations and notes, a formal consultant's report, a computer printout, etc. The only requirement is that the information is legible.

2.8 How a TUR Plan Update Differs from the Initial TUR Plan

After the initial Plan is prepared, it must be updated in every subsequent planning year for which a Plan is due for one or more covered toxic chemicals. The TURA statute and regulations include the same requirements for Plan Updates as for the initial Plans. Filers should reference the regulations at 310 CMR 50.48.

2.8.1 What a TUR Plan Update Involves

Facilities update a Plan by reviewing the current Plan and revising it as necessary to ensure that it is current and up to date.

Examples:

- Changes made in corporate policy or recognition that a future change in the policy encourage a larger focus on TUR may necessitate changes in the "Management Policy;"
- Significant alterations in the production lines or production processes affecting use and byproduct generation or the availability of TUR options should be noted in the update;
- Updates to chemical use and waste information to reflect the prior calendar year production levels and chemical use;
- Updating the list of potential TUR options;
- New (and carryover) options must be evaluated; and
- The evaluation of options rejected in prior years need to be reviewed and the technical/economic assumptions and 'cost of toxics' updated if necessary.

Updating the Plan does not involve rewriting it. A facility can add notes on sections reviewed and add updated information as an addendum to the Plan.

2.8.2 The Level of Effort for a TUR Plan Update

The specific situations at a facility will determine the level of effort of a TUR Plan Update.

Example:

- For companies whose production processes have not changed, the Plan Update may require a limited amount of time.
- The Plan Update may require more extensive work for facilities in rapidly evolving industries, those that have made extensive changes to their products or production processes, and/or have added new chemicals since the last Plan was developed.
- The Plan Update is a compilation of the work, analyses and changes made at the facility since the last Plan.
- A Plan Update does not require a separate planning process provided that the TUR Planner can certify that the planning requirements were met.

2.9 Role of the Senior Management Official and the TUR Planner

2.9.1 The Role of the Senior Manager

It is the responsibility of the senior manager at the facility to ensure that the Plan is a true reflection of a facility's current and future operations. The senior manager is required to sign a certification statement to that effect, under the penalty of the law.

2.9.1.1 Who can sign as the "senior manager"?

The senior manager must have management responsibility for the person or persons completing the Plan *and* must have authority to act as an agent for the toxics user (i.e., the company).

2.9.1.2 What is the senior manager attesting to by signing the certification statement?

The senior manager is attesting that "the information in the Plan and supporting documentation is true, accurate and complete," including:

- Employee notification occurred as described;
- The management policy is in place at the facility location;
- Process flow diagrams for all processes are included and are correct;
- Covered toxics used above the threshold and subject to planning have all been identified;
- Amount of the toxics used, generated as byproduct, and the amount of the byproduct treated onsite, transferred offsite, and released to air, water and land onsite and offsite are accurate for each production unit in which the toxics are used and are fully supported by documentation;
- Cost of toxics is correctly calculated and fully supported by documentation;
- Procedures used to identify options for potentially achieving toxics use reduction are supported by documentation an implemented as described;
- Economic and technical evaluations were done using the company's standard economic evaluation procedures and are supported by documentation; and
- Options selected for implementation or identified as requiring further analyses, and the associated schedules for these actions, are accurate.

2.9.1.3 How does the senior manager assure that the certification is accurate?

To attest that the Plan is true, accurate and complete, the senior manager must:

- Personally examine the Plan;
- Be familiar with the Plan and the planning process;
- Conduct an inquiry of the individuals immediately responsible for developing the Plan to assure that the contents are accurate, and the documentation is true, accurate and complete; and
- Have sufficient understanding of the planning requirements to be able to assert that, to the best of his/her knowledge, the Plan meets the regulatory requirements.

2.9.2 The Role of the TUR Planner

The statute delegates the review and approval of Toxics Use Reduction Plans to MassDEP-certified TUR Planners. Their job is to evaluate the Plan, much as a MassDEP inspector would do, to determine that the Plan:

- Complies with the requirements included in the TUR planning regulations found at 310 CMR 50.40; and
- Demonstrates a good faith and reasonable effort to identify and evaluate toxics use reduction options.

2.9.2.1 How does the TUR Planner certify a TUR Plan?

The TUR Planner must:

- Examine the Plan;
- Be familiar with the contents of the Plan;
- Ensure that the Plan contains each required section, including:
    - Employee notification,
    - Management policy,
    - Plan scope (including the description of the options identification process),
    - Production unit characterizations for each production unit in which a covered toxic is used, including process flow, materials accounting, qualitative or quantitative cost of toxics, purpose of the toxic chemical in the production unit, and unit of product,
    - TUR Options identified,
    - Technical and economic evaluation of each appropriate option,
    - Decisions on each appropriate option,
    - Required implementation/continued evaluation plans, and
    - Plan summary.
- Ensure that each section meets the standards for planning:
    - Has the required contents, including descriptions, calculations, and assumptions;
    - Is supported by documentation; and
    - Was completed with an understanding of the regulations and requirements for the Plan, in good faith.

3 THE REQUIRED TUR PLAN ELEMENTS

The Plan elements are discussed below. Because the planning process is iterative, it may not be possible to complete some portions of an element until subsequent work is done.

3.1 Initial Facility-Wide Requirements

3.1.1 Employee Notification on or Before January 1 [310 CMR 50.42(5)]

Facilities must notify all employees on or before January 1 of every Planning Year that a TUR Plan or Plan Update will be developed before July 1.

CONTENT: Six months prior to the date when the plan must be completed and submitted (July 1 of every even-numbered year), the facility must notify employees of the Plan requirements and identify the production units which will be included in the Plan. In the notice, the facility should solicit employee ideas aimed at eliminating or reducing the use of, and waste from, covered toxics in the production processes. The notification can be delivered the employees by any means considered effective.

PURPOSE: The Employee Notification notice serves to alert company workers to the upcoming planning process. The planning process should involve individuals throughout the organization, including those on the production line. Experience has shown that production line workers often have considerable insight into reducing chemical use and waste. In addition, the planning process itself requires expertise from facility personnel in various fields such as engineering, environmental compliance, marketing, finance, purchasing, sales, production, management, quality control, legal, health and safety, materials control, and research and development.

Facilities whose covered toxics are used **solely** for

- treating waste, wastewater, or air emissions,
- use in a pilot plant, or
- use in a startup production unit for the first two years of production,

need only complete the Facility-wide portion of the TUR Plan. The Plan must be certified by both the Senior Manager and a Toxics Use Reduction Planner, and a Plan Summary must be submitted to MassDEP with the Annual Form S Report on or before July 1 of the Planning Year.

Some facilities offer incentives to individuals who have suggestions for reducing toxic chemical use or waste. The notification may be used to announce these kinds of incentives if a facility chooses to offer them.

PLAN UPDATE: The Plan Update should either note that the notification process was not changed, or if it was, include the revised description. Evaluating and changing a notification process that previously did not generate any feedback from employees indicates an effort to solicit employee input.

WHAT MUST BE IN THE PHYSICAL PLAN: The Plan must include a description of the steps (contents, date and means of distribution) taken to notify employees. If the notification was done in writing, a copy of the notification, the date, and means of distribution would suffice. If done orally, a transcript of the meeting(s) along with the time and place and how the company ensured that all employees received the notification is required.

3.1.2 Management Policy [310 CMR 50.43(1)]

The Plan must include a statement of the management policy at the facility regarding toxic use reduction. A management statement dealing only with pollution control, waste minimization or recycling does NOT satisfy this requirement. The management statement must describe the company's policy toward reducing the use of toxic chemicals and their generation of byproduct.

CONTENT: At a minimum, the management policy must include descriptions of:

- The ways in which the company encourages toxics use reduction; and
- Company policies that EITHER encourage OR discourage toxics use reduction. These policies could be in the areas of:
    - Research and development,
    - Financial or capital investments, and
    - Hiring promotions, bonuses, or other incentives for company employees.

PURPOSE: The purpose of the Management Policy is to focus attention on ways the company currently promotes toxics use reduction, and what, if anything, it does that prevents toxics use reduction. This review and compilation of policies affecting TUR is intended to lead companies to either develop new policies or change existing policies to both encourage toxics use reduction and eliminate barriers to TUR. The Policy is also intended to communicate the company's approach to TUR.

Strong management commitment is central to successful development and implementation of toxics use reduction programs. Toxics use reduction planning encompasses many facets of facility operations, such as process engineering, environmental management, research and development, and purchasing and finance. It is essential that support and coordination occur at the management level. For example, some companies use the management policy to ensure that the principles of toxics use reduction are incorporated into all research and development activities, and all product and process design and modernization decisions. The management policy also serves to communicate the importance of TUR at all levels of the organization.

PLAN UPDATE: The management policy must be reviewed during the Plan update process to determine if any adjustments are required due to changes in other corporate policies or procedures, changes in company management, or to improve the policy's effectiveness. If no changes are made, note the date of the review and decision to leave it unchanged. If it is changed, the new policy must be included in the Plan.

WHAT MUST BE IN THE PHYSICAL PLAN: The written management policy with the written approvals required for any other corporate-wide policy, along with the policy adoption date, must be maintained in the physical Plan.

Management policies may be in a variety of written formats, for example:

- Narrative statement
- Concise bullet points
- Logo with a statement of philosophy

3.2 Production Unit Level Requirements

TUR options must be identified and evaluated for each reportable toxic in each production unit where it is used. The production unit in the plan must be consistent with the production unit description, including the process steps provided on the annual Form S reports. Facilities may choose to redefine their production units over the course of the planning process. If this is done, the Form S reports submitted in the planning year must reflect these changes. The following five sections of the Plan must be completed for each production unit where the covered toxic is used.

3.2.1 Process Characterization [310 CMR 50.44]

The process characterization lays out how the covered toxics are used in each production unit; in what amounts they are used; their function in the production unit; where they are incorporated into product or how they are lost as byproduct and emissions, releases, or offsite transfers; and the amounts of those losses.

3.2.1.1 Purpose the Chemical Serves

CONTENT: The Plan must include an explanation of the specific purpose the chemical serves in the production unit.

