TOXICS USE REDUCTION

PLAN AND PLAN UPDATE GUIDANCE

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I. 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. TURA also promotes the competitive advantage of Massachusetts businesses through encouraging efficient materials use and management. TURA requires Large Quantity Toxics Users (LQTUs) -- facilities that manufacture, process, or otherwise use chemicals included on the Toxics Use Reduction list in amounts in excess of specified thresholds to file annual Toxics Use Reduction (TUR) reports detailing their use and waste of these toxic substances. In addition, on every even calendar year these facilities must undertake an analytical process in which they evaluate how and why they use the substances identify opportunities for toxics use reduction in their production processes, and determine the technical and economic feasibility of implementing these identified techniques.[1]

TUR Plans and Plan Updates

This analysis is called a TUR Plan. The first plan for a chemical involves collecting and preparing detailed information about how the chemical is used, the production processes employed, the costs of using the chemical in the production process and of managing wastes from the production process, as well as research into toxics use reduction options. In subsequent years, the initial TUR Plan is updated by reviewing prior work and revising it as needed to reflect changes in production processes, economic factors, regulatory factors, that would affect the economic and technical analyses of prior TUR options, and to include new TUR options that have become available since the last plan.

The Planning process is designed to be flexible and readily adapted to the unique circumstances at each facility. The analysis must be done in good faith, employ good engineering and standard accounting practices, and be sufficient to make a sound business decision. For some companies, chemicals or production processes, the TUR Plan may include relatively limited analyses, particularly after the initial planning year. In other situations more extensive research, analysis and documentation will be required.

TUR Planning differs from traditional environmental regulatory programs in two ways:

1. Companies are not required to implement any TUR options they have identified.

[1] Companies that have completed two TUR Plans for two consecutive planning cycles have the option of doing either an Environmental Management System based TURA planning process or complete a Resource Conservation Plan (RC Plan). The latter plan applies TUR planning principles to water and energy conservation, reduction of toxic substances that are used below the reporting threshold or not regulated under TURA, or solid waste reduction. RC Plans can be completed every other planning cycle after the first one. Guidance on the requirements for these plans can be found at http://www.mass.gov/eea/agencies/massdep/toxics/regulations/policies-and-guidance.html.

However, if they choose not to implement an identified TUR option, they must explain why in the TUR Plan.

2. Companies are not required to submit the plans to the Massachusetts Department of Environmental Protection (MassDEP) for review and approval. Instead a MassDEP-approved Toxics Use Reduction Planner (TURP) must review the plan and certify that it meets all of the regulatory requirements. Only a Plan Summary with the TURP Certification and a certification as to the plan accuracy by a Senior Facility Manager are submitted to the agency. The Plan Summary and certification statements are due to MassDEP with the facility's Annual TUR Report.

This document describes the TUR Planning requirements established in 310 CMR 50.40. It explains the required:

- Planning process – the analyses and decisions that facilities must make in order to develop a complete and certifiable plan
- Plan contents – the information that must be included in the plan
- Documentation – the material that must retained and referenced that support the analyses and the results of the planning process.

Case studies on successful implementation of TUR can be found on the websites of the Toxics Use Reduction Institute (TURI), the Office of Technical Assistance and Technology (OTA), and the Northeast Waste Management Organization Association (NEWMOA).

http://www.turi.org/About/Library

http://www.mass.gov/eea/grants-and-tech-assistance/guidance-technical-assistance/agencies-and-divisions/ota/ota-publications/

http://www.newmoa.org/prevention/

This document has the following sections:

I. GENERAL TUR PLANNING REQUIREMENTS:
   A. Applicability
   B. What Chemicals Must be Included
   C. Certification Requirement
   D. Due Date
   E. Exceptions to the Planning Requirement
   F. Recordkeeping Requirements

II. SUMMARY OF THE REQUIRED PLANNING PROCESS
   A. Purpose of TUR Planning
   B. Steps in the Planning Process

C. General Planning Standards

III. PLAN CONTENTS
A. Facility-wide Requirements (Pre Production Unit Level Planning)
B. Production Unit Level Requirements
C. Facility-wide Requirements (Post Production Unit Level Planning)

II. GENERAL TUR PLANNING REQUIREMENTS

A. APPLICABILITY OF THE PLANNING REQUIREMENT [310 CMR 50.41]

Facilities that are large quantity toxics users (LQTUs) are required to develop biennial Toxic Use Reduction (TUR) Plans that evaluate whether there are any technically and economically feasible toxics use reduction opportunities available to the facility.

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

- Conduct any of the business activities described by Standard Industrial Classification (SIC) codes (or it's NAICs equivalent) 10 - 14, 20 - 39, 40, 44 - 51, 72, 73, 75 and 76; and
- Employ the equivalent of at least 10 full-time employees (FTEs);
- Manufacture, process, or otherwise use a TURA-listed chemical in excess of a reporting threshold (a "covered toxic").

The list of TURA Chemicals and the TURA Reporting instructions which contain additional information on the reporting requirements can be found at
http://www.mass.gov/eea/agencies/massdep/toxics/approvals/tura-online-reporting.html

B. CHEMICALS THAT MUST BE INCLUDED [310 CMR 50. 41]

The TUR Plan being submitted in the Planning Year must include each "covered toxic" that is being reported on in the Planning Year (each covered toxic that was used above the reporting threshold in the calendar year prior to the planning year) that was also reported at least once prior to the Planning Year. Thus if a facility is reporting on the chemical for the first time in the Planning Year no plan is required for that chemical.

> *For example, the 2010 TUR Plan had to include plans for each "covered toxic" that was used above the reporting threshold*
>
> 1. *in calendar year (CY) 2009 (and therefore included on the Reporting Year 2009 Annual TUR Report due to MassDEP by July 1, 2010)*
>
> *AND also*
>
> 2. *in any CY prior to 2009 (and therefore included on one or more Annual TUR Reports for Reporting Year 2008 or before)*

C. CERTIFICATION REQUIREMENT [310 CMR 50. 42]

The plans must be reviewed and certified by both:

1. **A senior management official** – an official with management responsibility for the individual(s) who developed the plan AND who has authority to act as an agent for the facility who certifies that he or she
   - Has examined and is familiar with the plan
   - Believes the supporting documentation exists and is consistent with the plan
   - Believes the information in the plan is "true, accurate, and complete"
   - Believes the plan meets the regulatory requirement
   - Knows that there are penalties for submitting false information.

AND

2. **A MassDEP approved Toxics Use Reduction Planner** (TURP) who certifies that.
   - He or she reviewed the plan
   - The plan meets the regulatory requirements
   - The plan represents a "good faith and reasonable effort to identify and evaluate toxics use reduction options".

There are two types of MassDEP approved TURPs. *General Practice TURPs* can certify plans at any facility. They are required to have completed a course in toxic use reduction planning offered by the Toxics Use Reduction Institute and passed an exam offered by MassDEP. *Limited Practice TURPs* are only authorized to certify plans at the facility in which they work. They must demonstrate experience in toxics use reduction in their application to MassDEP.

Additional information about the requirements for becoming a MassDEP approved TURP and the Directory of Approved TURPs can be found at:
http://www.mass.gov/eea/agencies/massdep/toxics/tur/toxics-use-reduction-tur-planners.html

D. PLAN DUE DATE [310 CMR 50.41]: JULY 1 OF THE PLANNING YEAR

The calendar year in which a plan is due is called the Planning Year. Plans must be completed and certified by a MassDEP approved Toxics Use Reduction Planner (TURP) by July 1 of the Planning Year. The Plan Summary and TURP and Senior Manager certification statements are submitted with the annual toxics use report covering toxics use in the prior calendar year.

For example, on or before July 1, 2010 a facility subject to TURA had to

- *Prepare and submit it's Annual Reporting Year 2009 TUR Report covering chemical use in calendar year 2009*
- *Complete its 2010 TUR Plan including the Manager's certification*

- *Obtain a certification statement from a TURP approving the plan*
- *Submit its 2010 Plan Summary and TURP certification MassDEP*

E. WHERE THE COMPLETED PLAN IS KEPT / RECORDKEEPING REQUIREMENTS [310 CMR 50.42(7)]

Plans must be kept at the facility. The referenced supporting information need not be kept together or even with the TUR Plan itself as long as the Plan states where the supporting materials can be found. TUR Plans and supporting documentation must be kept for at least five years after the Plan completion date and must be made readily available for review if requested by a MassDEP inspector. Only MassDEP has the authority to review the TUR Plan.

The TUR Plan (except the Plan Summary) is automatically deemed confidential, however companies may not exclude portions from MassDEP inspector review. All inspectors that have received special training in reviewing confidential reports must be allowed to review the TUR Plans in their entirety.

Plan Summaries must be submitted to MassDEP and are public information. Portions of the Plan Summary may be claimed confidential, in which case a "sanitized" version (one that does not contain confidential information) will be available for public review. (See MassDEP's confidentiality regulations at 310 CMR 3.00.)

F. EXCEPTIONS TO THE PLANNING REQUIREMENT

1. <u>General Exceptions</u>

TUR Planning is not required for a given chemical under the following circumstances:

- The Planning Year is the first year in which an Annual TUR Report is required for the "covered toxic". Planning is only required on chemicals that have been reported on in a year prior to the Planning Year. If the facility is only reporting on chemicals that had never been reportable in any prior year, it is entirely exempted from TUR Planning in that Planning Year.
- 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 the Planning Year (and by extension will not have to submit an annual report for the chemical on July 1 of the year following the Planning Year) it does not have to include that chemical in its TUR Plan for that Planning Year.

