Ministry of Environment and Climate Change Strategy

TECHNICAL GUIDANCE MIN-12

ENVIRONMENTAL MANAGEMENT ACT

DEVELOPMENT AND USE OF TRIGGER RESPONSE PLANS

Version 1.0

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Environmental Protection Division

Purpose of this Guide

Trigger Response Plans (TRPs) are a proactive tool that can help facility operators manage and respond to changing conditions or situations before the situation becomes problematic or results in harm to the environment or human health or damage to infrastructure.

Some *Environmental Management Act* (EMA) authorizations require the holder to develop and implement a TRP for some aspect of their operation in order to mitigate environmental risks and minimize impacts. This guide serves as a reference for Qualified Professionals (QPs) who are responsible for preparing TRPs on behalf of an applicant or authorization holder. The guide describes recommended best practices for the preparation of TRPs.

Submitted TRPs are reviewed by Ministry of Environment and Climate Change Strategy (ENV) staff to ensure conformance with this guidance document and any other regulatory requirements, and to confirm that they are clear, the actions will be effective, and the language is enforceable. Adherence to the advice laid out in this guidance document in the preparation of the plan will not only result in more effective plans but will also reduce the likelihood that the plan will need to be significantly amended following ENV review. This will result in savings of time and expenses for the authorization holder.

Definitions

Discharge Standard – a requirement that limits the quality, quantity, frequency, and/or duration of the waste discharge including the maximum and/or mean limits for the concentration of contaminants of potential concern, including the period over which the limits are measured. Permit limits are an example of how discharge standards are set under EMA.

Numeric Performance Metric (NPM)- a measurable value that quantifies either the outcome or result of effluent treatment (i.e. the final effluent quality), or the performance of the treatment in removing a specified chemical constituent (i.e. load reduction). It forms the basis for a quantitative comparison of the quality of treatment plant inflows and outflows.

Site Performance Objective (SPO) - a target set for a location in the receiving environment to help ensure the performance of works and management practices. SPOs may be established as standards that must be met in the receiving environment (like a permit limit), conditions that must be true for a discharge to occur, or triggers for implementation of contingency measures or further investigations.

What is a Trigger Response Plan (TRP)?

TRPs identify appropriate specific actions to be used in response to observed or measured changes in conditions that are approaching management objectives (i.e. to respond to increasing trends which may be approaching EMA permit limits, SPOs or Water Quality Guidelines). TRPs are a proactive measure to avoid non-compliance and to ensure impacts to the receiving environment are avoided.

The purpose of a TRP is to help authorization holders respond to changing situations in a timely manner and take meaningful actions that will keep them operating within their permit requirements. A TRP

helps authorization holders to think things through ahead of time, and to have a plan in place so they know how to respond and can do so without delay. Under a TRP, authorization holders utilize data that measures treatment system performance, discharge quality or receiving environment conditions to inform early implementation of pre-determined response actions and contingency measures before a situation escalates, there are impacts to the receiving environment, and the proponent is held responsible for any subsequent costs associated with the mitigation of those impacts.

As each authorized facility is unique, the details of how risk and uncertainty are addressed will differ, as will each TRP. By laying this out in a plan, rather than through detailed/prescriptive authorization conditions, there is flexibility for the authorization holder to modify the plan over time, based on learnings/results.

Figure 1 illustrates an approach where escalating responses are invoked at trigger levels that are set at pre-determined contaminant concentrations that are associated with increasing levels of risk. If a lower trigger is reached (indicated by the yellow horizontal line) initial responses (identified by yellow arrow) could include a confirmation of observed levels and/or assessment of actual impacts, and then possibly an initial response action to change the trajectory so levels go down instead of continuing to rise. At higher trigger levels (i.e. the red horizontal line) which reflect greater risk, contingency measures such as new/additional treatment, ceasing of discharge could be implemented as a more intensive response (identified by red arrows). If no trigger levels are exceeded, then the standard permit requirements and normal monitoring are considered sufficient.