PURPOSE: An understanding of why the chemical is used is needed to evaluate whether the chemical can be eliminated or used in a lesser amount, or if a less toxic alternative can be substituted.

WHAT MUST BE IN THE PHYSICAL PLAN: The process characterization must include a written explanation for how each covered toxic is used in the production unit.

3.2.1.2 Unit of Product

CONTENT: The product and the metric for measuring the quantity produced should have already been identified in the annual Form S report. While developing TUR Plans, facilities may decide to change their unit of product. This is acceptable, provided that the same unit of product is used on the annual Form S report submitted with the Plan Summary. See further discussion of unit of product in TURA Reporting Instructions.

PURPOSE: An accurate unit of product allows a facility to assess the effectiveness of its TUR planning by normalizing data (i.e., the amount of a covered toxic used per unit of product, the costs of using it per unit of product, and the costs and savings) to account for natural fluctuations in production.

PLAN UPDATE: If the unit of product has not changed since the prior TUR Plan, the facility should note this fact on the previous TUR plan and include the date it was reviewed. If the unit of product has been changed, include the new description in the Plan with the date the unit of product was changed. Make sure the unit of product is also changed on the applicable annual Form S reports submitted with the Plan Summary.

WHAT MUST BE IN THE PHYSICAL PLAN: The unit of product must be stated in the TUR Plan for each reported toxic used in the production unit. No further documentation is required.

3.2.1.3 Process Flow Diagram

A process flow diagram must be prepared for each production unit. The process flow diagram is a visual representation of the movement of the covered toxic through the processes within a production unit. These diagrams identify the processing steps used in the production unit, where and how the reportable chemical enters and is used in the production process, and where it leaves the production unit as product or byproduct.

PURPOSE: By identifying the points in the process where the covered toxic leaves the production unit as byproduct, the process flow diagram reveals production process steps that could be changed to reduce or eliminate the raw material loss as byproduct.

CONTENT: The process flow diagram must show:

- The number assigned to the production unit, and reported on the applicable Form S report;
- Each manufacturing or processing step, including
    - raw material receipt, storage, and transfer to the production unit
    - transfer and storage of the product up to the point it is shipped offsite
- The manufacturing steps that have been identified on the Form S report submitted in prior reporting years;
- The same steps as are included on the Form S reports;
- Non integral recycling;
- Waste treatment;
- Waste transfer and storage until the waste is shipped offsite;
- The movement of the "covered toxic" through the production unit, including the location where the covered toxic:
    - Enters the production unit
    - Leaves the production unit as byproduct or product
    - Is released as byproduct to the air or water, disposed of to land onsite, destroyed through onsite treatment, or transferred off site as a solid or hazardous waste or wastewater
- The revision date of the diagram.

> **Note**: Because the production facility includes all aspects of production from the receipt of raw materials through the shipment of finished product, facilities with more than one production unit may have steps that are common to all production units.

PLAN UPDATE: If the production process has not changed since the prior TUR Plan, the prior process flow diagram may be used, provided that the date it was reviewed for the current TUR Plan is included. If the production process has changed, a new process flow diagram must be prepared.

WHAT MUST BE IN THE PHYSICAL PLAN: The process flow diagram, including the date it was prepared/last updated must be included in the TUR Plan. Exhibit 2 in the Appendix is an example of a process flow diagram that contains all the elements that must be included in the Plan. If more than one covered toxic is used in a production unit, the Plan can either include all the chemical movement information on the same process flow diagram or separate process flow diagrams can be developed for each covered toxic. No further documentation is required.

3.2.1.4 Material Use, Byproduct, Transfer and Release Accounting

Detailed materials accounting describes total inputs and outputs of the "covered toxics" in the production unit for the year on which the plan is based. The input is the quantity of chemical used in the production unit. Outputs are the losses as byproduct, including the fate of that byproduct (e.g., onsite recycling, treatment or release, or transfer offsite for recycling, wastewater treatment or hazardous or solid waste treatment or disposal).

PURPOSE: Materials accounting reveals the quantity of each covered toxic used and lost as byproduct in the production process, and the management of the byproduct – onsite release, treatment, recycling, or transfer offsite for treatment and/or disposal.

This exercise provides data needed to quantify the full cost of using the chemical and makes it possible to calculate the full cost of using the substance. This information can be used to evaluate the potential savings from reducing or eliminating the byproduct that must be managed in accordance with environmental regulations. In addition, this process is the basis for measuring the success of the TUR changes implemented. If the TUR was successful, use and byproduct should decrease per unit of product produced.

CONTENT: The use and waste accounting includes the total amount of each covered toxic, and the amount per unit of product, that is:

- Manufactured, processed or otherwise used;
- Generated as byproduct; or
- Released from the facility as emissions.

The materials accounting must also state, for each covered toxic used in the production unit:

- The total amount of the byproduct that is:
    - Treated (destroyed/converted into another chemical) onsite
    - Treated offsite
    - Recycled onsite
    - Recycled offsite
    - Disposed of onsite
    - Disposed of offsite

Byproduct must be tracked to its ultimate disposal by calculating:

- The amount being released onsite (including any amounts that remain in the waste stream following treatment) to:
    - Air
    - Water
    - Land
- The amount transferred offsite as:
    - Solid or hazardous waste
    - Wastewater
- The amount treated offsite as:
    - Solid or hazardous waste
    - Wastewater
- The amount recycled offsite

- The amount disposed of offsite (the fate of materials transferred offsite that were not destroyed through treatment) to:
    - Land
    - Water
    - Air

The estimation methods used to determine each of these amounts must also be described in the Plan.

These analyses for each production unit must include:

- byproduct and emissions from all portions of materials handling (receipt, storage, and transfer) from the production unit,
- use in the production unit, and
- transfer and storage of the final product.

Byproduct generated through facility-wide activities must be allocated among production units if a covered toxic is used in more than one production unit. Acceptable approaches for obtaining byproduct and emissions data include measurements, estimations, or engineering calculations.

The following methods fall within the criteria of "standard engineering practices" and can be used for determining byproducts and emissions. These are the same methods that are used for preparing the facility-wide chemical use and waste information submitted on the annual TUR reports. Note that other methods may also be appropriate, such as:

- EPA published or facility determined emissions factors;
- Continuous monitoring;
- Extrapolations from periodic monitoring;
- Design calculations (e.g., estimating yield for a chemical manufacturing operation);
- Mass balance calculations such as the assumption that the amount otherwise used equals byproduct (e.g., no direct measurement of emissions);
- Engineering calculations using physical and chemical property data found on safety data sheets or other sources; and
- Laboratory results (e.g., solvent content of coated product).

Methods of quantification will differ from company to company and may differ within a company for each chemical or production unit. In addition, facilities may choose to refine their calculations later in the planning process when they are evaluating whether to implement a particular TUR technique.

PLAN UPDATE: Because the amount of the covered toxic used and generated as byproduct and released onsite or transferred offsite changes from year to year, the materials accounting must be redone each planning cycle. It may change substantially if TUR has been implemented since the last planning cycle.

WHAT MUST BE IN THE PHYSICAL PLAN: The materials accounting, including the calculations, assumptions, and estimation methods, must be included in the Plan. The source of the data used (e.g., consultant reports, monitoring data) in the calculations must be referenced and available for review by MassDEP for five years following the TUR Plan due date but does not need to be included with the Plan.

If the calculations and reference documents used to support the Form S and Form R calculations meet the planning requirements, they can be used in the Plan. However, the information required for the Plan is at the production unit level. If a chemical is used in more than one production unit, the Form S and Form R calculations and associated documentation will not be sufficient to document the amount used in each individual production unit.

The calculations do not have to be typed. Exhibit 3 in the Appendix shows an optional format that can be used for the materials accounting.

3.2.1.5 Cost of Toxics

PURPOSE: The purpose of the "Cost of Toxics" analysis is to ensure there is a comprehensive analysis of all the costs, those that are obvious, such as the purchase cost, and those that are less clear, such as environmental compliance costs. This information is the basis of the evaluation of economic feasibility and will also allow for a quick screening of many options. If, for example, the cost of implementing a TUR option is many times the maximum possible savings if the substance was eliminated entirely, it could be considered clearly economically infeasible.

CONTENT: A qualitative or quantitative cost of toxics determination must be made for each covered toxic in each production unit in which it is used.

The evaluation can be *qualitative* if the chemical has no technically feasible options for TUR in the production unit. A qualitative analysis involves identifying which cost elements are relevant – those that would change if the covered toxic chemical use changed or was eliminated – stating whether the cost would increase or decrease with use, and the relative magnitude of the change.

The evaluation must be *quantitative* if one or more technically feasible TUR options have been identified. A quantitative analysis involves calculating the total annual cost and cost per unit of product for each of the cost elements that are relevant to that chemical in that production unit. The impact of costs that cannot be quantified must also be stated.

Potentially relevant cost elements include:

a) indirect and direct labor and materials costs (which shall be stated in the Plan);
b) purchase or manufacturing cost of the toxic and its alternative chemical;
c) capital and equipment costs;
d) storage, accumulation, treatment, disposal, and handling costs associated with toxics and byproducts;
e) costs associated with activities required to comply with local, state, or federal laws or regulations, including but not limited to, fees, taxes, and costs associated with treatment, disposal, reporting and labeling;
f) worker health or safety costs associated with the toxic and its alternative chemical, including but not limited to, protective equipment, and lost employee time due to accidents or routine exposure to the toxic;
g) insurance;
h) potential liability costs that may arise from intentional, intentional, or accidental activities or occurrences;
i) loss of community goodwill and product sales lost to competing non-toxic products; and
j) other cost items that are relevant.

The cost of toxics must affirmatively state whether each of these cost elements is relevant and whether it is quantifiable. Only relevant costs must be considered, although the analysis must state why cost elements were not considered relevant.

It is particularly important for facilities to determine if any indirect or overhead costs such as storage, or insurance or regulatory compliance costs, that are not usually associated with the production unit, are relevant. Experience has shown that when carefully examined, these costs can significantly affect the economic feasibility analysis.

Capital costs of existing equipment are typically only relevant if the company's existing production equipment will need to be replaced within the company's fiscal planning horizon. However, the operating costs of that equipment may be affected by the quantity of the toxic chemical used or wasted.