  For example, a company that otherwise used more than 10,000 pounds of toluene in CY 2008 and in CY 2009 but had adopted TUR methods that would reduce total use below 10,000 pounds in

CY 2010 would not be required to complete a 2010 TUR Plan for Toluene even though the facility included toluene in its Reporting Year 2009 Annual Report due to MassDEP by July 1, 2010.

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 and as a result actual use in the calendar year in which the plan was due exceeded the reporting threshold and an Annual TUR Report was due on the following July 1.

- The facility is scheduled to close. If a facility is scheduled to shut down during the Planning Year, planning is not required.

  The scheduled closing date must be entered on the Plan Summary form for the Planning Year in which the plan would otherwise have been due.

  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.

Note: Although the above circumstances exempt facilities from planning for certain chemicals, these facilities are still required to report that these exemptions apply on the "The Plan Submittal Selection Form" that must be submitted with the Annual TUR Report.

2. <u>Partial Exceptions: Only Facility-wide Planning is Required</u>

As is true with Annual TUR Reports, some portions of the plan are done for the facility as a whole, and others apply to the individual production units. Whenever reporting for a chemical is limited to the facility-wide information, then planning for that chemical is similarly limited. This applies in the following circumstances:

- **Waste Treatment Chemicals**: If a chemical is used *solely* for the purpose of waste treatment, production unit level reporting is not required on that chemical, and only the facility-wide portions of the plan must be completed. However, if the chemical is also used in other processes, production unit level planning IS required for those non-waste treatment processes in which the chemical is used
- **Pilot Plants:** The explanation for chemicals used in waste treatment also applies to chemicals used in pilot plants
- **Start up Production Units**: The explanation for chemicals used in waste treatment also applies to chemicals used in start up production units. Note however that the exemption for production unit level reporting and planning only applies either for the time it takes to get the production working at the desired efficiency or two years from initial operation, whichever is shorter.
- **Chemicals Used in Laboratories:** Chemicals used in laboratories under the direction of a technically qualified individual as defined under the federal EPCRA program (40CFR Part 372.38(d) and 40 CFR part 720.3(ee) are not counted toward facility-wide use of those chemicals. Therefore the TUR Plans (and Annual Reports) do not need to cover the manufacture, process or otherwise use of a chemical in a laboratories that meet this condition.

Note: Planning and reporting is required on all non laboratory uses of that chemical if it is used in these processes above the reporting threshold**.**

Note: 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.

III. OVERVIEW OF TOXICS USE REDUCTION PLANNING REQUIREMENTS

A. PLANNING BACKGROUND

1. The Purpose of TUR Planning

TUR Planning is an alternative approach to environmental protection. It is designed to reduce the amount of toxic chemicals used and wasted (generated as byproduct) in the production process and released as pollution by leading companies to identify toxics use reduction measures that are both effective and save the company money.

Over the years, facilities have documented significant cost savings, better materials tracking, decreased energy and water use, and improved manufacturing efficiency and product quality through TUR Planning. Facilities have also identified substantial improvements in the health and safety of their workers as the result of implementing TUR options. Thus it has provided companies with both a competitive advantage and improved management awareness of environmental issues. Some facilities have reduced the need for MassDEP permits and costly pollution control devices as a result of their TUR efforts, while others have used TUR Planning as the foundation for environmental management systems and programs leading to better pollution prevention. Experience proves that TUR Planning works.

2. What is "Toxics Use Reduction"?

The Toxics Use Reduction Act defines "toxics use reduction" (TUR) as "*Reducing or eliminating the use of a chemical per unit of product produced without substituting a more toxic chemical or , shifting risks between workers, consumers, or parts of the environment.* [2]". It involves changes in the ways chemicals are manufactured, processed, or otherwise used, or byproducts generated, in the production process. TUR can be accomplished in two main ways:

- Using a less toxic substance or less of the toxic substance to make the product

  For example using changing the formula of a coating to use water rather than an organic solvent, or making a tubing with thinner walls..

- Using the toxic substance more efficiently: changing the production process so that the a smaller amount of the chemical is wasted during production.

  For example, painting methods can be changed to reduce overspray and increase transfer efficiency so that less of the paint ends up as hazardous waste, or cutting procedures can be changed so that less material ends up as scrap.

[2] MGL21I Section 2 Definitions

The Act specifies six categories of TUR:

- Input substitution
- Product reformulation
- Production unit modification
- Production unit modernization
- Improved operations and maintenance
- In-process (integral) recycling or reuse.

Note: Reducing production levels would not be considered TUR, and neither the law nor the regulations require Massachusetts industries to take such a step.

Note: There is no requirement in the TURA statute mandating companies to use less of a substance.

B. WHAT ARE THE REQUIREMENTS OF THE TUR PLANNING PROCESS?

The TUR Planning process has three aspects:

- The required activities: the actions and analyses companies must undertake and the decisions they must make
- The "TUR Plan" itself: the description and documentation of the planning process used, analyses conducted, and decisions made
- HOW the information is collected, analyses are completed, decisions are made, and the planning process and results are documented.

The law and regulations specify the required actions, analyses and decisions, and documentation. HOW the work is done is entirely up to the facility.

1. <u>Mandatory Planning Activities</u>

TURA planning involves the following mandatory activities. Some are required for the facility as a whole, and others are required for each production unit in which each covered toxic is used.

1. For the facility as a whole the facility must:
   - Develop a statement of the company's management policy regarding Toxics Use Reduction
   - Notify employees of the start of the TUR Planning process no later than January 1 of the Planning Year.

2. For each production unit in which a "covered toxic" is used the facility must:
   - Examine how and how much of each "covered toxic" is manufactured, processed, or otherwise used, and how, how much, and at what point in the production process byproducts are generated and released to the environment
   - Identify the universe of *potentially* feasible TUR options for each "covered toxic"
   - Conduct a technical evaluation of each identified "potentially feasible TUR option" that covers the following issues:
     - Whether the identified technique is "appropriate" because it is:
       - TUR
       - Legal

       AND
       - Technically feasible
     - And for each "appropriate" technique:
       - The expected reduction in chemical use and byproduct
       - Enough information to evaluate implementation costs
   - Evaluate the economic feasibility – the costs and savings – associated with implementing each "appropriate" TUR option identified
   - Determine which TUR options to implement
   - Develop an implementation schedule for each chosen option.

3. For the facility as a whole:
   - Describe the scope of the TUR Plan –
     - the chemicals and production processes it includes
     - the TUR options identified and evaluated, and the results of the evaluations
     - which (if any) TUR options will be implemented and expected changes in the amount of each chemical used and generated as byproduct that will result.
   - Prepare the Plan Summary which lists for each chemical
     - the TUR Options considered
     - the TUR options the facility plans to implement
     - Projected change in total use and byproduct generation
   - Obtain the signatures of a:
     - Senior management official at the company certifying to the accuracy of the plan
     - MassDEP licensed Toxics Use Reduction Planner (TURP) certifying that the plan complies with all regulatory requirements.
   - Submit the Plan Summary and certifications to MassDEP on or before July 1 of the Planning Year.

2. The TUR Plan

The "TUR Plan" itself is the compilation of:

- Description of the actions undertaken
- The required analyses conducted
- The decisions made
- Explanation of the decisions
- The supporting documentation that must be included in the TUR Plan
- References to (including the location of) other supporting documentation that informed the analyses and decisions.

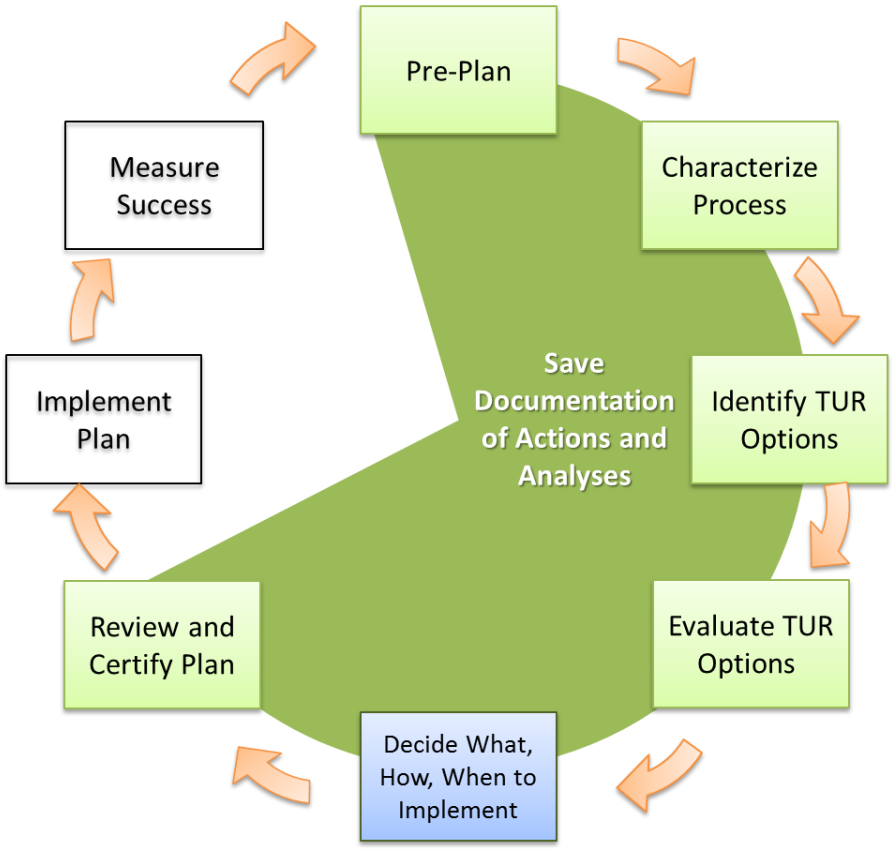
3. The Planning Process

Exhibit 1 presents an overview of TUR Planning. Decisions and analyses need to be documented, and the reasons why options were rejected or selected must be included in the plan.

