A Framework of Sample Metrics for Evaluating the Efficiency and Effectiveness of Environmental Permitting Systems

OVERVIEW

This document was developed at the direction of the E-Enterprise Leadership Council to provide useful information for project teams that are seeking to improve the processes employed by the US EPA for programs in which US EPA is the lead permitting agency. Specifically, this document: (1) lays out a framework that includes a list of sample metrics that may be useful in analyzing, evaluating, and improving the operational efficiency and effectiveness of permitting systems on an ongoing basis, and includes metrics relating to timeliness, quality, quantity, process complexity, cost, outputs, and system impacts, and; (2) provides some sample use cases to illustrate how the document may be effectively utilized. Consistent with the collaborative spirit of E-Enterprise for the Environment, efforts to improve permitting systems can benefit from the insights and contributions of personnel at all levels of government as well as other stakeholders, and will likewise provide collective benefits across the national environment enterprise.

RECOMMENDED GUIDELINES FOR USE OF THIS DOCUMENT

1. The sample metrics provided below are intended to serve as a framework for thinking about developing and applying measures. These sample metrics are not intended to set a "standard" or "requirements" that should be applied to any particular permitting system. Taken together, they serve as an illustrative framework that may provide ideas or inspiration for the development of project-specific measures.
2. The sample metrics are organized into seven broad categories: timeliness, quality, quantity, process complexity, cost, outputs, and system impacts. However, within this framework, some of the metrics could appear under more than one category.
3. In selecting or developing one or more metrics for use in evaluating a particular permitting system's efficiency and effectiveness, it is essential to first ask and answer the following question: "What is the problem that we are trying to address or solve by the use of a metric?" For example, if the principal problem is that permit issuance takes longer than is desired, one or more measures of "timeliness" will be the initial focus. However, to ensure that in focusing on timeliness, the quality of the issued permits is not eroded, it may also be helpful to simultaneously or sequentially track one or more measures of quality.
4. For each particular permitting system, different metrics may be most useful and appropriate; as a general matter, only a handful of metrics should be applied at any one time to a particular system or process, and they should be selected based on the specific problems that need to be solved within that system or process at that moment. Under a continuous process improvement approach, different metrics may be most helpful at different times. The development and ongoing collection of data sets under a metric can be very time consuming and costly, thus reinforcing the importance of being both highly tactical and highly strategic in the selection and application of metrics for each particular circumstance.
5. This sample list of metrics is not intended to serve as a standard baseline for evaluating all permitting systems or comparing one permitting system to another, and the goal should not be to attempt to collect all of these metrics for all systems or processes at all times.
6. A permitting system is often one among several important components of an overall environmental program, and all of those components may have effects on each other. Typically, there are direct linkages and feedback loops among and between program components, including outreach/education, permitting, appeals of permitting decisions, monitoring and data collection, compliance assistance, and enforcement. The sample metrics identified in this project are intended to focus primarily on measures of effectiveness of the permitting component of a broader, more comprehensive program.

7. This framework is based upon an understanding that permitting systems are established to achieve the following general purposes: improved compliance rates; increased regulatory certainty (i.e., provide detailed operational guidance not available through laws or regulations); obtain stakeholder input, and; provide appropriate flexibility (within regulatory constraints) to address a wide range of circumstances.
8. This framework is also based upon an understanding that well-functioning permitting systems will deliver the following benefits, among others: better environmental outcomes; enhanced economic and societal conditions, and; increased public confidence.
9. This framework may help to provide some insights to process improvement teams as they begin mapping the current state of a permitting process. It is not intended to replace or serve as a standard set of measures for statistical analysis of individual process steps within a Kaizen or mapping event. This framework may be particularly useful to process improvement teams as they are developing a potential future state for a process or in identifying measures for determining whether the future state, once implemented, effectively addresses the problem(s) they were trying to solve by redesigning the process. The sample use cases provided at the end of this framework describe situations in which data from an initial set of measures is collected to help understand and track the symptoms of the problem, and more detailed measures are then applied once the root cause(s) of the problem has or have been identified and solutions or countermeasures have been implemented.
10. This framework is not intended to serve as a set of "standard public reporting measures" for use across some or all of the permitting programs administered by EPA, states or tribes.

The team that developed this document includes EPA, state, and tribal personnel. This effort is in line with the EELC's recommendation from September 2017, informed by the draft EPA Strategic Plan, to look at sample permitting metrics, and draws upon previous internal scoping work, a Lean Government Metrics Guide (EPA, 2009), and the team's own respective experiences and insights.

LIST OF SAMPLE METRICS FOR EVALUATING THE EFFECTIVENESS OF PERMITTING SYSTEMS

The table below presents a list of sample metrics for evaluating the effectiveness of permitting systems and identifies potential metric sub-components, where applicable.