The analysis must be based on the costs of using the covered toxic in the calendar year prior to the Planning Year (the calendar year covered by the Annual TUR Report being submitted with the Plan Summary).

Assumptions must be clearly articulated in the analysis to indicate how costs of using the covered toxic were allocated to the production unit, and this allocation must be "as accurate to the extent possible" (310 CMR 50.46A(4)).

PLAN UPDATE: The plan update involves reviewing the estimates to see if they are still valid given the current costs of doing business and updating them as necessary.

WHAT MUST BE IN THE PHYSICAL PLAN: For covered toxics in which one or more technically feasible TUR options have been identified, the Plan must include the quantitative calculations with references to the supporting documentation, and the specific location of that supporting documentation for each covered toxic in each production unit in which it is used. The Plan must also include a qualitative cost evaluation for those covered toxics in production units for which no technically feasible options have been identified. Each analysis must address each of the cost elements identified in 310 CMR 50.46A.

Exhibit 4 in the Appendix is an optional form that may be used to state the qualitative or quantitative costs of toxics. Facilities can use this format or provide the information in a format of their choice. To comply, the format needs to affirmatively address each of the cost elements listed above.

3.2.2 *Options Identification [310 CMR 50.45]*

Facilities are required to go through a process to identify all technologies, procedures or training programs that could potentially achieve toxics use reduction.

PURPOSE: This step is a comprehensive survey of options that the facility can use to achieve TUR. The intent is to look at chemical input substitution or product redesign as well as production changes that would minimize the amount of the raw material that ends up as byproduct and must be released to the environment, treated onsite or transferred to offsite waste management facilities.

CONTENT: The facilities must consider the six types of toxics use reduction identified in the statute and 310 CMR 50.10. The Plan must include a written description of the procedure used and its results including:

- Personnel involved, including their names and roles in the companies;
- Meeting dates and participants, agendas and minutes;
- Description of information sources consulted;
- Description of information gathering techniques; and
- List of technologies, procedures or training programs identified.

Because it must be a comprehensive analysis, the "good faith and reasonable effort to identify and evaluate TUR options" must include facility representatives having a variety of responsibilities and expertise within the company, including production, engineering, research and development, environmental health and safety, and financial staff. In addition, a good faith effort involves more than simple brainstorming, and should include literature review, working with vendors and suppliers, and other research techniques, such as working with the Toxics Use Reduction Institute (TURI) or the Massachusetts Office of Technical Assistance (OTA).

The identification process also includes all the options identified in previous planning cycles that meet the definition of TUR. Although laws, regulatory requirements, technology, and economics, or technically or economically infeasible options in the past may not result in TUR may become viable and economically feasible in the future.

FORMAT: Exhibit 5 in the Appendix presents an optional format for listing the options identified and the procedures and personnel used in the identification process. This chart also has fields for reporting the results of the technical analyses discussed in the next section.

Additional TUR Opportunities

- Improving operations and maintenance associated with spills, leaks or spoilage during the receipt, storage, transfer and/or prior to shipment of raw material or finished product;
- Minimizing waste by implementing closer process monitoring or better production metrics to improve the production process or waste treatment operations;
- Implementing employee training in TUR to raise awareness, resulting in a workforce more likely to engage in production practices or design that minimize toxic chemical use and waste;
- Minimizing the disposal of product that failed quality control tests through improved process controls;
- Involving Research and Development and engineering staff in long-range planning to include consideration of toxic chemical use and waste in their design of processes and products;
- For facilities using raw material that contains listed substances, working with vendors to find raw materials with lower levels of the covered toxics;
- Continuing dialogue with customers about options to encourage openness to safer choices.

PLAN UPDATE: Any options identified but not implemented in a previous planning cycle must be included in the plan update. In addition, the facility must make a good faith effort to identify new TUR options. The list of options developed for the prior TUR Plan may be used provided the facility notes the date that each option was first identified. New TUR options, along with the date and procedures used to identify them, must also be appended to the list.

WHAT MUST BE IN THE PHYSICAL PLAN: The list discussed above, and procedures used to identify each technique must be included in the TUR Plan. Meeting notes with dates, articles reviewed during the process, vendor information etc. must be kept and their location identified to serve as supporting documentation of a "good faith and reasonable effort" to identify and evaluate the TUR options. The written description of the procedure must be included in the Scope section of the technical evaluation.

The technical evaluation involves examining the technical aspects of each potential TUR option to determine if it reduces toxic use and is technically feasible, and to collect enough information to estimate the costs and savings associated with its implementation.

3.2.2.1 Technical Evaluation (310 CMR 50.46)

CONTENTS: Figure 2 illustrates the general flow of the technical analysis. The Technical Evaluation must determine the "appropriate" TUR option based on whether it is:

- TUR – whether it meets the technical definition of a TUR technique (for example, a recycling option that is not designed to be integral to the production unit is not considered TUR), and does not involve substituting a chemical that poses greater risk to workers or the environment than the covered toxic under consideration;
- Likely to result in a reduction of toxic use or byproduct generation per unit of product produced (some techniques meet the definition of TUR but might not accomplish any reductions for various reasons);
- Legal – whether there are laws or regulations that prohibit its adoption; and
- Technically feasible – whether the production process would yield the necessary product quality, there is sufficient physical room for the equipment, the technology can work at production scale, the required technology exists, worker skills are adequate, or training is feasible, or whether any other technical issues would limit feasibility.

If the TUR option is found to be inappropriate for one of the above reasons, the technical evaluation is complete.

> ***Note***: Economic considerations are NOT included in the technical feasibility analysis.

If the technique is found to be "appropriate," then the technical evaluation must be continued to calculate the expected reduction in chemical use and byproduct in total pounds and pounds per unit of product. The total pounds reduced is calculated as the difference between the amount used and generated in the reporting year covered by the annual Form S reports submitted with the Plan Summary (i.e., the calendar year prior to the planning year) and for the reporting year following the planning year (i.e., the calendar year following the planning year).

Once a TUR option has been identified as technically feasible, the technical evaluation is completed by conducting the following:

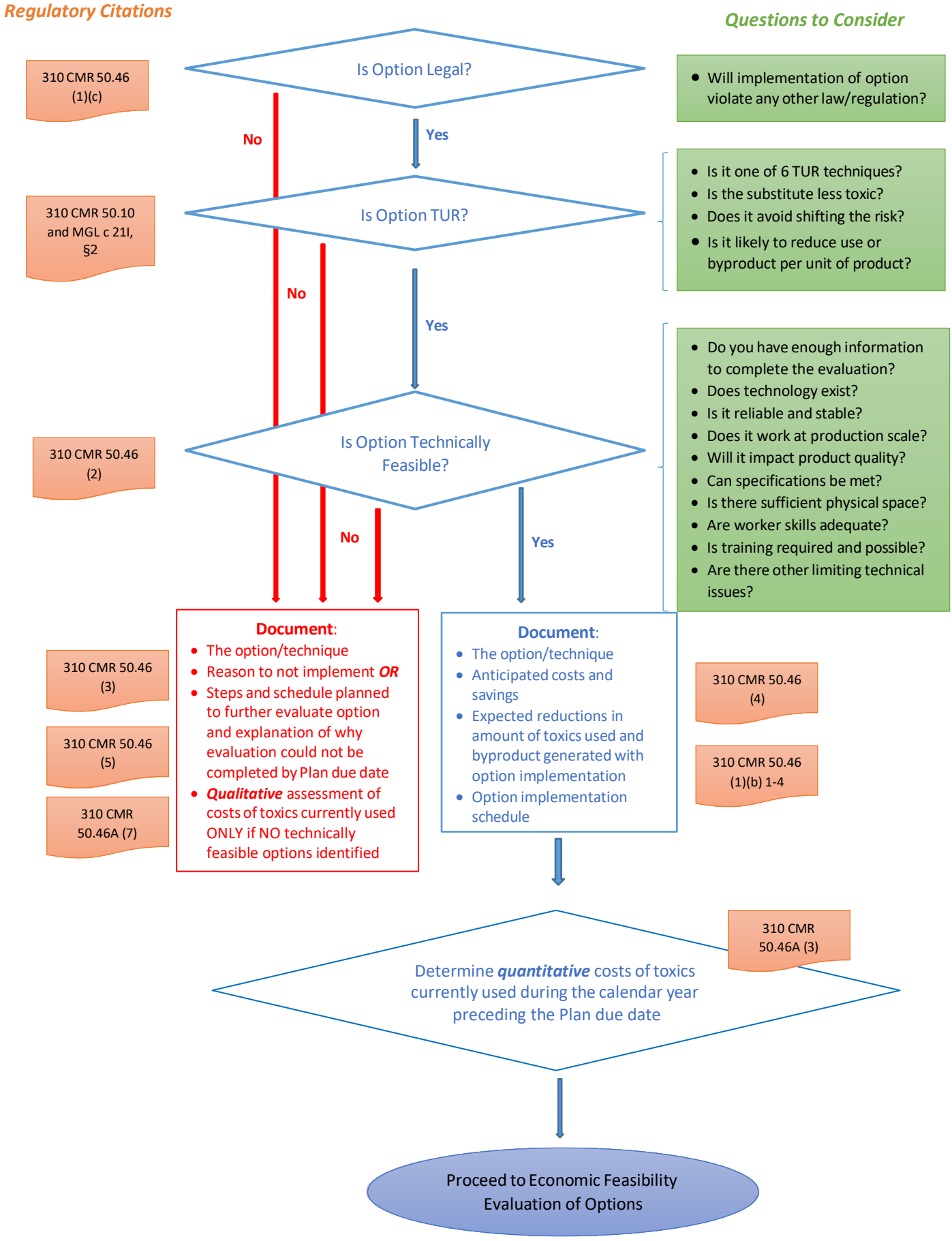
- Collecting the information needed to make a "good faith and reasonable" determination of the economic feasibility of the option; and
- Drafting an implementation timeline for options that may be selected by the facility.

There are no explicit criteria for a technical evaluation. Facilities may choose any evaluation process, if they do the analysis in good faith, use good engineering practices, and document the assumptions and work performed in the analysis.