EXHIBIT 1

Elements and sequence of a TUR Plan

Shaded elements are required by TURA



The chart shows the TUR Planning as a cyclical process. While not required by the regulations, many companies' find it to their advantage to think of it as such and 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 the prior plan.

There are several important caveats to the planning process outlined above.

- **The options identification, evaluation, and decision making process is not likely to occur in as linear a fashion as described.**

  The chart presents a stylized version of the planning process. During the process new techniques will be brought to light and evaluated while others will drop out as soon as it is determined that they are not TUR or would violate other environmental regulations or or are technically or economically infeasible. Evaluating one approach may give rise to new ideas. Some may take extensive research or testing to determine if they are feasible, which may take longer than the "planning cycle". Finally, it is unlikely that all of the techniques will be in the same phase of the process at the same time.

- **The technical evaluation is "complete" and can be stopped as soon as the company has enough information to either:**

  - Determine that the technique is "inappropriate" because it is illegal, not TUR or is technically infeasible.

    This analysis may occur at the same time as the technique is identified.

    For example, a member of the team might note that the proposed substitute chemical poses greater health and safety risks than the chemical under evaluation, or as soon as the technique is identified. Or someone on the team may know it was tried previously but was technically infeasible due to product quality issues.

    In other situations, the facility may need to do some research into the labor or capital costs or into the effects on product quality or customer acceptance before it obtains enough information to screen out the technique as clearly technically infeasible

  OR

  - for "appropriate" TUR options (those TUR options that are legal and technically feasible) there is enough information to complete the:
    - Economic feasibility analysis
    - Estimate of reductions in use and byproduct associated with implementation.

- **The economic evaluation need only be completed for "appropriate" TUR options**
- **The economic evaluation needs to "consider" certain specified cost elements, but only needs to be as precise and detailed as needed to:**

- Make a "good faith business decision" that the technique clearly economically infeasible

OR

- Make a good faith estimate of the costs and savings associated with implementation
- Decide whether or not it is economically feasible, using the company's current decision making criteria
- Make a good faith decision about whether or not the company will implement the technique
- Develop an implementation schedule for techniques selected for implementation.

As with the technical evaluation, the economic evaluation may involve extensive research or analysis or may be relatively simple.

> *For example, a technique could be deemed 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 labor or the capital costs before it can determine economic feasibility.

Caution: Although simple cost appraisals can often be adequate economic analyses, planners must not be too quick to reject a TUR option as economically infeasible. The analysis must be done in "good faith" and must considers some often overlooked costs such as environmental compliance, worker health and safety or insurance costs, or unquantifiable costs such as customer good will or future liability or customer good will. These costs must be considered because they have often tipped the balance in favor of implementation of a TUR technique.

- **Facilities are not required to implement any identified techniques even those that are economically feasible**

  Although they are not required to implement every economically feasible technique identified, the plan must contain an explanation of why the company chose not do do so. Past experience indicates that companies usually choose to do so because it is in their best interest.

- **Facilities are not required to abide by the schedule they developed in the TUR Plan**

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

C. PLAN UPDATES

After the initial plan is prepared, it must be updated in every subsequent Planning Year for which a plan is due.

1. What does a Plan Update Involve?

Updating the plan involves reviewing each portion of the plan and revising it as necessary to ensure that it is still current. For example:

- Changes in corporate policy may necessitate changes in the "Management Policy"
- Any significant alterations in the production lines or production processes affecting use and byproduct generation will need to be noted.
- Chemical use and waste information will need to be updated to reflect the prior calendar year production levels
- The list of potential TUR options will need to be updated,
- New options will need evaluation
- The technical and economic assumptions used in the evaluation of options rejected in prior years need to be reviewed and updated if necessary.

Updating the plan does not involve rewriting the document. It is acceptable to add notations indicating that sections were reviewed, and add updated information as addenda.

2. What is the Level of Effort of a Plan Update?

The level of effort depends on the specific situation at the facility. For example, .

- The Plan Update may require a limited amount of work for companies whose production processes have not changed, or for which there are limited TUR options yet to be implemented or stable industries with limited technological change in the industry,.
- The Plan Update may require more extensive work for companies in a rapidly evolving industry, or that have made extensive changes to their products or production processes or have added new chemicals since the last plan. .
- For companies that are continually evaluating and modifying their production processes to minimize chemical use and waste, the plan can be a compilation of the work and analyses and changes made at the facility since the last plan: a separate planning process is not necessary as long as the toxics use reduction planner can certify that the planning requirements were met.

D. PLAN DEVELOPMENT STANDARDS

The TURA planning regulations are flexible, leaving companies free to use whatever process and format works best for them as long as the essential elements are included in the plan. The process is designed to complement a facility's existing management, planning and decision making processes as much as possible. Decisions made during toxics use reduction planning and implementation are the same as other business decisions companies make. The regulations do not require the use of any specific engineering or cost evaluation procedures.

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

- Use of good engineering practices
- Use of standard accounting practices
- Develop the information required to complete the plan in good faith
- It must demonstrate a good faith and reasonable effort to identify and evaluate TUR options
- Decisions about economic feasibility must be consistent with the facilities "current economic decision making practices" unless they choose to modify them in order to adopt an identified TUR technique.

The amount of analysis required will vary depending on the TUR option under consideration. The rule of thumb is that the analysis has to be "good enough" to make informed business decisions, in accordance with existing company decision making practice. Analyses and calculations that are developed for a plan may be presented in the plan in a variety of ways. The analyses can be included in the plan in their original form, whether handwritten, a formal consultant's report, a computer printout, etc. There is NO need to reformat or retype the work done. As long as the information is legible, it can be included as is.

IV. THE PLAN CONTENTS

The following sections step through each required element of the planning process. They explain:

- What the element involves or consists of
- The purpose of each element,
- Any differences in how the element is handled in the initial plan and the plan update
- The format of the information in the plan
- The required documentation.

The plan elements are discussed below in the general order in which they are likely to be worked on. However, because the planning process is iterative, it may not be possible to complete some portions of an element until subsequent work is done. For example, the Plan Scope includes a summary about TUR implementation that can only be written at the end of the planning process.

The remainder of this document is comprised of the following sections. The regulatory citation for each required TUR Plan element is provided:

A. FACILITY-WIDE REQUIREMENTS (PRE PRODUCTION UNIT LEVEL PLANNING)
1 Management Policy [310 CMR 50.43(1)]
2. Employee Notification [310 CMR 50.42(5)]

B. PRODUCTION UNIT LEVEL REQUIREMENTS
1. Process Characterization [310 CMR 50.44]
2. Options Identification [310 CMR 50.45]
3 Technical Evaluation [310 CMR 50.46]
4 Economic Evaluation [310 CMR 50.46A]
5. Options Selection and Implementation Planning [310 CMR 50.46(4)]

C. FACILITY-WIDE REQUIREMENTS (POST PRODUCTION UNIT LEVEL PLANNING)
1. Plan Scope [310 CMR 50.43(2)]
2. Plan Summary [310 CMR 50.47]
3. Plan Certification and Submission to MassDEP [310 CMR 50.42(3) and (4)]

There are five portions of the plan that must be done for the facility as a whole:

- Employee Notification
- Management Policy

- Plan Scope
- Plan Summary
- Certifications and Submission to MassDEP.

Facilities whose "covered toxics" are used *solely* for the purpose of:

- Treating waste, wastewater or air emissions,
- In a pilot plant

OR

- In a start up production unit for the first two years of production

need only complete the Facility-wide portion of the TUR Plan. However, the plan must be certified and a Plan Summary submitted to MassDEP with the Annual TUR Report due on July 1 of the Planning Year.

A. FACILITY-WIDE INFORMATION (PRE PRODUCTION UNIT LEVEL PLANNING)

This section explains the requirements related to Employee Notification and Management Policy because these parts of the plan can be developed prior to the work that must be done at the production unit level.

1. Employee Notification by January 1 [310 CMR 50.42(5)]

Facilities are required to notify all employees that a TUR Plan will be developed and solicit their ideas on eliminating or reducing the use and waste of "covered toxics" in the production processes. The notification must occur no later than January 1 of the Planning Year.

CONTENT: The January 1 notification must:

- Identify the toxic chemicals and production units included in the plan or plan update
- Describe the requirements and criteria for the plan; and
- Solicit comments and suggestions from employees on toxics use reduction options.

PURPOSE: The Employee Notification notice serves to alert company workers to the upcoming planning process in which they are likely to participate. It is intended to involve the individuals throughout the organization, particularly those on the production line, in the planning process. 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.

PLAN UPDATE: Employees must be notified of the planning process each Planning Year.

Facilities may choose to change the notification process if it didn't result in the desired participation. The Plan Update should either note that the notification process was not changed, or if it was, include the revised description..

FORMAT: The notification can be in writing or oral, and can be delivered by any means considered effective.

DOCUMENTATION: The plan must describe the steps (contents, date and means of distribution) taken to notify employees. If the notification was done in writing a copy of the notification and the date and means of distribution would suffice.

2. Management Policy [310 CMR 50.43(1)]

The facility must identify its policies regarding toxics use reduction in a statement of management policy.

CONTENT: The policy must include, at a minimum, 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 investments or capital investments,
  - Hiring promotions, or bonuses, or other incentives for company employees, and
  - Any other area.

Caution: It would not be acceptable to have a management statement dealing only with pollution control or waste minimization, or recycling. The management statement must describe the company's policy toward reducing the use of toxic chemicals and the generation as byproduct.