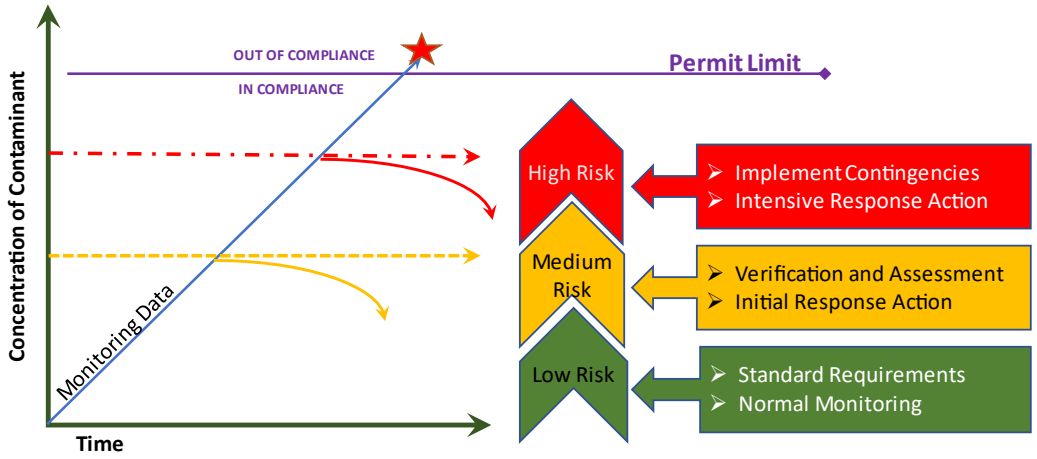

Figure 1. Trigger Response Plan Schematic

Considerations for Preparing a Trigger Response Plan

Triggers should be established relative to meaningful criteria such as a water quality guideline, a site performance objective (SPO), a permit limit or other permit requirements. To be effective, triggers should be set below critical thresholds that must be attained, such as permit limits. The combination of triggers and responses, and their relationship to the criteria, will depend on the site-specific circumstances and proposed responses. The details of setting the specific trigger levels may be stipulated by the Statutory Decision Maker (SDM) and in these instances the TRP should reflect these requirements.

The TRP should be drafted in accordance with general recommendations and best practices identified in the "Guide to Preparing Effective Plans" guidance document issued by ENV in 2022.

The key technical elements of a TRP are:

1. Define each trigger(s) – location, water quality characteristic or biological measure, concentration or level, frequency and duration, etc.;
2. Description of monitoring activities necessary for measuring the defined trigger(s);
3. Clear process for determining and confirming if a trigger has been reached, and a process for reporting the trigger exceedance (e.g., timing of reporting, internally within the company and externally (if appropriate);
4. Clear definitions/descriptions of specific and time bound actions to be taken in response to a trigger being reached;
5. What person or position is responsible for implementing each action;
6. Tables, figures and/or decision trees to illustrate the steps to follow in applying the TRP to assist in communicating how the plan will be implemented;
7. What subsequent trigger or event will be used to determine when it may be appropriate to resume or increase discharge again, following a cessation or reduction in discharge; and
8. A regular review process, conducted by a QP, to assess the usefulness and impact of the TRP. The review and associated report should include, but not be limited to:
    a. An assessment of the effectiveness of the TRP in ensuring permit limits (or other critical thresholds) are not exceeded;
    b. A summary of all exceedances of trigger levels throughout the year;
    c. A summary of all actions planned and taken, and adherence to the trigger actions listed in the TRP;
    d. Recommendations for updates to the TRP; and
    e. Any other comments, recommendations, and observations the QP considers would be relevant to the Director in reviewing and approving the TRP or any amendments to the plan.