When is the evaluation complete? The evaluation is complete as soon as the TUR planning team has enough information to determine that the technique being evaluated is technically infeasible, is illegal, and/or does not constitute toxics use reduction. Otherwise, it is complete when there is enough information to move on to the economic evaluation stage, including expected reductions in the amount of the covered toxic used and generated as byproduct if the option was implemented, and to develop a realistic implementation plan.

Figure 2: Determining if Option is Technically Feasible

(310 CMR 50.46(1))



What if the evaluation cannot be completed by the Plan due date? There may be instances in which it is not possible to complete the technical evaluation of the technique prior to the due date for the Plan. For example, bench scale testing may be required to determine impacts on product quality or to determine whether the technique works. Test marketing may be required to evaluate customer acceptance. These are all valid reasons to extend the evaluation completion date.

If the facility must do additional research before it can evaluate the technical feasibility of a technique, the facility must:

- Develop a brief explanation of why the research cannot be completed by the due date of Plan completion, and
- Identify the additional research steps to be taken and an implementation schedule for those steps.

> ***Note***: While a facility may take extra time to complete an in-depth technical analysis such as the bench scale testing mentioned above, it is NOT acceptable for a facility to take extra time to complete only the costs and savings analysis or to only develop the projected use reductions.

PURPOSE: The purpose of this evaluation is to obtain enough information about each TUR option to make a sound business decision as to the adoption of the technique. This decision involves eliminating the technique because it does not reduce toxic use, is illegal, is technically infeasible, or if collecting the technical information needed to determine the chemical reductions and costs and savings and associated with implementing it are infeasible.

PLAN UPDATE: The Plan Update must include the analyses of new techniques, as well as any updated information for techniques considered but rejected in earlier Plans. The TUR options rejected as technically or economically infeasible in earlier planning cycles need to be reevaluated considering changes in technology, customer base, rules and regulations, worker competency, and chemical use. TUR options that were not practical two years ago may now be feasible. The results of the technical evaluation developed for the prior TUR Plan may be used as long as the facility:

- Updates the use and reduction projections;
- Notes the date that each option was reevaluated and the results of that reevaluation; and
- Appends the results of the evaluation of any new TUR options identified during the current planning process.

WHAT MUST BE IN THE PHYSICAL PLAN: The Plan must state the results of the technical analysis for each option, and, for each "inappropriate" option, the reason(s) why it is either not TUR, not legal, or not technically feasible. For technically feasible options the TUR Plan must show the projected reductions in use and byproduct as total pounds and per unit of product, and include any assumptions and calculations used to determine those amounts.

Exhibit 6 in the Appendix presents an optional chart for identifying new TUR options and determining if they are technically feasible. It includes a section for summarizing the results of the technical analysis.

3.2.2.2 Economic Evaluation [310 CMR 50.46A]

In this step, the company determines the costs and savings associated with implementing each "appropriate" TUR option, and the economic feasibility of doing so.

CONTENT: Figure 3 graphically depicts the economic evaluation process. To complete the economic evaluation, facilities must calculate the costs and savings (total and per unit of product) associated with the implementation of each "appropriate" TUR option and determine if it meets the company's current investment criteria. The analysis is complete as soon as there is enough information about the estimated costs and savings associated with implementing the TUR option.

Note: The technique may be declared economically feasible even if it does not meet the company's current investment criteria, but it MUST be deemed economically feasible if it DOES meet the criteria.

The economic analysis of each feasible TUR option must include each of the following cost elements in the calculation of the costs and savings associated with the TUR option:

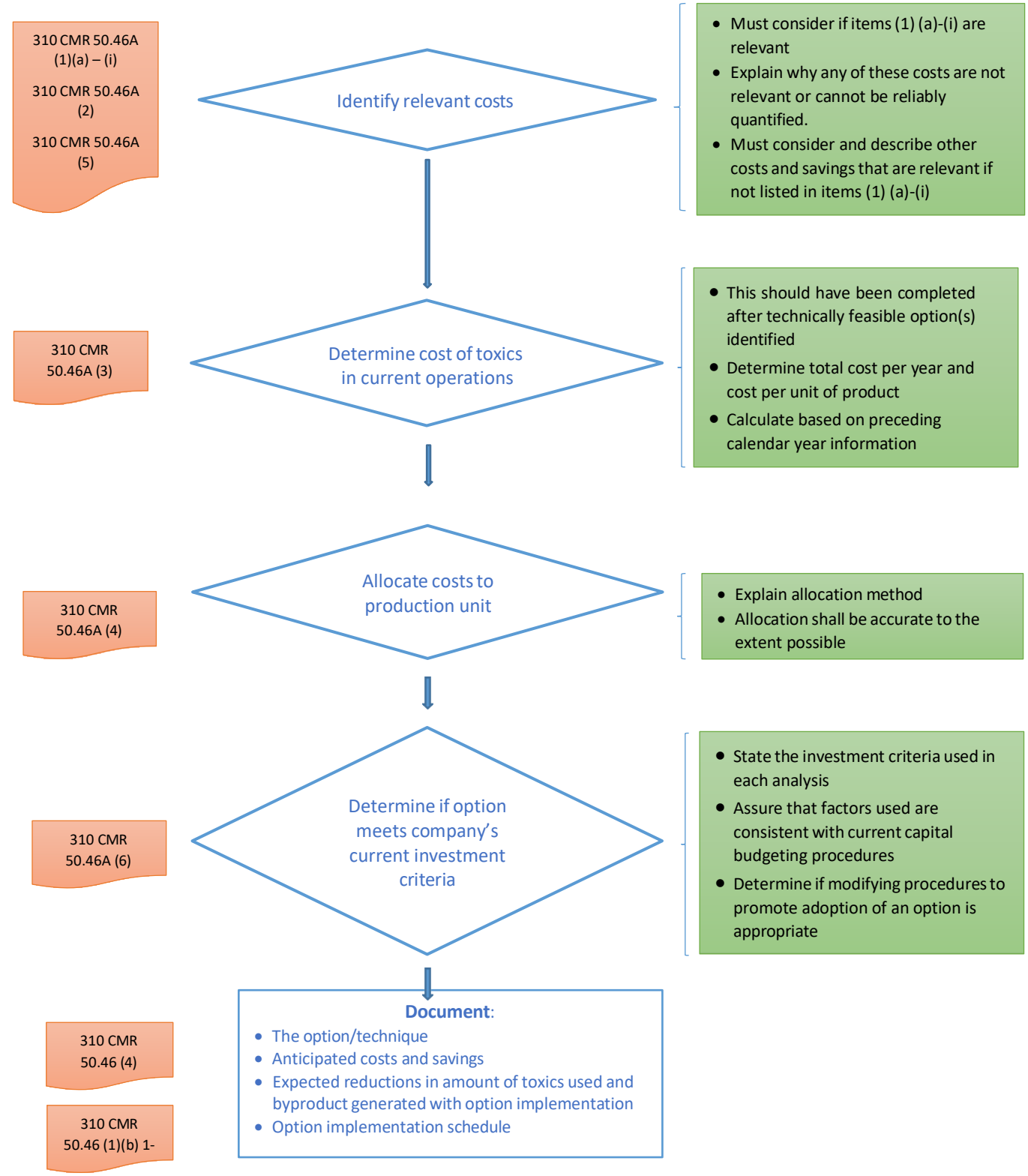
- Indirect and direct labor and materials costs;
- Purchase or manufacturing cost of the toxic and its alternative chemical;
- Capital and equipment costs; and
- Storage, accumulation, treatment, disposal, and handling costs associated with toxics and byproducts.

As discussed in Section 3.2.1.5, changes in costs are relevant if they change in a meaningful way, should the TUR option be implemented. Costs that are deemed to be not relevant in the cost of toxics analysis may be relevant when calculating the costs of implementing a particular TUR option. For example, capital costs would be relevant if the TUR option involved new production equipment. The analysis must include an explanation of why a cost element is unquantifiable and describe its overall impact – positive or negative – on the costs and savings associated with implementing the TUR option.

A particular cost element could be irrelevant if the company made the decision to implement the TUR option regardless of its cost. In this case, it would be acceptable to limit the analysis of costs to whatever cost elements the company needed to consider developing its implementation strategy.

Figure 3: Determining if Technically Feasible Option is Economically Feasible

(310 CMR 50.46A)



3.2.2.3 Other Specific Requirements

The analysis must be based on the costs of using the covered toxic in the calendar year prior to the planning year. If a facility has decided to implement a technique without any economic analysis, or has already implemented the technique, they only need to provide a rough estimate of the net costs of implementation. The analysis must clearly indicate:

- How costs of using the covered toxic were allocated to the production unit. This allocation must be "as accurate to the extent possible" (310 CMR 50.46A(4)); and
- The discount rate, cost of capital, depreciation rate, or payback period, if any, used in the analysis.

While the regulations do not specify the methodology for evaluating the costs and savings, they do require the facility to use the same depreciation rate, cost of capital, and economic performance criteria (e.g., payback period, internal rate of return, net present value) it would normally use for capital budgeting, assuming the facility typically considers these factors in capital budgeting decisions. The facility does not need to base its decision to implement an option on factors that are as stringent as it normally uses.

PURPOSE: This analysis is designed to provide the facility with the economic information needed to make a "good faith and reasonable" decision whether to implement a TUR option and to develop a realistic implementation schedule for the selected TUR options. By comparing implementation costs with expected savings from reducing the use of the covered toxic, the facility can determine if it would be in its economic interest to adopt the TUR technique.

PLAN UPDATE: The Plan Update must include an economic evaluation of any newly identified technically feasible options, and a review of the economic analysis of technically feasible options identified in prior plans that were not implemented. Facilities need to evaluate whether there are any changes in the costs of using the covered toxic or the costs of implementing the TUR option that would make the technique economically feasible.

Economic analyses from the prior Plan may be used, if the analyses have been reviewed to determine if there are any significant changes in the costs or savings that would affect the economic feasibility determination. If there were no changes, the date of the review must be noted on the economic analysis from the prior TUR year. The analysis must be updated if there were changes to the costs or savings that would affect economic feasibility. In either case, the review date needs to be noted.