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 discourages toxics use reduction. This review and compilation of policies affecting the adoption of TUR is intended to lead companies to either develop new policies or change existing policies in ways that both encourage toxics use reduction and eliminate barriers to its adoption. It is also intended to communicate the firm's approach to TUR.

Strong management commitment is central to successful development and implementation of toxics use reduction programs. Since toxics use reduction planning encompasses many facets of the 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. The management policy also serves to communicate the importance of TUR to all levels of the organization.

PLAN UPDATE: The management policy must be reviewed to determine if any adjustments are required due to changes in other corporate policies, procedures, management, or because of a determination that it needs to be edited to improve its effectiveness.

If no changes are made, it is sufficient to 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.

FORMAT: Management policies may be in a variety of formats including:

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

DOCUMENTATION: The written management policy with the written approvals required for any other corporate wide policy and the adoption date serves as the required documentation. The required documentation for the Plan Update is either the "old" policy with the date it was reviewed, or, if the policy was changed, the new signed and dated policy.

B. PRODUCTION UNIT LEVEL REQUIREMENTS

TUR Options must be identified and evaluated for each production unit in which each covered toxic for which a plan is required. Each "covered toxic" has a distinct function in each production unit, and has different costs associated with its use. Therefore the potential TUR options and their technical and economic feasibility are unique to the particular production unit/chemical combination under consideration.

The Production Units in the plan must be consistent with the production unit listed on the applicable Form S in the Annual Toxics Use Reduction Report submitted with the plan. Facilities may choose to redefine their production units over the course of the planning process. If so, the Form Ss submitted in the Planning Year must also reflect the new production unit.

The following sections of the plan must be completed for each production unit in which a "covered toxic" included in the plan is used.

- Process Characterization
- Options Identification
- Technical Analyses
- Economic Feasibility Analyses
- Implementation Decision.

1. Process Characterization [310 CMR 50.44]

The process characterization lays out the ways in which "covered toxics" are used in each production unit, in what amounts they are used, their function, and 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..

The process characterization section of the plan includes:

- A description of the purpose of each "covered toxic"
- The unit of product for each "covered toxic" (already defined in the Form S) and the unit of product
- A process flow diagram
- Materials accounting information for each "covered toxic", broken out into the same categories as required in the Form S and TRI Release information, for each production unit rather than for the facility as a whole.

  Note: If the facility has only one production unit for the chemical then the materials accounting in the plan will be the same as the Form S and TRI Release information in the Annual TUR Report.

2. Purpose of the Chemical

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

PURPOSE: An understanding of why the particular substance is used is needed to evaluate whether it can be eliminated, used in a lesser amount, or a less toxic alternative used in its place.

DOCUMENTATION: A written explanation must be somewhere in the plan.

PLAN UPDATE: It is unlikely that the purpose a chemical serves will change, however, if the company has new information about the reasons why the particular chemical is or is not necessary, it should be added

3. Unit of Product

The unit of product is a measure of the product output or the amount of work produced by a process.

CONTENT: This metric for measuring the amount of product produced has already been identified in the annual toxics use report Form S. In the course of 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 Toxics Use Report submitted with the Plan Summary.

See the TURA Reporting instructions for further discussion of unit of product.at http://www.mass.gov/eea/agencies/massdep/toxics/approvals/tura-online-reporting.html for

PURPOSE: An accurate unit of product allows a facility to measure the amount of a "covered toxic" used, and the costs and savings associated with different TUR options at varying levels of production.

DOCUMENTATION: The unit of product must be stated in the TUR Plan for each "covered toxic" used in the production unit. No further documentation is required.

PLAN UPDATE: If the unit of product has not changed since the prior TUR Plan the statement from the prior TUR Plan simply annotate it with the date it was reviewed for the current plan. If the unit of product has been changed, include the new description in the plan with the date it was changed. Make sure it is changed it on the applicable Form S's as well. .

4. Process Flow Diagram

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 and communicate the processing steps used in the production unit and 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.

CONTENT: The process flow diagram must show:

- The number assigned to the production unit, and reported on the applicable Form S
- Each manufacturing or processing step including raw material receipt, storage, and transfer to the production unit, and storage of the product prior to shipment offsite. These have been identified on the Form S submitted in prior reporting years.
- Non integral recycling
- Waste treatment
- The movement of the "covered toxics" through the production unit including the location where the "covered toxic"
    - Enters the production unit
    - Leaves the production unit as byproduct or product
    - Whether the byproduct is released to the air, water or disposed of to land onsite, or is destroyed through onsite treatment, or transferred off site as a solid or hazardous waste or wastewater.

PURPOSE: This diagram identifies the operations and points in the process the "covered toxic" leaves the production unit as byproduct. It reveals the production process steps that could be changed to reduce or eliminate that raw material loss.

FORMAT: Exhibits 3 through 4 show example process flow diagrams. If more than one "covered toxic" is used in a production unit the plan can either include all of the chemical movement information on the same process flow diagram or separate process flow diagrams can be developed for each "covered toxic".

DOCUMENTATION: The process flow diagram with the date it was prepared must be included in the TUR Plan. No further documentation is required.

PLAN UPDATE: If the production process has not changed since the prior TUR Plan, the "prior" process flow diagram may be used, provided it has been annotated with the date it was reviewed for the current TUR Plan. If the production process has changed, then prepare and date a new process flow diagram.

5. Materials 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. Input is the quantity of chemical used in the production unit. Outputs are the losses as byproduct, and the ultimate fate of that byproduct: onsite recycling, treatment or release, or transfer offsite for recycling, wastewater treatment or hazardous or solid waste treatment or disposal.

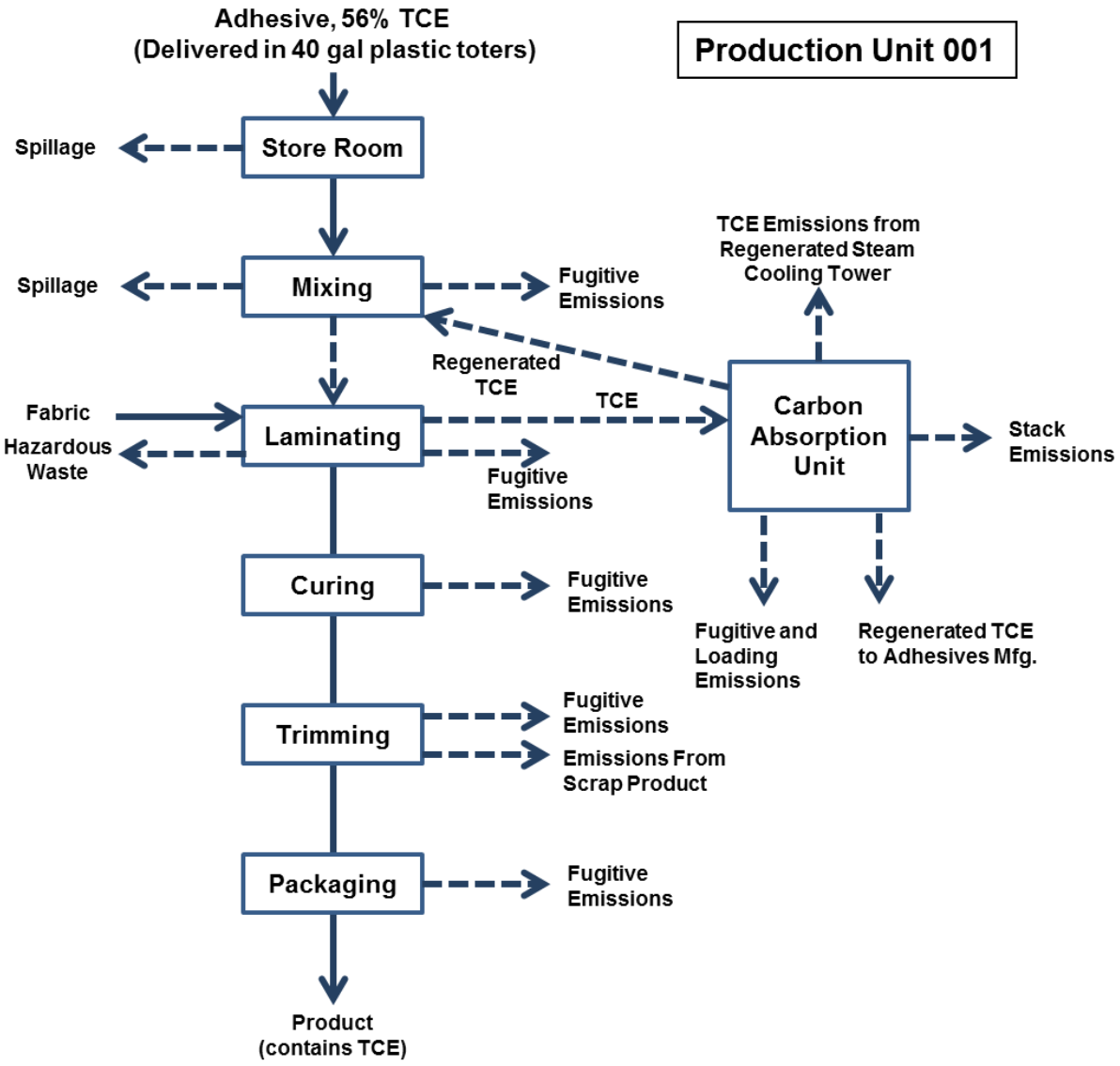
CONTENT: The materials accounting includes the total amount, and the amount per unit of product, of each "covered toxic" that is:

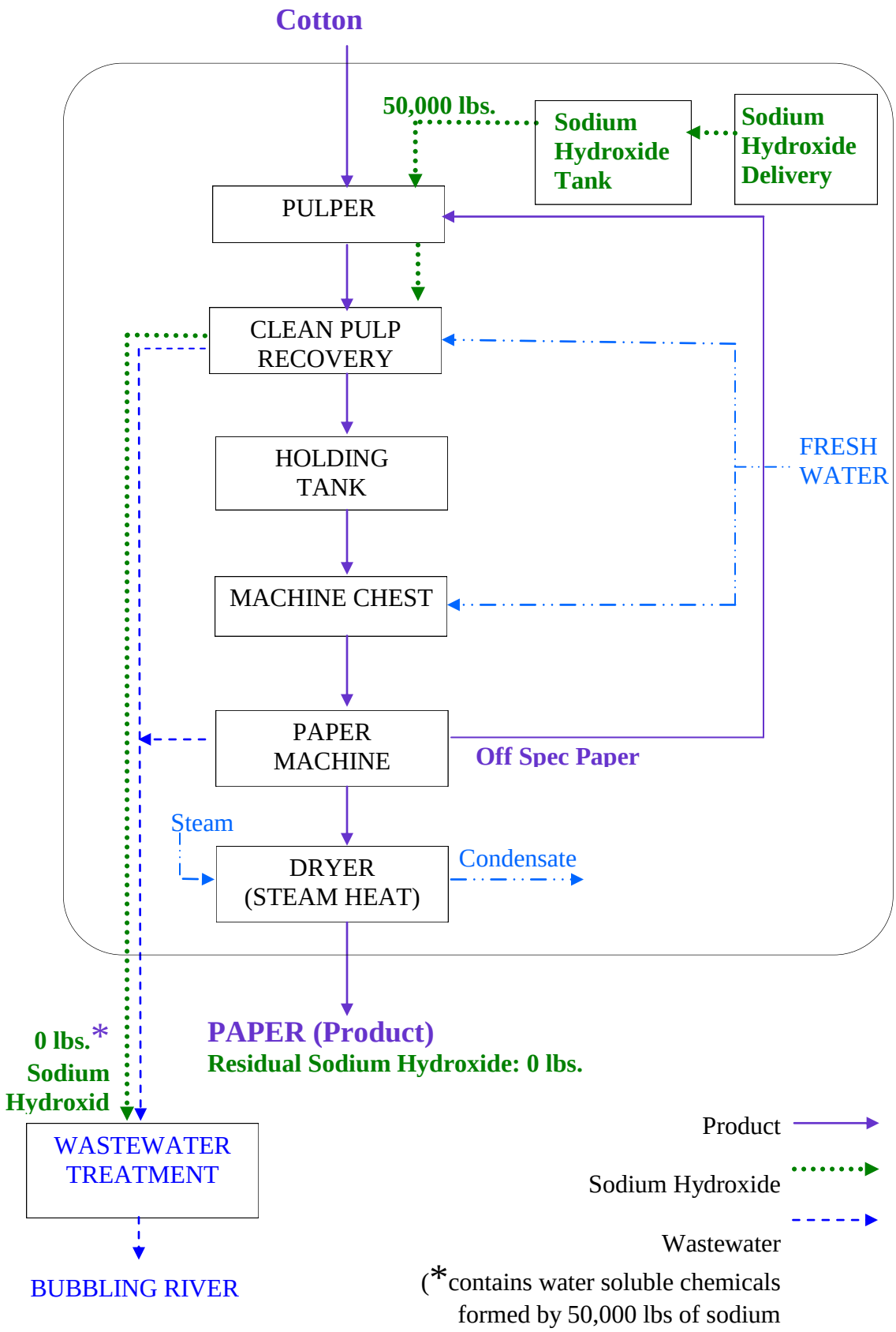
- Manufactured, processed or otherwise used
- Generated as byproduct
- Released from the facility as "Emissions".

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) on-site
  - Treated offsite
  - Recycled onsite
  - Recycled offsite
  - Disposed of onsite
  - Disposed of offsite.

EXHIBIT 3


Adhesive, 56% TCE
(Delivered in 40 gal plastic toters)
Production Unit 001
Spillage
Store Room
Spillage
Mixing
Fugitive Emissions
TCE Emissions from Regenerated Steam Cooling Tower
Regenerated TCE
TCE
Fabric
Hazardous Waste
Laminating
Fugitive Emissions
Carbon Absorption Unit
Stack Emissions
Curing
Fugitive Emissions
Fugitive and Loading Emissions
Regenerated TCE to Adhesives Mfg.
Trimming
Fugitive Emissions
Emissions From Scrap Product
Packaging
Fugitive Emissions
Product
(contains TCE)


Cotton
50,000 lbs.
Sodium Hydroxide Tank
Sodium Hydroxide Delivery
PULPER
CLEAN PULP RECOVERY
HOLDING TANK
MACHINE CHEST
PAPER MACHINE
Off Spec Paper
FRESH WATER
Steam
DRYER (STEAM HEAT)
Condensate
PAPER (Product)
Residual Sodium Hydroxide: 0 lbs.
0 lbs.*
Sodium Hydroxid
WASTEWATER TREATMENT
BUBBLING RIVER
Product
Sodium Hydroxide
Wastewater
(*contains water soluble chemicals formed by 50,000 lbs of sodium

- Byproduct must be tracked to its ultimate disposal by calculating
    - The amount being released onsite (including any amounts that remains 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 waste or hazardous waste
        - Wastewater
    - The amount recycled offsite
    - The amount disposed of offsite (the ultimate 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.

The analysis and production units must include byproduct and emissions from all portions of materials handling: receipt, storage, and transfer to 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.

A rule of thumb for the level of precision required for materials accounting is "the number has to be good enough to make informed business decisions". Measurements, estimations or engineering calculations are all acceptable approaches for obtaining byproduct and emissions amounts. Methods of quantification will probably 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 trying to decide whether or not to implement a particular TUR technique.

All of the following methods fall within the criteria of "standard engineering practices" and can be used for determining byproducts and emissions, provided they are accurate enough to meet the rule for making good business decisions.

- 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 material safety data sheets or other sources
- Laboratory results (e.g., solvent content of coated product).

Note that other methods may also be appropriate.

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 or recycling, or transfer offsite for treatment and/or disposal. This exercise provides data needed to quantify the full cost of using the chemical. Calculating the amounts of the "covered toxic" used and generated as byproduct that are managed onsite or offsite makes it possible to calculate the full costs of using the substance and therefore, 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 will decrease per unit of product produced.

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

DOCUMENTATION: The materials accounting as well as 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 five years following the TUR Plan due date, but does not need to be included onsite with the plan.

To the extent that 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 and associated documentation will not be sufficient.

FORMAT: The calculations do not have to be typed. Exhibit 5 shows an optional format that can be used for the materials accounting. A full sized version appears in the appendix of this document.

6. 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 meant to be a comprehensive survey of options that the facility could use to achieve TUR. The intent is to think broadly and creatively about ways the production process could be changed to eliminate or reduce the use of the chemical in the product and/or the amount wasted in the production process.

CONTENTS: The facilities must consider the six types of toxic use reduction identified in the statue and 310 CMR 50.10:

- Input substitution
- Product reformulation,
- Production unit redesign or modification
- Production unit modernization
- Improved operation and maintenance
- Integral recycling or reuse) defined in 310 CMR 50.10.

The plan must include a written description of the procedure used and its results including:

- Personnel involved
- Description of information sources consulted
- Description of information gathering techniques
- List of technologies, procedures or training programs identified.

Include options that were identified and evaluated any time after the last planning process in the plan.

Because it must be a comprehensive analysis, the "good faith and reasonable effort to identify and evaluate TUR options" effort required by the regulations, means that the personnel involved with Options Identification must include representatives of a variety of responsibilities and expertise in the company, including production staff, engineering staff, research and development staff, environmental health and safety staff, and financial staff. In addition a good faith effort involves more than simple brainstorming. Work includes literature review, working with vendors and suppliers, and other research techniques.

EXHIBIT 5

OPTIONAL TABLE: MATERIALS ACCOUNTING Complete one for each production unit in which a covered toxic is used Add additional sheets if more than 3 covered toxics are used in the production unit Append calculations and assumptions						
Production Unit #:_____Calendar Year Use:_____Date Prepared:_____						
	COVERED TOXIC		COVERED TOXIC		COVERED TOXIC	
Chemical Name/CAS #						
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. "Emissions"*						
2. ONSITE MANAGEMENT						
a. Recycled						
b. Treated** as wastewater						
c. Treated** as solid or hazardous waste						
d. Disposed of to Land						
e. Total Amount Released to Air						
f. Total Amount Released to Water						
g. Total Amount Released to Land						
h. TOTAL AMOUNT MANAGED ONSITE (sum of a-g)						
3. OFFSITE MANAGEMENT						
a. Treated** as wastewater						
b. Treated as solid or hazardous waste						
c. Total Amount Recycled						
d. Disposed of (released) to Water						
e. Disposed of (released) to Air						
f. Disposed of (released) to Land						
g. TOTAL AMOUNT MANAGED OFFSITE (sum of a-f)						

*The sum of onsite releases and the amount transferred offsite in waste for recycling, treatment, and/or disposal

**Destroyed / converted into another chemical

FORMAT: *Exhibit 6 Optional Chart: Identification and Technical Evaluation Results* is a suggested format for listing the options identified and the procedures and personnel used in the identification process. (A full sized version can be found in the Appendices.) This chart also has fields for reporting the results of the technical analyses discussed in Section 6: Technical Evaluation.

PLAN UPDATE: Any options identified and 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 developed for the prior TUR Plan may be used as long as the facility notes the date that each option was first identified, and new TUR options, along with the date and procedures used to identify them are appended to the list.