METRIC	METRIC SUB-COMPONENTS (WHERE APPLICABLE)
Timeliness Metrics	
Lead Time (Elapsed Time) Lead time is the total amount of time from start to finish. It's greater than total work (processing) time, which includes value added time and non-value-added time (waste). A common goal of Lean initiatives is to reduce both lead time and total processing time to be closer to the value-added time.	• Total time that's value-added time (and % that's value added) • Sources of "non-value added" time that may add delays to the entire permitting approval process (e.g. excessive or duplicative reviews) • Total time that's non-value added • The ratio of lead to processing time
Work Time (Processing Time/Cycle Time/Touch Time)	• Processing time that's value added (and % value added time) • Processing time that's non-value added
Best and Worst Completion Time (i.e., full range of lead/elapsed times)	• Lead and process time at each step of the process map associated with a particular permit review process
Percent on-time delivery (compared with statutory or regulatory deadlines)	• Percent of deviation from statutory/regulation deadline (range and mean)

Activity ratio (or Process cycle efficiency) Processing time divided by Lead time, expressed as a percentage, or value-added time divided by Lead time, or value-added time divided by work time	
The percentage of applications received per unit of time (day? Month? Year?) that are administratively incomplete (i.e., don't contain all of the information required by statute or regulation to enable them to be processed) or are otherwise substandard	• Data on most common missing or incomplete or inaccurate application components • Elapsed Time and Process Time necessary to retain incomplete application, notify applicant to send in missing materials, receive and integrate missing materials into application, update the administrative completeness determination *Note: another way to think about this might be where a program (1) has a process map established; and (2) identifies how many applications are at each step of the process. One of the process/waiting boxes might be "determination of whether application is complete". With this set up for the information, a program could then know (1) how many applications are in process; (2) where they are all located; (3) which steps take the most/least time.*
Percentage delayed	• Ratio for a given time period of the number of applications whose processing was delayed due to failure to undertake timely or concurrent coordination/consultation with other governmental entities having an interest in the matter, including Tribes, divided by the total number of applications received.
Prioritization of Applications	• Extent to which the processing of one type of application, or of any single application, is given priority over another type of application or any other specific applications and the impact on timeliness
Compliance History Do agencies consider known regulated entities and past compliance history at permit renewals? Does an entity with a good compliance record have a quicker review than one that doesn't?	• Extent to which compliance history affects permit review times • Extent to which a good compliance record simplifies the drafting of a permit factsheet • Extent to which good compliance reduces the likelihood of receiving significant public comments that require an agency response
Quality Metrics	
Understandability (e.g., the number of times that a permittee, agent or member of the public must contact the issuing agency to seek a clarification of a permit term or condition)	• May include "ease of implementability" or extent to which permit conditions apply what a permittee may consider to be "common or good sense"

Consistency (e.g., the number of substantive permit terms or conditions that may be different among permits issued for ostensibly the same type of activity)	
Transparency (e.g., the number of freedom of information act (FOIA)/open records requests seeking permitting process documents)	
Percent Appealed (May provide a measure of the legal "defensibility" of permits or the extent to which they are written in compliance with all applicable legal requirements)	• Number or percentage of permit decisions that are appealed (or requested to be reconsidered).
Customer Satisfaction Qualitative or quantitative results from customer satisfaction surveys	
Stakeholder Input and Consultation	• Number of potentially affected tribal or other governmental entities, and number/percentage of those notified and provided an opportunity to comment
Extent of public engagement	• Measures of public participation/engagement
Rework Percent of products or work in process that needs to be redone	
Percent Complete and Accurate	
Rolling First Pass Yield Percent of occurrences in which the product or document passes through the entire process without needing rework	
Quantity Metrics	
How many applications are in process at any time (i.e., what's the Work in Progress (WIP))?	
How many applications are rejected or denied because they don't meet the minimal regulatory standards (due to both administrative and technical processes)?	• Number of applications returned to applicant agent due to incomplete data submittal • Number of applications denied based on a technical deficiency for failing to meet regulatory minimums.
How many special conditions are included in individual permits?	• Extent to which frequency of particular types of special conditions in individual permits may suggest the need to create more standard condition templates
How many applications are delayed or on hold?	• Number of applications on hold because staffs don't know what to do or have not elevated an issue for guidance, or management has not made a decision.
What is the flow rate of applications?	• Ratio of incoming applications over outgoing decisions.