WHAT MUST BE IN THE PHYSICAL PLAN: The Plan must include the economic analysis outlined above for each "appropriate" TUR option. Reference and retain the supporting documentation such as vendor quotes, memos, or notes from company fiscal or engineering staff used to develop the cost and savings estimates in order to demonstrate that the facility demonstrated a "good faith and reasonable effort" to evaluate the TUR option.

3.2.3 TUR Options Selection and Implementation Planning [310 CMR 50.46(4)]

After completing the options identification and technical/economic evaluation, companies must:

- Decide which, if any, "new" (not previously adopted) TUR options they choose to implement;
- Which, if any, require additional evaluation;
- Explain why any "appropriate" TUR options are not being implemented;
- Develop an implementation schedule for each "new" TUR option being implemented; and
- Develop an explanation and evaluation schedule for which, if any, TUR options require further evaluation.

WHAT MUST BE IN THE PHYSICAL PLAN: The plan must include the information listed above. Exhibit 7 in the Appendix provides an example of a chart that can be used to capture the results of the economic analysis and implementation decision.

3.3 Facility-Wide Requirements (Postproduction Unit Level Planning)

This section explains the facility-wide planning requirements that can only be completed after the production unit level work is done. All facilities that are subject to the planning requirement, including those exempted from the production unit level planning requirement, must complete a Plan Scope and Plan Summary. These facilities must also obtain the required certifications and submit the applicable portions of the Plan Summary form to MassDEP.

3.3.1 Plan Scope [310 CMR 50.43(2)]

The Scope is a summary of the planning process and plan results. It cannot be created until the planning process has been completed.

PURPOSE: The Plan Scope serves as an executive summary of the Plan.

CONTENT: The Plan Scope describes each production unit included in the Form S report(s) submitted when the Plan Summary is due. The description needs to contain the following information:

- The identifying number the facility assigned to the production unit;
- Process and product description;
- Unit of product;
- Chemical name and CAS number of each TURA reported chemical used in the production unit;
- The procedures used to identify potential TUR techniques;
- Each TUR option identified and whether it:
    - Will be implemented,
    - Will not be implemented, OR

- Is still under evaluation; and

- The projected reduction in pounds of use and byproduct for each covered toxic for which one or more TUR options will be implemented.

PLAN UPDATE: Because the Plan Scope is a summary of the current year planning activities, a new one must be prepared for each Planning Year.

WHAT MUST BE IN THE PHYSICAL PLAN: The written Plan Scope itself, coupled with the other Plan sections and their supporting documentation, suffices as the required documentation.

Because the Plan Scope covers all production units and chemicals, it must be created as a stand-alone section. However, charts and lists developed for other parts of the TUR Plan and Plan Summary can also be used for the Scope. The following must be included in the Plan Scope:

- Descriptions of the Production Units included in the Form S reports;
- The description of the options identification process;
- The list of TUR options identified, and whether they will be implemented or are still under evaluation; and
- The projected reduction (in pounds) of use and byproduct for each covered toxic, summed for each TUR option.

The Plan Summary form (see Section 3.3.2, below) can provide the required information for the last two bullet points, provided the options still under evaluation are also included on that form.

3.3.2 Plan Summary [310 CMR 50.47]

Companies are required to submit a summary of the Plan. The Plan Summary is due on July 1 of the planning year. It is submitted with the annual Form S report due on July 1 of the planning year.

CONTENT: The Plan Summary includes:

- Projected facility-wide changes in the total quantities of each listed toxic chemical used and generated as byproduct. This is measured as the difference between the amount that is projected to be reported on the annual Form S report submitted with the next Plan Summary and the amount reported on the annual Form S report submitted with the current Plan Summary.
- ALL TUR options considered during the current planning cycle.
- The new TUR options the company plans to further evaluate or implement because of the current Plan. Companies may also choose to include TUR options implemented because of prior years' Plans. If they choose to do so, they must indicate the year in which these previously adopted techniques were put into place.
- Any TUR options the company said would be implemented in the previous Plan Summary that were not implemented, a brief explanation of why they were not adopted, or a schedule change for an evaluation that could not be completed in the prior plan.
- Any other information the company believes would be beneficial for MassDEP or the public to review.

- The required senior management and TUR Planner certification statements.

> ***Note:*** If the facility is projecting to *reduce* use or byproduct, the difference is reported as a negative number. Projected *increases* in chemical use over the two-year period are reported as a positive number.

PLAN UPDATE: The Plan Summary will be different each planning year. The Plan Summary must be filled out during each planning cycle and submitted with the annual Form S report.

WHAT MUST BE IN THE PHYSICAL PLAN: Include a copy of the completed Plan Summary form with the Plan. The Plan Summary is submitted on a form provided with the reporting package.

> ***Note:*** *Only* management and TUR Planner certification statements are required if the facility was exempt from doing production unit level reporting for a chemical (i.e., because the chemical was used only in waste treatment, a startup production unit, or a pilot plant).

3.3.3 Certification Requirements [310 CMR 50.42(3) and (4)]

Once the Plan has been developed, it must be certified by the senior plant manager and a MassDEP certified TUR Planner. A senior manager is an official who has management responsibility for the persons or team completing the Plan, and who has authority to act as an agent for the toxics user. The senior manager certifies the accuracy of the statements in the Plan and the information used in it, based on the manager's inquiry of persons immediately responsible for developing the Plan. The TUR Planner certifies that he or she has reviewed the Plan and that, in their professional judgment, the planning process and the Plan conform to MassDEP regulations. The TUR Planner acts as the proxy for MassDEP inspectors, assuring that a company's TUR Plan satisfies the requirements and intent of toxics use reduction planning. The certification form is submitted separately with the Annual TUR Reporting package.

3.3.4 Submission to MassDEP

The Plan Summary and certifications are submitted to MassDEP through the Plan Summary Form Package, which has three parts:

1. The Plan Submittal Selection Form, in which the facility indicates what kind of Plan – TUR, or one of the allowed alternatives (Resource Conservation or TURA EMS Planning) – the facility is doing.
2. An indication of:
    - Whether the facility has either of the following exemptions to the planning process:
        - A covered toxic (and its associated CAS number) has been reduced below the reporting threshold for the current calendar year, and will not have to be included in the annual Form S report due on July 1 of the next year, or
        - The facility has already closed or will close during the current calendar year (indicating the closure date); and
    - Whether the facility completed an RC Plan in the prior planning cycle. In this case the facility will

submit an RC progress report form along with the TUR plan summary.

3. The TUR Plan Certification Form, which includes a statement that must be signed by the MassDEP-certified TUR Planner.

4 TUR PLANNING UNDER SPECIAL CIRCUMSTANCES

This section describes the requirements and options available to facilities under special circumstances.

4.1 Updating a TUR Plan When a Facility has No New TUR Options

At its most fundamental, a Plan is designed to ensure that a facility has a comprehensive understanding of:

- How and why it uses toxic chemicals;
- How and why they end up as waste;
- How much is used and wasted; and
- Whether there are options available to reduce their use of toxic chemicals.

And, to determine whether implementing any of the options would be advantageous to the company, the Plan should address:

- The cost of using toxic chemicals and the waste generated; and
- The costs of those TUR options.

Accordingly, a Plan Update involves checking to see that:

- There are no new potential TUR opportunities; and
- The data, costs, and assumptions used to review technically feasible options in prior years are still valid.

When no new TUR options are identified for any of the six TUR techniques during the Plan Update process, the TUR Plan Update process would involve:

- Updating the materials accounting for each production unit/toxic chemical combination to reflect actual operations – an activity that must be completed in any event to submit the required annual Form S and Form R reports;
- Documenting that a good faith effort to identify additional potential TUR options was made by consulting with production workers, engineers, research and development staff, and quality assurance staff inside the facility as well as clients, vendors, trade organizations, and other sources, including TURI and OTA;
- Verifying that the management policy, production unit description, cost of toxics and prior economic and technical evaluations are still valid;
- Notifying employees, and describing the current year employee notification procedure for the prior year descriptions in the prior year scope of the Plan;
- Preparing the Plan Summary, indicating that no new options were evaluated or selected for implementation, and projecting the anticipated change in chemical use and byproduct for the next year; and
- Submitting the Plan Update for review and certification by senior management and a certified Toxics Use Reduction Planner.

4.2 A Facility Has More Options than it could Reasonably Implement in each Planning Cycle

If there are many technically feasible options (including those from prior years), these options should be prioritized for further analysis. An analysis of economic impact and the expected reductions for each option must be made to facilitate prioritization of the feasible options identified.

- Options that are clearly economically infeasible require nothing more than the limited evaluation that was done to reach that conclusion (see Section 3.2.2.2 for more information).
- Options that are potentially economically feasible should be prioritized based on available resources, rough cost estimates, the difficulty of implementation, expected benefits, and resources available for implementation. The rough economic evaluations (quantifiable and qualitative) used to do this prioritization and the rationale for the prioritization need to be documented. (Note that available labor resources, available capital, etc. are all legitimate "costs" of implementing an option.)
- The highest priority options get as much additional economic evaluation as is needed to make the decision of whether they are economically feasible.
    - If none of the highest priority options turn out to be economically feasible, the others need to undergo a more thorough evaluation to assess their economic feasibility.

Note that this procedure only applies if there are more economically feasible options than could be implemented in a planning cycle. The facility will not be considered as operating in "good faith" if it merely claims to not have the time or staff to evaluate or implement a TUR option.

4.3 A Facility Has Fully Incorporated TUR Planning into Its Ongoing Operations

Some facilities have been able to incorporate TUR planning into their regular business decision processes on an ongoing manner. This is ideal and is encouraged by MassDEP. In this instance, the following should still be completed:

- Notify all employees of the planning process and solicit input by January 1 of the planning year;
- Update chemical use, waste treatment/transfer and release numbers (needed for the annual Form S and Form R reports);
- Update the cost of toxics for each covered toxic chemical/production unit combination;
- Provide a description of the ongoing options identification process;
- Capture the options identified and evaluated, and the ongoing results of the evaluations. This should serve as a running list of each option identified, evaluated, and the outcome, including why options were rejected or adopted. Reference supporting documentation and where it can be found;

- Include a description of the calculations required to determine the expected (or, if implemented, actual) reductions;
- For those options that have been adopted, include any analyses that was done in making the decision to adopt, referencing supporting documentation and where it can be found;
- Estimate projected reductions in use and generation of hazardous byproduct; and
- Update the Plan Summary with the list of technically feasible TUR options considered and selected, showing relevant calculations and assumptions employed in this assessment, and referencing the type and location of supporting documentation.