DOCUMENTATION: The list and procedures used to identify each technique must be included in the TUR Plan. Meeting notes with dates, articles, vendor information etc. can serve as supporting documentation of a "good faith and reasonable effort" to identify and evaluate the TUR options.

7. Technical Evaluation [310 CMR 50.46]

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

CONTENTS: Exhibit 7 shows the general flow of the technical analysis. The Technical Evaluation must determine whether or not the TUR option is "appropriate" based on whether it is:

- TUR – whether it reduces use or byproduct per unit of product produced, and does not involve substituting a chemical that poses greater risk to workers or the environment than the "covered toxic" under consideration
- Legal – whether there are laws or regulations that prohibit its adoption
- Technically feasible – whether the production process would yield the necessary product quality, there is sufficient physical room for the equipment, the technology can work above a bench scale, the required technology exists, worker skills are adequate or training is not feasible, or whether any other technical issues would limit feasibility

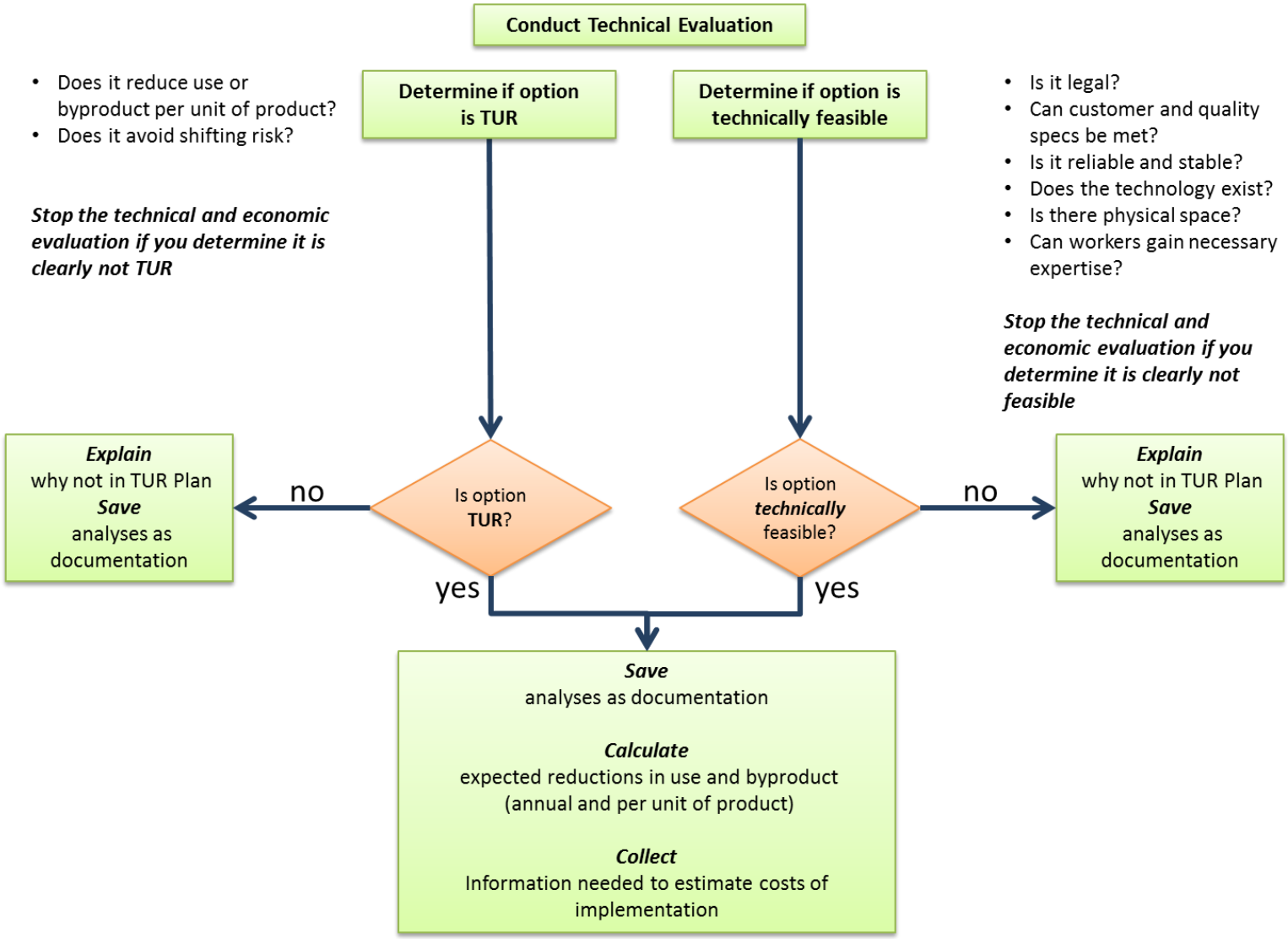
  Note: Economic considerations are not a factor in the technical feasibility analysis.

If the TUR option is found to be inappropriate for one of the above reasons, the Technical Evaluation is complete. If the technique is found to be "appropriate" then the Technical Evaluation must be continued to:

EXHIBIT 6

Optional Chart 2: TUR OPTIONS IDENTIFICATION and RESULTS OF TECHNICAL EVALUATION					
PRODUCTION UNIT:					
Technique Description					Date Identified
TUR Type	Input Substitution Production Unit Modification Production Unit Modernization Improved Operation and Maintenance Integral Recycling				
Covered Toxic(s)					
Identification Process Who involved, Information sources, Data gathering techniques					
a. Is it Legal?	Yes No	Why Not:			Date Reevaluated/Outcome
b. Is it TUR	Yes No	Why Not:			
c. Is it Technically Feasible	Yes No Evaluation Incomplete	Why Infeasible OR Reason feasibility evaluation could not be completed, remaining research steps and schedule h			Date Reevaluated/Outcome
d. Appropriate? Yes if a-c are yes	Yes No	Projected Reduction (when fully implemented)	Annual	Per Unit of Product	Date Reevaluated/Outcome
		Use			
		Byproduct			
Technique Description					Date Identified
TUR Type	Input Substitution Production Unit Modification Production Unit Modernization Improved Operation and Maintenance Integral Recycling				
Covered Toxic(s)					
Identification Procedure					
a. Is it Legal?	Yes No	Why Not:			Date Reevaluated/Outcome
b. Is it TUR	Yes No	Why Not:			
c. Is it Technically Feasible	Yes No Evaluation Incomplete	Why Infeasible OR Reason feasibility evaluation could not be completed, remaining research steps and schedule			Date Reevaluated/Outcome
e. Is it "Appropriate"? Yes if a-c are "Yes"	Yes No	Projected Reduction (when fully implemented)*	Annual	Per Unit of Product	Date Reevaluated/Outcome
		Use			
		Byproduct			

EXHIBIT 7


Conduct Technical Evaluation
Determine if option is TUR
Determine if option is technically feasible
• Does it reduce use or byproduct per unit of product?
• Does it avoid shifting risk?
Stop the technical and economic evaluation if you determine it is clearly not TUR
• Is it legal?
• Can customer and quality specs be met?
• Is it reliable and stable?
• Does the technology exist?
• Is there physical space?
• Can workers gain necessary expertise?
Stop the technical and economic evaluation if you determine it is clearly not feasible
Is option TUR?
Is option technically feasible?
no
no
yes
yes
Explain why not in TUR Plan Save analyses as documentation
Explain why not in TUR Plan Save analyses as documentation
Save analyses as documentation
Calculate expected reductions in use and byproduct (annual and per unit of product)
Collect Information needed to estimate costs of implementation

- 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 TUR Reports submitted with the Plan Summary (the calendar year prior to the Planning Year) and for the Reporting Year following the Planning Year (the calendar year following the Planning Year).

- Collect the information needed to develop an estimate of implementation costs and timetable. The estimate must be as accurate as needed to make a "good faith and reasonable" determination of whether or not the option is economically feasible.

Criteria: There are no explicit criteria for a technical evaluation. Facilities may go about the evaluation in whatever way they generally evaluate projects, as long as 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 and may be stopped as soon as the planners have enough information to determine that the technique is clearly technically infeasible, is not legal, and/or is not toxics use reduction. Otherwise it is complete when there is enough information to conduct the economic evaluation (including expected reductions in the amount of the "covered toxic" that would be used and generated as byproduct if the option was implemented), and to develop a realistic implementation plan if it is selected for implementation. Please see Section III.B of this document for further discussion of this topic.

Note: The regulations anticipate that the nature of the required technical evaluation should be commensurate with other technical evaluations of production processes conducted by the facility.

What if the evaluation cannot be completed by the plan due date? There may be instances in which it is not be possible to complete the technical evaluation of the technique prior to the date in which the plan must be completed.

> *For example, bench scale testing may be required to determine impacts on product quality or to figure out whether the technique actually works. Or, some test marketing may be required to evaluate customer acceptance.*

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,
- 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 develop the projected use reductions.

PURPOSE: The purpose of this evaluation is to obtain enough information about each TUR option to be able to make a good business decision about whether or not to adopt the technique. This decision involves either eliminating it as "inappropriate" because it is not TUR, is illegal, or is technically infeasible, or if it is "appropriate" for further consideration, collecting the technical information needed to determine the chemical reductions and costs and savings and associated with implementing it.

FORMAT: *Exhibit 6: Optional Chart: Options Evaluation and Results of the Technical Evaluation* includes a section for summarizing the results of the technical analysis. (A full sized version can be found in Appendix A)

DOCUMENTATION: 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 reduction in use and byproduct as total pounds and per unit of product, and include any assumptions and calculations used to determine those amounts.