When a TRP has multiple triggers at different levels, the responses at each level should escalate to ensure an appropriate response. Initial responses upon reaching any trigger may include further investigation to confirm findings. Responses to a lower-level trigger exceedance may include further characterization of potential effects, identification of causes for reaching the trigger, and determination if additional contingency measures require implementation. Additional data collection, beyond routine monitoring may be required. An immediate escalated response may be more appropriate upon reaching higher trigger levels, such as changes to management actions, decreasing or ceasing discharge, or upgrading of works. TRPs are not considered Adaptive Management Plans (AMPs) which provide a systematic way of

reducing uncertainties over time through experimentation and monitoring, but rather support direct, timely and pre-determined responses to observed conditions in order to avoid an undesirable outcome. TRPs are a means to ensure that contingency measures are implemented when and where required to maintain compliance with the EMA permit. An example table for development of a TRP is included in Appendix 1.

Relationship to Numeric Performance Metrics

A Numeric Performance Metric (NPM) is a continuous improvement tool that may be established to promote effective operation of treatment plants to maximize their potential to reduce environmental risks. Unlike a discharge standard, an NPM is not a legal limit that must be met. Instead, an NPM is a measurable value that quantifies either the outcome or result of effluent treatment (i.e. the final effluent quality), or the performance of the treatment in removing a specified chemical constituent (i.e. load reduction). This tool is useful when treatment works are applied to a new site or in a novel application, and careful monitoring and evaluation of performance is important to validate actual effectiveness against predicted performance, and ensure works are operated as expected by the manufacturer.

TRPs can be used to support achievement of NPMs, in a similar manner as they are used to operate for SPOs or permit limits. However, a TRP is more commonly applied as a proactive tool to ensure that facilities operate within limits or other critical thresholds that have been established to avoid impacts, rather than to maximize performance or more generally reduce risks.

Implementation and Compliance

A TRP should be written with clear and measurable triggers and actions to ensure it can be easily implemented, and so that Compliance and Enforcement (C&E) inspectors can review the actions taken and determine if they have been carried out in accordance with ministry expectations. When conducting inspections, ministry C&E staff will review the TRP and the actions taken in accordance with the plan, to evaluate if the plan was followed, and to confirm that all actions and reporting was completed as required.

Summary

TRPs can be required in EMA authorizations as a proactive tool that can help facility operators manage and respond to changing conditions or situations before the situation becomes problematic or results in damage to infrastructure or harm to the environment or human health. They use site-specific criteria to define an escalation of management actions or contingency plans when pre-determined thresholds or triggers are exceeded. The tool is used to support achievement of compliance with permit requirements and to reduce impacts to the receiving environment.

Appendix 1: Example framework for a TRP for a water treatment facility showing escalation of responses using effluent quality triggers

Parameter	Normal Operating Range	Permit Limit	Level 1 Trigger	Level 1 Response	Level 2 Trigger	Level 2 Response	Level 3 Trigger	Level 3 Response
ABC	50-100 mg/L	150mg/L	110mg/L	1. Immediately report to supervisor 2. Immediately resample effluent to verify results – rush analysis at the lab 3. Sample influent 4. Review flow data, reagent usage, and other operating parameters 5. Make adjustments to address anomalies 6. Once return to normal range, provide	130mg/L	1. Immediately report to QP and Mine Manager 2. Immediately resample effluent to verify results – rush analysis at the lab 3. Increase effluent sampling frequency to daily 4. Take action – e.g. add stabilizing reagent per response procedure 5. Once return to normal range, provide	140mg/L	1. Immediately report to QP and Mine Manager 2. Immediately resample effluent to verify results – rush analysis at the lab 3. Increase effluent sampling frequency to twice daily(?) 4. Reduce effluent flows by 50% and direct excess effluent to holding pond,

				report to Mine Manager.		report to Manager.		5. Notify Ministry and Indigenous Nations 6. Prepare to place plant in full recirculation mode if permit limit is reached. 7. Once return to normal range, provide report to Manager Indigenous Nations and Ministry.
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