4.4 A Facility Cannot Complete the Evaluation or Implement an Option by the Plan Due Date

The TURA planning regulations recognize that the identification, evaluation, and implementation of TUR options are not necessarily tied to a two-year (or six months from the January 1 employee notification deadline) cycle. Evaluations that extend beyond July 1 of the planning year are addressed by including in the Plan:

- An explanation of the reasons why the evaluation warrants additional time; and
- An evaluation schedule.

Similarly, facilities are free to develop any implementation schedule for their selected options. There is no limitation in time required to implement or evaluate an option, if the schedule is developed in "good faith" and reflects the actual needs of the facility. Some options may require several years to fully evaluate, test and/or obtain the resources to implement.

5 Alternative Planning Processes

Once a facility has completed a Plan and two Plan Updates it has the option of:

- Incorporating TUR into an Environmental Management System and obtaining the certification of a certified EMS professional. Please refer to Environmental Management Systems (EMS) Planning Guidance for more information.
- Preparing a Resource Conservation (RC) Plan that brings TUR planning approaches to minimizing energy use, water use, solid waste generation, or the use of "non-covered toxics" (i.e., TURA-listed substances used below reporting threshold or toxic substances that are exempt from TURA reporting). Please see Resource Conservation (RC) Planning Guidance for more information. RC Plans can only be substituted for traditional TUR Plans every other planning cycle thereafter.

  While RC plans that address energy, water, or solid waste generation must be certified by a MassDEP certified TUR Planner, RC Plans that address "non-covered toxics" can be approved by any TUR Planner.

For more information about Toxics Use Reduction Planning, go to:

- Massachusetts Department of Environmental Protection Toxics Use Reduction Program: MassDEP Toxics Use Reduction Program
- Toxics Use Reduction Institute: Toxics Use Reduction Institute (TURI)
- Office of Technical Assistance: Office of Technical Assistance and Technology (OTA)

APPENDIX

EXHIBIT 1 - Checklist of Items in the Physical Plan

Note that this does not include information on the TUR team members (names and titles, assignments) or meeting notes, which are important parts of TUR Plan documentation.

✓	**An organized compilation of TUR Plan documents/sets of documents** *(Check off all elements that have been incorporated into your physical TUR Plan)*	**Regulatory Citation**
1	**Written Toxics Use Reduction Management Policy with the following minimum elements**:	310 CMR 50.43 (1)
	Date during this planning cycle policy was either revised or reviewed	
	Description of how facility encourages TUR	
	Description of policies that encourage or discourage TUR	
2	**Written description of the employee notification procedure that includes:**	310 CMR 50.42 (5)
	Date employees notified (must be by January 1 of the Planning Year)	
	Notification method	
3	**Written Description of the Contents of the Notification (or a copy of the notification or the prepared remarks) that includes:**	310 CMR 50.42 (5)
	Toxic Substances and Production Units covered by the plan	
	Plan Requirements	
	Solicitation of suggestions for toxics use reduction	
4	**Description of each production unit in which a covered toxic is used that includes:**	310 CMR 50.44
	Process Flow Diagram, a visual representation of the movement of covered toxics into and out of the production unit and into and out of the facility that includes:	310 CMR 50.44(1)
	• For First plans: date it was prepared • For Plan Updates with production process changes : date it was updated • For Plan Updates without production process changes: date it was reviewed	
	• The number assigned to the production unit in the Form S(s) submitted with the plan summary	310 CMR 50.44(1)(b)
	• Each step in the manufacturing processes within the production unit and including waste treatment and recycling that is not integral to the production unit. The specific production steps must be consistent with the list of processes included in the Form S(s) submitted with the Plan Summary, it can be more detailed. (Note the production unit includes material storage prior to use and product storage prior to shipment.)	310 CMR 50.44(1)(a)

✓	**An organized compilation of TUR Plan documents/sets of documents** *(Check off all elements that have been incorporated into your physical TUR Plan)*	**Regulatory Citation**
	• The steps in the process where each covered toxic enters the production unit	310 CMR 50.44(1)(c)
	• The steps in the process where each covered toxic leaves the production unit as byproduct	
	• The steps in the process or outside the production unit where byproduct becomes an emission released to the environment or transferred offsite	
	• The points in the process where each covered toxic leaves the production unit as product	
	Description of the product and the unit of product as listed on the Form S(s) submitted with the plan summary	310 CMR 50.44 (3)
	The purpose served by each covered toxic used in the production process-	310 CMR 50.44 (4)
For each covered toxic used in the production unit the following amounts and the calculations, assumptions and estimation methods and the location of the supporting documentation used to determine them. (Note: this is the information required on the Form S allocated to each production unit)		310 CMR 50.44 (2)
	Total Pounds and pounds per unit of product manufactured, processed and otherwise used in the prior calendar year	
	Total pounds and pounds per unit of product generated as byproduct in the prior calendar year	
	Total pounds and pounds per unit of product of "emissions" (waste covered toxic) released or disposed onsite and the total pounds and pounds per unit of product transferred offsite in the prior calendar	
For each **emission** of each covered toxic used in the production unit the following amounts and the calculations, assumptions and estimation methods and the location of the supporting documentation used to determine them (Note this is the information reported on the Form R, allocated to the production unit)		310 CMR 50.44 (6)
	Released or disposed onsite to air, to water and to land in the prior calendar year	
	Transferred to offsite treatment for ultimate disposal, to offsite recycling and to offsite disposal and the amount ultimately released to air, to land and to water in the prior calendar year	

✓	**An organized compilation of TUR Plan documents/sets of documents** *(Check off all elements that have been incorporated into your physical TUR Plan)*	**Regulatory Citation**
	A "Cost of Toxics" calculation for each covered toxic used in the production unit For covered toxics for which no technically feasible TUR options were identified, the evaluation is "Qualitative" – it identifies which of the following costs are relevant to the production unit and explains why the remainder are not. For covered toxics for which a technically feasible TUR option was identified, the qualitative evaluation is expanded to quantify relevant costs and calculate total annual costs and costs per unit of product for the prior calendar year. The method used to allocate facility wide costs to the production unit and the impact of non-quantifiable costs must be explained. For plan updates that include technically feasible options add the date during the current planning cycle in which the prior "cost of toxics" calculation was reviewed and any necessary updates.	310 CMR 50.44 (7) and 310 CMR 50. 46a
	Consider the following costs in conducting the cost of toxics analysis: • indirect and direct labor and materials costs (which shall be stated in the plan) • purchase or manufacturing cost of the toxic and its alternative chemical • capital and equipment costs • storage, accumulation, treatment, disposal, and handling costs associated with toxics and byproducts • costs associated with activities required to comply with local, state, or federal laws or regulations, including but not limited to, fees, taxes, and costs associated with treatment, disposal, reporting and labeling • worker health or safety costs associated with the toxic and its alternative chemical, including but not limited to, protective equipment, and lost employee time due to accidents or routine exposure to the toxic • insurance • potential liability costs that may arise from intentional, unintentional, or accidental activities or occurrences • loss of community and product sales lost to competing non-toxic products. • Other relevant costs	310 CMR 50.46a (1) &(2)
5	**Alternatives Screening:** A list of all technologies, procedures, training programs newly identified in this planning cycle as potentially achieving toxics use reduction and whether or not they were technically feasible – would work, would result in toxics use reduction, complied with applicable regulatory requirements, and would result in the desired product. For Plan updates also include previously identified technically feasible options that were not implemented	310 CMR 50.45 (2)

✓	**An organized compilation of TUR Plan documents/sets of documents** *(Check off all elements that have been incorporated into your physical TUR Plan)*	**Regulatory Citation**
6	**For each technically feasible option newly identified in the current planning cycle or identified but not implemented in a prior planning cycle:**	310 CMR.45 (2)
	A description of the TUR Option	310 CMR 46 (3)(a) & 4(a)
	A determination of the expected annual and per unit product reductions in use and byproduct including calculations, assumptions and estimation methods. The determination only needs to be as precise as needed to complete the economic analysis needed to make an implementation decision, or if implemented to provide a good faith estimate of expected reductions	310 CMR 50.46 (1)(a) & (b) & 310 CMR 50.46 (4)(c)
	An evaluation of the economic feasibility of the option based on the costs of implementing the option and the potential savings on the basis of the facility's current costs of using the covered toxic in their existing operations. It must include the calculations, assumptions, and the location of supporting documentation, and be based on the company's existing decision making practices. The evaluation is complete when a company has enough information to make either a decision to implement or a "good faith" business decision that it is economically infeasible. • For Plan Updates that include technically feasible options from prior planning cycles add the date during the current planning cycle in which the evaluation was reviewed and any necessary updates to the prior evaluation.	310 CMR 50.46a
	Statement of Decision on each Technically Feasible TUR Option	310 CMR 50.46 (3) &(4)
	If not being implemented an explanation of why not	310 CMR 50.46 (3)(b)
	If being implemented an implementation schedule	310 CMR 50.46 (4)(d)
	If evaluation involves product testing or engineering design or some other technical issue that cannot be completed prior to the plan due date, schedule for completing the evaluation and explanation of the reasons for the delay.	310 CMR 50.46 (5)
7	**Scope of Plan**	310 CMR 50.43(2)
	Description of the option identification procedures used in the Plan including dates and participants and sources of information	310 CMR 50.43(2)(b)
	Description of each the production unit, in which a covered toxic, including the CAS of each covered toxic, included in the Plan is manufactured, processed or otherwise used. Description of the unit of product, and a listing of process codes consistent with what is entered on the Form S report.	310 CMR 50.43(2)(a)
Plan Summary Form for each chemical		