The work done, research conducted, and memos written to support the decision about technical feasibility need to be referenced in the plan, and must remain available for five years to document that the analysis met the planning standards enumerated in the regulations. Document that the information:

- Was developed in accordance with standard engineering practices
- Was developed in good faith
- Demonstrates a good faith and reasonable effort to identify and evaluate TUR options.

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 in light of changes in the technology, customer base, rules and regulations, worker competency, chemical use etc. TUR options that were not practical two years ago now may 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, the results of that reevaluation

AND

- Appends the results of the evaluation of any new TUR options identified during the current planning process.

8. <u>Economic Evaluation [310 CMR 50.46A]</u>

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: Exhibit 8 shows the economic evaluation process. In order 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 technique can 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.)

When is the analysis complete? The analysis is complete and can stop as soon as there is enough information about the estimated costs and savings associated with implementing the TUR option for the company to make a "good faith and reasonable" decision that :

EITHER

- The TUR option is clearly economically infeasible

  As with the technical analysis, the economic analysis is complete and can be stopped as soon as the there is enough information to make "a good faith and reasonable" business decision that the technique is clearly economically infeasible.

  Determining that a technique is clearly economically infeasible may be a very simple comparison between the maximum possible savings from eliminating the chemical entirely and a rough estimate of the implementation costs of the TUR option that shows that the maximum potential savings are far less than the cost of implementation. In other situations, the facility may need to do a more detailed analysis. For example, additional research into the labor, capital or other implementation costs, or a more precise calculation of the expected savings from reducing the use of the "covered toxic" or a net present value analysis may be required to make the determination.

OR

- The TUR option is economically feasible and
  - whether or not the company will implement it

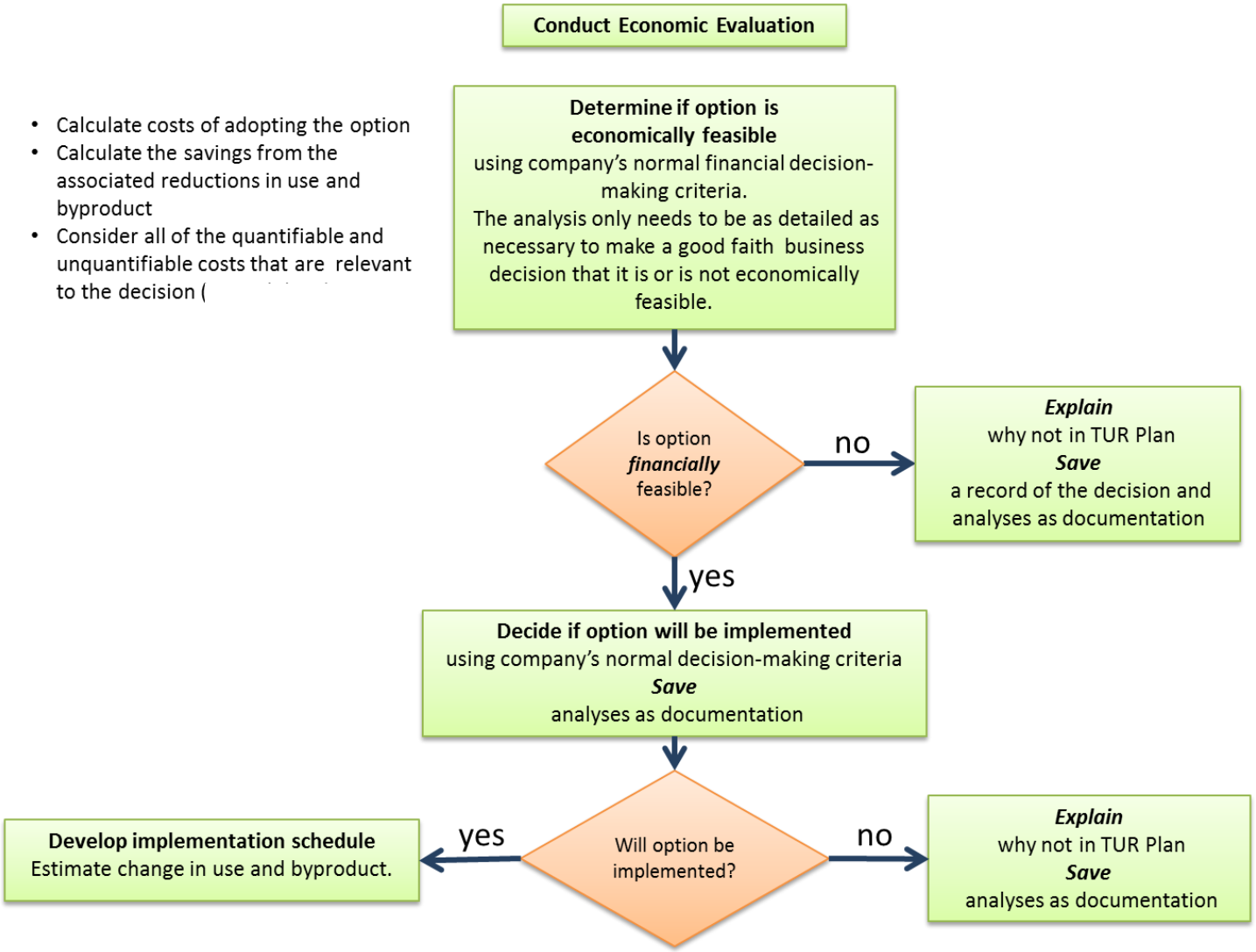
  and if the technique is being implemented

  - there is enough economic information to develop a realistic implementation schedule.

Criteria: The regulations establish specific required parameters for determining the costs and savings associated with the implementation of the TUR option, and determining its economic feasibility.

- **Cost Elements that must be included**: The economic analysis of each "appropriate" TUR option must *consider* 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

EXHIBIT 8


Conduct Economic Evaluation
Calculate costs of adopting the option
Calculate the savings from the associated reductions in use and byproduct
Consider all of the quantifiable and unquantifiable costs that are relevant to the decision (
Determine if option is economically feasible using company's normal financial decision-making criteria. The analysis only needs to be as detailed as necessary to make a good faith business decision that it is or is not economically feasible.
Is option financially feasible?
no
Explain why not in TUR Plan
Save a record of the decision and analyses as documentation
yes
Decide if option will be implemented using company's normal decision-making criteria
Save analyses as documentation
Will option be implemented?
yes
Develop implementation schedule
Estimate change in use and byproduct.
no
Explain why not in TUR Plan
Save analyses as documentation

- Storage, accumulation, treatment, disposal, and handling costs associated with toxics and byproducts

- **When Cost Elements Must be Quantified**: Per the regulations, while facilities must *consider* the costs listed above in their analysis. It is only necessary to *quantify* these cost elements if:

  - The cost element is relevant to the analysis. However, the analysis must include an explanation of the rationale for each cost that was deemed irrelevant.

    Costs are relevant if they would change in a meaningful way if the TUR option were to be implemented. The cost of implementing certain TUR options may be so small as to be irrelevant. Examples could include adding information on ways to minimize the amount of the "covered toxic" that is wasted in a particular production unit to ongoing worker training. However the savings associated with the reductions in chemical purchase and waste management costs would need to be quantified.

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

    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 AND the TUR option would meaningfully reduce or eliminate replacement costs

    A particular cost element could be irrelevant is 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 in order to develop its implementation strategy.

  - The cost element is quantifiable.

    Cost elements such as the impact of "going green" on a customer base, or avoided future liability, are often not quantifiable but can influence a company's choices about TUR. If a cost element is unquantifiable the analysis must include an explanation of why and describe its overall impact – positive or negative – on the costs and savings associated with implementing the TUR option.

- **The year that must be used for calculating the cost associated with using the "covered toxic"**: 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 that must be clearly articulated in the analysis: The analysis must clearly indicate

  - How costs of using the "covered toxic" were allocated to the production unit, and

this allocation must be "as accurate as the extent possible"[3].

- The discount rate, cost of capital, depreciation rate, or payback period, if any, used in the analysis

- **Use of the company's normal fiscal decision making criteria**: 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. However, the facility does not need to base its decision to implement an option on as stringent factors as it normally uses. It might, for example, allow a longer payback period or lower rate of return for a technique that reduces byproduct from a chemical that has a high potential for liability.

- ***Optional* Stand-alone "Cost of Toxics" Analysis**: While the economic analysis of each "appropriate" TUR option must show the economic savings from the reduced use and byproduct generation associated with adopting the technique, a stand-alone calculation of the total cost of using the toxic chemical in the production process is no longer required. Instead companies may choose to calculate the savings associated with the reduced use and waste of the chemical separately for each TUR Option. However, facilities may find it easier to calculate the full costs of using the "covered toxic" once, and then refer to the relevant portions of that calculation in the individual economic evaluations, rather than repeating the savings calculations for each "appropriate" TUR option. In particular, calculating the full cost of using the "covered toxic" will likely streamline the economic evaluation by making it fairly simple to demonstrate that a TUR option is clearly economically infeasible. Economic infeasibility is clear if maximum potential savings is well below the lowest estimated costs of implementing the option. i

PURPOSE: This analysis is designed to provide the facility with the economic information needed to make a "good faith and reasonable" decision whether or not to implement a TUR option and to develop a realistic implementation schedule for TUR options it has chosen to adopt. 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.

DOCUMENTATION: The plan must include the economic analysis outlined above for each "appropriate" TUR option. The analysis must identify the estimated costs and savings associated with implementation. 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. Exhibit 9 shows a chart that can be used to capture the results of the economic analysis. (A full sized version can be found in Appendix A.)

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

[3] 310 CMR50.46A(4)

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, as long as 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.