✓	**An organized compilation of TUR Plan documents/sets of documents** *(Check off all elements that have been incorporated into your physical TUR Plan)*	**Regulatory Citation**
	List of new Technically Feasible Options Identified (Options Considered on the Plan Summary form)	310 CMR 50.43(2)(c)
	List of Options selected for implementation	310 CMR 50.43(2)(c)
	List of Options selected for implementation in the prior Plan that were not implemented, with explanation of why they were not implemented	310 CMR 50.43(2)(c)
	Projected change in Use and Byproduct generation in the calendar year following the Plan	310 CMR 50.46(4)(c)
	Signed TURP certification statement (in the Plan summary, but only one signature needed	310 CMR 50.42(3)
	Signed Management certification statement	310 CMR 50.42(4)

EXHIBIT 2 - Process Flow Diagram Exemplar: Trichloroethylene (TCE) Use in Production Unit 001

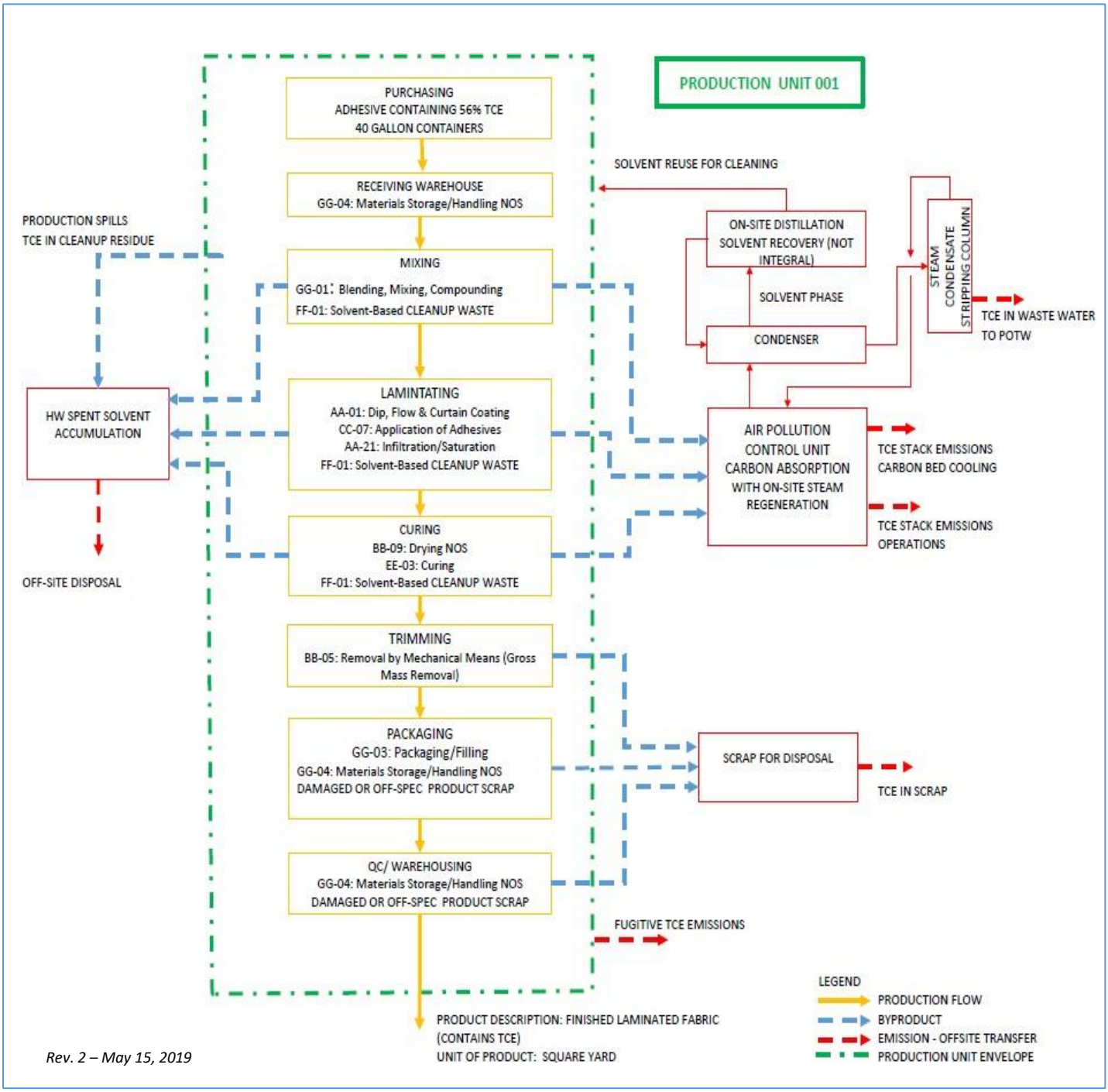


EXHIBIT 3 - Optional Form that can be used for Materials Accounting Purposes

OPTIONAL TABLE FOR REQUIRED COVERED TOXIC USE BYPRODUCT AND ON AND OFFSITE EMISSIONS/RELEASES CALCULATION FOR PRIOR CALENDAR YEAR **Complies with 310 CMR 50.44 (2), (5) & (6)** **COMPLETE ONE PER PRODUCTION UNIT, INCLUDE ALL COVERED TOXICS** **APPEND CALCULATIONS AND STATEMENT OF ESTIMATION METHODS AND LOCATION OF SUPPORTING DOCUMENTATION**						
Date Prepared:		**Production Unit #:**		**Unit of Product:**		
Location of Supporting Documentation:						
	Covered Toxic		**Covered Toxic**		**Covered Toxic**	
Chemical Name						
CAS #						
Purpose of Chemical						
	Pounds		**Pounds**		**Pounds**	
1. USE	Total	Per unit of product	Total	Per unit of product	Total	Per unit of product
a. Manufactured						
b. Processed						
c. Otherwise Used						
d. TOTAL (sum of a-c)						
e. Byproduct						
f. Released as or disposed of as "Emissions"* Byproduct disposed of or released onsite or transferred offsite						
2. EMISSIONS MANAGEMENT (BYPRODUCT FATE)	Total Pounds		Total Pounds		Total Pounds	
2a. MANAGEMENT OF BYPRODUCT ONSITE	Total	Per unit of product	Total	Per unit of product	Total	Per unit of product
a. Recycled						
b. Treated (destroyed) in a wastewater treatment system						
c. Treated (destroyed) in a solid or hazardous waste treatment system						
d. Treated (destroyed) in an air pollution control device						
e. Disposed of to Land						
f. Total Amount Released to Air						
g Total Amount Released to Water						
h Total Amount Released to Land						
i TOTAL AMOUNT MANAGED ONSITE (sum of a - h)						

EXHIBIT 4 - Optional Cost of Toxics Form

OPTIONAL FORM FOR DOCUMENTING COST OF TOXICS EVALUATION [310 CMR 50.46A(7)] **Create a separate form for each production unit for which there are no technically feasible options** ***NOTE*: Economic evaluation of technically feasible options must be quantitative**					
Production Unit #		Date Prepared/ Reviewed/ Updated		# of Products per Year	
Location of Supporting Documentation				Allocation of costs to Production Unit	
Covered Toxic Name(s) and CAS No.					

COST ELEMENT (from 310 CMR 50.46a (1) (a-g) and (2))	**Is the Cost Element *Relevant*[5] to the Production Unit (Y/N)**	**If No, explain**	**If relevant, is it quantifiable? (Y/N) Explain.**	**IF THERE IS A TECHNICALLY FEASIBLE OPTION**	
				Annual Cost/Savings ($/yr)	**$ / Unit of Product**
Manufacturing Costs					
(a) direct labor					
(a) indirect labor					
(a) materials					
(b) purchase of covered toxic or its precursors					
(c) equipment (including cost of capital if relevant)					
Materials and Waste Management Costs					
Raw Material Storage Costs					
(a) direct labor					
(a) indirect labor					
(a) materials					
(c) equipment (including cost of capital if relevant)					
Product Accumulation and Storage Costs					
(a) direct labor					
(a) indirect labor					
(a) materials					

[5] The cost associated with this element would change if use of the covered toxic declined or was eliminated.

COST ELEMENT (from 310 CMR 50.46a (1) (a-g) and (2))	Is the Cost Element *Relevant*[6] to the Production Unit (Y/N)	If No, explain	If relevant, is it quantifiable? (Y/N) Explain.	IF THERE IS A TECHNICALLY FEASIBLE OPTION:	
				Annual Cost/Savings ($/yr)	$ / Unit of Product
(c) equipment (including cost of capital if relevant)					
Byproduct Accumulation and Storage Costs					
(a) direct labor					
(a) indirect labor					
(a) materials					
(c) equipment (including cost of capital if relevant)					
Onsite Air Pollution Control Treatment Costs					
(a) direct labor					
(a) indirect labor					
(a) materials					
(c) equipment (including cost of capital if relevant)					
Onsite Wastewater Treatment Costs					
(a) direct labor					
(a) indirect labor					
(a) materials					
(c) equipment (including cost of capital if relevant)					
Onsite Energy Recovery Costs					
(a) direct labor					
(a) indirect labor					
(a) materials					
(c) equipment (including cost of capital if relevant)					
Onsite Recycling Costs					
(a) direct labor					
(a) indirect labor					

[6] The cost associated with this element would change if use of the covered toxic declined or was eliminated.

COST ELEMENT (from 310 CMR 50.46a (1) (a-g) and (2))	**Is the Cost Element *Relevant*[7] to the Production Unit (Y/N)**	**If No, explain**	**If relevant, is it quantifiable? (Y/N) Explain.**	**IF THERE IS A TECHNICALLY FEASIBLE OPTION:**	
				Annual Cost/Savings ($/yr)	**$ / Unit of Product**
(a) materials					
(c) equipment (including cost of capital if relevant)					
Onsite Solid or Hazardous Waste Disposal Costs					
(a) direct labor					
(a) indirect labor					
(a) materials					
(c) equipment (including cost of capital if relevant)					
Offsite Wastewater Treatment Costs					
Offsite Hazardous Waste Management Costs					
Offsite Solid Waste Management Costs					
Offsite Recycling Costs					
Offsite Energy Recovery Costs					
Offsite Energy Recovery Costs					
(e) Costs associated with activities required to comply with local, state, or federal laws or regulations, including but not limited to fees, taxes, and costs associated with treatment, disposal, reporting and labeling *(Costs of treatment are in (b) above)*					
Fees and Taxes					
Compliance Activities (record keeping, reporting, labelling, inspections, measurements, monitoring, training etc.)					
(a) direct labor					
(a) indirect labor					
(a) materials					
(c) equipment (including cost of capital if relevant)					
Permitting /Plan Approvals/Registrations					
(a) direct labor					

[7] The cost associated with this element would change if use of the covered toxic declined or was eliminated.

COST ELEMENT (from 310 CMR 50.46a (1) (a-g) and (2))	**Is the Cost Element *Relevant*[8] to the Production Unit (Y/N)**	**If No, explain**	**If relevant, is it quantifiable? (Y/N) Explain.**	**IF THERE IS A TECHNICALLY FEASIBLE OPTION:**	
				Annual Cost/Savings ($/yr)	**$ / Unit of Product**
(a) indirect labor					
(a) materials					
(c) equipment (including cost of capital if relevant)					
(f) Worker health or safety costs associated with the toxic and its alternative chemical, including but not limited to, protective equipment, and lost employee time due to accidents or routine exposure to the toxic					
(a) lost labor					
(a) direct labor					
(a) indirect labor					
(a) materials					
(c) equipment (including cost of capital if relevant)					
(g) Insurance					
(h) Potential liability costs that may arise from intentional, unintentional, or accidental activities or occurrences					
(i) Loss of community and product sales lost to competing non-toxic products.					
50.46a (2) Other relevant costs (list)					

[8] The cost associated with this element would change if use of the covered toxic declined or was eliminated.

EXHIBIT 5 - Optional New TUR Options Identification and Technical Feasibility Documentation

PRODUCTION UNIT #:		PLANNING YEAR	
Technique 1 Description			Date Identified
TUR Type (Circle)	Input Substitution Product Reformulation Production Unit Modification Production Unit Modernization Improved Operation and Maintenance Integral Recycling		
Covered Toxic(s) Addressed (List)			
Is it Legal?	Yes No	Why Not:	
Does it meet the definition of TUR?	Yes No	Why Not:	
Is it likely to result in the reduction of use or byproduct per unit of product?	Yes No	Why Not:	
Is it Technically Feasible?	Yes No Evaluation Incomplete	Why Infeasible OR Reason feasibility evaluation could not be completed, remaining research steps and schedule	
Identification Procedure (describe)			
Technique 2 Description			Date Identified
TUR Type (Circle)	Input Substitution Product Reformulation Production Unit Modification Production Unit Modernization Improved Operation and Maintenance Integral Recycling		
Covered Toxic(s) Addressed (List)			
Is it Legal?	Yes No	Why Not:	
Does it meet the definition of TUR?	Yes No	Why Not:	
Is it likely to result in the reduction of use or byproduct per unit of product?	Yes No	Why Not:	
Is it Technically Feasible?	Yes No Evaluation Incomplete	Why Infeasible OR Reason feasibility evaluation could not be completed, remaining research steps and schedule	
Identification Procedure (describe)			

EXHIBIT 6 - Optional Chart: Evaluation of Technically Feasible Options

PRODUCTION UNIT:					
Technique Description					Date Identified
TUR Type	Input Substitution Product Reformulation Production Unit Modification Production Unit Modernization Improved Operations and Maintenance Integral Recycling				
Covered Toxic(s)					
Projected Reductions in Use and Byproduct (append calculations with location of supporting documentation)	Projected Reduction (when fully implemented)		Annual	Per Unit of Product	If from Prior Planning Cycle: Date Reevaluated/ Outcome
	Use				
	Byproduct				
Is it Clearly Economically Infeasible	Yes No	If Yes, show economic rationale: Estimated Cost of Implementation: Maximum Possible Savings from Eliminating Chemical Use (from cost of toxics and projected reductions in use and byproduct):			
Has the company already implemented it or decided to implement it without a full economic analysis?	Yes No	Estimated cost of implementation: (attach calculations and supporting documentation if any) Estimated savings (from the cost of toxics and projected reductions in use and byproduct)			
Is it Economically feasible?	Yes No	Attach Economic Evaluation			
Is additional time needed for evaluation	Yes No	If Yes, explain why and provide an implementation schedule			
Will it be Implemented?	Yes No	If No, explain why not: or If Yes provide and implementation schedule			

EXHIBIT 7 – Optional Form for Required Economic Evaluation of Technically Feasible Options *(Includes Cost Of Toxics)*

Attach Additional Calculations, Assumptions etc.

Location of Supporting Documentation:					Option Name:				
Production Unit #		# of Products per Year			Expected % Reduction in Use:				
Allocation of shared costs to Production Unit/Chem:					Date Prepared/Reviewed/Updated:				
Covered Toxic Name and CAS:									
CURRENT COST OF TOXICS					**COST OF IMPLEMENTING TECHNICALLY FEASIBLE OPTION**				
COST ELEMENT (from 310 CMR 50.46a (1) (a-g) and (2))	**Comments**	**Is the cost element relevant (and quantifiable)? If No, explain**	**Annual $**	**$ / Unit of Product**	**Is the cost element relevant? If No explain**	**One Time $**	**Annual $**	**$ / Unit of Product**	**Net Savings or Expense from Option[9]**
Manufacturing Costs									
(a) direct labor									
(a) indirect labor									
(b) purchase of covered toxic or its precursors									
(a) materials									
(c) equipment (including cost of capital if relevant)									
(d) Storage, accumulation, treatment, disposal, and handling costs associated with toxics and byproducts									
Raw Material Storage Costs									
(a) direct labor									
(a) indirect labor									

[9] Consider Cost of Implementation and Reduced Chemical Costs

CURRENT COST OF TOXICS					COST OF IMPLEMENTING TECHNICALLY FEASIBLE OPTION				
COST ELEMENT (from 310 CMR 50.46a (1) (a-g) and (2))	**Comments**	**Is the cost element relevant (and quantifiable)? If No, explain**	**Annual $**	**$ / Unit of Product**	**Is the cost element relevant? If No explain**	**One Time $**	**Annual $**	**$ / Unit of Product**	**Net Savings or Expense from Option[9]**
(a) materials									
(c) equipment (including cost of capital if relevant)									
Product accumulation and storage costs									
(a) direct labor									
(a) indirect labor									
(a) materials									
(c) equipment (including cost of capital if relevant)									
Byproduct accumulation and storage costs									
(a) direct labor									
(a) indirect labor									
(a) materials									
(c) equipment (including cost of capital if relevant)									
Onsite Air Pollution Control Treatment costs									
(a) direct labor									
(a) indirect labor									
(a) materials									
(c) equipment (including cost of capital if relevant)									
Onsite Wastewater Treatment costs									
(a) direct labor									

CURRENT COST OF TOXICS					COST OF IMPLEMENTING TECHNICALLY FEASIBLE OPTION				
COST ELEMENT (from 310 CMR 50.46a (1) (a-g) and (2))	**Comments**	**Is the cost element relevant (and quantifiable)? If No, explain**	**Annual $**	**$ / Unit of Product**	**Is the cost element relevant? If No explain**	**One Time $**	**Annual $**	**$ / Unit of Product**	**Net Savings or Expense from Option[9]**
(a) indirect labor									
(a) materials									
(c) equipment (including cost of capital if relevant)									
Onsite energy recovery costs (or savings)									
(a) direct labor									
(a) indirect labor									
(a) materials									
(c) equipment (including cost of capital if relevant)									
Onsite recycling costs									
(a) direct labor									
(a) indirect labor									
(a) materials									
(c) equipment (including cost of capital if relevant)									
Onsite solid or hazardous waste disposal costs									
(a) direct labor									
(a) indirect labor									
(a) materials									
(c) equipment (including cost of capital if relevant)									
Offsite Wastewater Treatment Costs									

CURRENT COST OF TOXICS					COST OF IMPLEMENTING TECHNICALLY FEASIBLE OPTION				
COST ELEMENT (from 310 CMR 50.46a (1) (a-g) and (2))	**Comments**	**Is the cost element relevant (and quantifiable)? If No, explain**	**Annual $**	**$ / Unit of Product**	**Is the cost element relevant? If No explain**	**One Time $**	**Annual $**	**$ / Unit of Product**	**Net Savings or Expense from Option[9]**
Offsite Hazardous Waste Management Costs									
Offsite Solid Waste Management Costs									
Offsite Recycling									
Offsite Energy Recovery									
Offsite Energy Recovery Costs									
e) Costs associated with activities required to comply with local, state, or federal laws or regulations, including but not limited to, fees, taxes, and costs associated with treatment, disposal, reporting and labeling *(Costs of treatment are in (b) above)*									
Fees and Taxes									
Compliance Activities (record keeping, reporting, labelling, inspections, measurements, monitoring, training etc.)									
(a) direct labor									
(a) indirect labor									
(a) materials									
(c) equipment (including cost of capital if relevant)									
Permitting / Plan Approvals /Registrations									
(a) direct labor									
(a) indirect labor									
(a) materials									

CURRENT COST OF TOXICS					COST OF IMPLEMENTING TECHNICALLY FEASIBLE OPTION				
COST ELEMENT (from 310 CMR 50.46a (1) (a-g) and (2))	**Comments**	**Is the cost element relevant (and quantifiable)? If No, explain**	**Annual $**	**$ / Unit of Product**	**Is the cost element relevant? If No explain**	**One Time $**	**Annual $**	**$ / Unit of Product**	**Net Savings or Expense from Option[9]**
(c) equipment (including cost of capital if relevant)									
(f) Worker health or safety costs associated with the toxic and its alternative chemical, including but not limited to, protective equipment, and lost employee time due to accidents or routine exposure to the toxic									
(a) Lost labor									
(a) direct labor									
(a) indirect labor									
(a) materials									
(c) equipment (including cost of capital if relevant)									
(g) Insurance									
(h) Potential liability costs that may arise from intentional, unintentional, or accidental activities or occurrences									
(i) Loss of community and product sales lost to competing non-toxic products.									
50.46a (2) Other relevant costs (list)									
TOTAL									