9. 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
- Explain why they are not implementing any "appropriate" TUR option
- Develop an implementation schedule for each "new" TUR option being implemented.

DOCUMENTATION: The plan must include the information listed above. *Exhibit 9, Optional Chart Appropriate TUR options: Outcome of the Economic Evaluation and Implementation Decision,* is an example of a chart that can be used to capture the results of the economic analysis and implementation decision. (A full sized version can be found in Appendix A.)

C. FACILITY-WIDE REQUIREMENTS (POST PRODUCTION 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, obtain the required certifications and submit the applicable portions of the Plan Summary form to MassDEP.

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.

CONTENT: The Plan Scope describes:

- Each production unit included in the Form S(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 ,

EXHIBIT 9

OPTIONAL CHART: APPROPRIATE TUR OPTIONS:
OUTCOME OF THE ECONOMIC EVALUATON & IMPLEMENTATION DECISION

PRODUCTION UNIT:			
Technique Description			
Is it Economically feasible?	Yes No	Date Reevaluated / Outcome	
Will it be Implemented?	Yes No	If No, explain why not: or If Yes provide and implementation schedule	Date Reevaluated / Outcome
Technique Description			
Is it Economically feasible?	Yes No	Date Reevaluated / Outcome	
Will it be Implemented?	Yes No	If No, explain why not: or If Yes provide and implementation schedule	Date Reevaluated / Outcome
Technique Description			
Is it Economically feasible?	Yes No	Date Reevaluated / Outcome	
Will it be Implemented?	Yes No	If No, explain why not: or If Yes provide and implementation schedule	Date Reevaluated / Outcome

- Process and product description
- Unit of product
- Chemical name and CAS number of each "covered toxic" (reportable 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
- The projected reduction in pounds of use and byproduct for each "covered toxic" for which one or more TUR options will be implemented.

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

FORMAT: 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 TURA Plan Summary can also be used for the scope. Specifically:

- The Production Unit Descriptions included in the Form S's have all of the information needed to describe the production unit.
- The charts describing the options identification procedures and results of the technical and economic assessments and implementation plans can be used for the description of the procedures used to identify TUR Options, the list of TUR Options identified, and whether or not they will be implemented or are still under evaluation. Alternatively, the Plan Summary form, which must list the TUR Options considered and selected can be used to provide this information, provided the options still under evaluation are also included on the form.
- The Projected reduction in pounds of use and byproduct for each "covered toxic" need to be summed for each TUR Option, but this information can be used for the Plan Summary.

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.

DOCUMENTATION: The written Plan Scope itself, coupled with the other plan sections and their supporting documentation suffices as the required documentation.

2. <u>Plan Summary [310 CMR 50.47]</u>

Instead of submitting the complete plan to MassDEP, companies are required to submit a summary of the plan. The Plan Summary is due on July 1st of the Planning Year. It is submitted with the Annual TUR Report due on July 1 of the Planning Year.

CONTENT: The Plan Summary includes:

1. 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 TUR Report due with the next Plan Summary and the amount reported on the Annual TUR Report submitted with the current Plan Summary.

   Note: If the facility is projecting to reduce use or byproduct the difference is reported as a negative number

   > *For example the 2010 Plan Summary projected change in use was calculated as:*
   >
   > *[the amount projected to be used in CY 2011)] – [the amount used in CY 2009]*
   >
   > *The [amount used in CY 2009] was included on the Annual TUR Report due on July 1 2010 and submitted with the 2010 Plan Summary*
   >
   > *The [amount projected to be used in CY2011] would have been the amount the company projected that it would use in CY2011 (given their plans to implement the selected TUR Options*

2. ALL TUR options considered during the current planning cycle.

3. The **new** TUR options the company plans to implement **as a result of the current plan**. Companies may also choose to include TUR options implemented as a result of prior years' plans. However, if they choose to do so they must indicate the year in which these previously adopted techniques were put into place.

4. Any TUR options the company said would be implemented in the previous Plan Summary that were not implemented, and a brief explanation of why they were not adopted.

5. Any other information the company believes would be beneficial for MassDEP or the public to review.

6. The required management and TURP certification statements.

Note: Items 1 – 5 are not required if the facility was exempt from doing production unit level reporting for this chemical because it was ALL used in waste treatment, a start up production unit, or a pilot plant

FORMAT: The plan summary is submitted on a form provided with the Reporting Package. It is in the Appendix B TUR PLANNING REPORTING FORMS.

PLAN UPDATE: The plan summary will be different each year so must filled out each planning cycle and submitted with the Annual TUR Report,

DOCUMENTATION: Include a copy of the completed Plan Summary form with the Plan,

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 Toxics Use Reduction Planner. A senior plant 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 toxics use reduction planner certifies that he or she has reviewed the plan and that, in his or her professional judgment, the planning process and the plan conform to MassDEP regulations.

The certification form is included with the Annual TUR Reporting package. A copy is included in Appendix B TUR PLANNING REPORTING FORMS.

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 on which the facility indicates
    - What kind of Plan (TUR, or one of the allowed alternatives: Resource Conservation or EMS Planning) the facility is doing.
    - Whether the facility has either of the following exemptions to the planning process:
        - The names and CAS numbers of any “covered toxics” included on the Annual TUR Report submitted with the Plan Summary that have been eliminated or the use of which has been reduced below the reporting threshold for the current calendar year, and will not have to be included in Annual TUR Report due on July 1 of the next year
        - The facility has already closed or will close during the current calendar year, and the closure date

2. The Plan Summary Form which includes the elements described above

3. TUR Plan Certification Form which includes the statements that must be signed by both the facility manager and the MassDEP approved TURP.

Copies of these forms can be found in APPENDIX B TUR PLANNING REPORTING FORMS

V. APPENDIX A: OPTIONAL PLANNING CHARTS

OPTIONAL CHART: MATERIALS ACCOUNTING

Complete one for each production unit in which a covered toxic is used
Add additional sheets if more than 3 covered toxics are used in the production unit
Append calculations and assumptions

Production Unit #:
Calendar Year Use:_____ Date Prepared:_____

	COVERED TOXIC		**COVERED TOXIC**		**COVERED TOXIC**	
Chemical Name/CAS #						
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. "Emissions"*						
2. ONSITE MANAGEMENT						
a. Recycled						
b. Treated** as wastewater						
c. Treated** as solid or hazardous waste						
d. Disposed of to Land						
e. Total Amount Released to Air						
f. Total Amount Released to Water						
g. Total Amount Released to Land						
h. TOTAL AMOUNT MANAGED ONSITE (sum of a -g)						
3. OFFSITE MANAGEMENT						
a. Treated** as wastewater						
b. Treated as solid or hazardous waste						
c. Total Amount Recycled						
d. Disposed of (released) to Water						
e. Disposed of (released) to Air						
f. Disposed of (released) to Land						
g. TOTAL AMOUNT MANAGED OFFSITE (sum of a-f)						

OPTIONAL CHART: TUR OPTIONS IDENTIFICATION and RESULTS OF TECHNICAL EVALUATION

PRODUCTION UNIT:					
Technique Description					Date Identified
TUR Type	Input Substitution Production Unit Modification Production Unit Modernization Improved Operation and Maintenance Integral Recycling				
Covered Toxic(s)					
Identification Process Who involved, Information sources, Data gathering techniques					
a. Is it Legal /	Yes No	Why Not:			Date Reevaluated/ Outcome
b. Is it TUR	Yes No	Why Not:			
c. Is it Technically Feasible	Yes No Evaluation Incomplete	Why Infeasible OR Reason feasibility evaluation could not be completed, remaining research steps and schedule h			Date Reevaluated/ Outcome
d. Appropriate? Yes if a-c are yes	Yes No	Projected Reduction (when fully implemented)	Annual	Per Unit of Product	Date Reevaluated/ Outcome
		Use			
		Byproduct			
Technique Description					Date Identified
TUR Type	Input Substitution Production Unit Modification Production Unit Modernization Improved Operation and Maintenance Integral Recycling				
Covered Toxic(s)					
Identification Procedure					
a. Is it Legal /	Yes No	Why Not:			Date Reevaluated/ Outcome
b. Is it TUR	Yes No	Why Not:			
c. Is it Technically Feasible	Yes No Evaluation Incomplete	Why Infeasible OR Reason feasibility evaluation could not be completed, remaining research steps and schedule			Date Reevaluated/ Outcome
e. Is it "Appropriate"? Yes if a-c are "Yes"	Yes No	Projected Reduction (when fully implemented)*	Annual	Per Unit of Product	Date Reevaluated/ Outcome
		Use			
		Byproduct			

OPTIONAL CHART: APPROPRIATE TUR OPTIONS:
OUTCOME OF THE ECONOMIC EVALUATON & IMPLEMENTATION DECISION

PRODUCTION UNIT :			
Technique Description			
Is it Economically feasible?	Yes No	Date Reevaluated/ Outcome	
Will it be Implemented?	Yes No	If No, explain why not: or If Yes provide and implementation schedule	Date Reevaluated/ Outcome
Technique Description			
Is it Economically feasible?	Yes No	Date Reevaluated/ Outcome	
Will it be Implemented?	Yes No	If No, explain why not: or If Yes provide and implementation schedule	Date Reevaluated/ Outcome
Technique Description			
Is it Economically feasible?	Yes No	Date Reevaluated/ Outcome	
Will it be Implemented?	Yes No	If No, explain why not: or If Yes provide and implementation schedule	Date Reevaluated/ Outcome

APPENDIX B TUR PLAN REPORTING FORMS

To be added in March when the New Electronic Reporting System is available

Massachusetts
Department
of
ENVIRONMENTAL
PROTECTION