What percentage of the universe for this permit type has applied for and been issued a permit?	• Measure of "market penetration" of the permit system
Process Complexity Metrics	
Process Steps: Total number of steps in a process where a task or activity is performed	• Focus may be primarily on the agency's internal steps for processing a submitted application, but could include evaluation of the burden on applicants in terms of the steps they may be taking to prepare and submit an application or address other aspects of seeking a permit
Value Added Process Steps: Number of process steps that add value from a customer's perspective (i.e., steps where information and materials are transformed into products/ services a customer wants). This number typically does not change with Lean.	
Decisions: Number of points in process where a choice is made about a course of action	
Delays: Number of points in process where time is wasted by waiting for something to occur	
Handoffs: Number of times work is passed from one entity to another	
Loops: Number of times when there are a series of steps that loop backwards and repeat themselves at least once	
Black Holes: Number of extreme combinations of loops, delays, decisions, and handoffs from which no further progress is made or where years can pass before proceeding with the process	

Below are other potential categories of financial and workload measures that could be considered. However, these are not necessarily directly actionable, but rather are reflective of the cumulative effects of various factors (as may be reflected in some of the more detailed measures or metrics identified elsewhere in this document) that typically can be directly managed through process changes.	
System Impacts	
Environmental, economic, and societal outcomes	• Measures will vary depending on the medium/media to be protected; may include the economic feasibility or cost effectiveness of specific types of permit conditions (e.g., units of environmental benefit gained per dollar spent) *Note: it may be challenging to isolate or identify the environmental benefits that are specifically attributable to a permitting system as a portion of the environmental benefits derived from an overall program, including such components as education/outreach, enforcement, etc.*
Cost Metrics	
Labor Savings (or Freed Capacity)	• Change in the number of full time equivalent (FTE) employees needed for a process (i.e., FTEs that can be reassigned to other tasks/positions because of efficiency improvements).
Cost Savings	• Dollar savings from Lean or Six Sigma projects, such as: - Dollar value of FTE savings (e.g., from staff attrition and avoided need to hire) - Reductions in contractor costs (after subtracting Lean facilitator costs) - Other office cost savings (e.g., energy/utility costs, consolidating office space, avoided costs such as not needing a new IT system)
Cost per Product	• Labor, material, and overhead costs to produce a product (or service product)
Output Metrics	
Backlog	• Number of products or service products that have not been started or entered the process
Work in Process (WIP)	• Amount of products or transactions that are being processed or waiting to be processed
Inventory	• A supply of raw materials, finished products, and/or unfinished products in excess of customer demand

EFFECTIVENESS CRITERIA FOR SELECTION OF APPROPRIATE METRICS

As mentioned above, different metrics may be most helpful at different times, depending on the specific problems that need to be solved. The team identified a set of effectiveness criteria, mostly based on the SMART model (Simple, Measurable, Actionable, Relevant, Timely), meant to help select the lean metrics that are the most relevant for different agencies and organizations. The team recommends considering the following criteria when selecting permitting metrics, and notes that other criteria may also be appropriate:

- Is this metric easily understandable by all parties? (SIMPLE)
- Can these data be collected easily by EPA/States/tribes? (Is this practical?) (MEASURABLE)
- Do the data provide information that enables you to improve or better manage the process? (ACTIONABLE)
- Is the metric broadly applicable and relevant across all permit and media types? (RELEVANT)
- Does the metric provide the right info to the right people at the right time for making decisions? (TIMELY)
- Who is the customer of this metric? (Note: may be more than one customer)
- Is this metric already in use by other jurisdictions for the same purpose?

SAMPLE USE CASES FOR THE FRAMEWORK FOR PERMITTING SYSTEMS MEASURES

1. Situation: Statutory deadline for making decisions on permit applications is 60 days. There are 300 permits in a backlog of applications not processed within the statutory time frame. A root cause analysis using "5 Whys" found that substantial time was spent by staff drafting original language for permit terms and conditions for each application. Staff developed a database library of terms and conditions used in previously issued permits that were not subject to legal challenges and created a standard form template (including standard plug-ins) to be used as the starting point for all draft permits except under limited specified circumstances.

    a. Initial potentially helpful metrics: If the following metrics were not already in place, they could be implemented to provide baseline information:

        i. Number of backlogged permits
        ii. Flow rate of applications (ratio of incoming applications over outgoing decisions)
        iii. Number of permits in process at any time (work in progress (WIP))
        iv. Average time spent per application drafting permit terms and conditions

    b. Following development and internal training on the use of the database, template and plug-ins, these more detailed metrics may be helpful:

        i. Number and percentage of applications issued using the standard form template
        ii. Number and frequency of updates to the database library of terms, conditions, templates and plug-ins

2. Situation: The process for approving each permit includes nineteen steps, four levels of review and signoff, and may take up to 10 months before a final decision is made on an application. A Kaizen event was conducted in which the map of the current state showed that there were numerous handoffs and that written delegations of authority were not in place, resulting in repetitive reviews. The future state

map introduced written delegations subject to specified limitations and eliminated three rounds of review for most applications.

a. Initial potentially helpful metrics: If the following metrics were not already in place, they could be implemented to provide baseline information:

   i. Ratio of work time (value added processing time) to lead time (total time from start to finish)
   ii. Decisions: Number of points in the process at which a choice is made about a course of action
   iii. Delays: Number of points in the process at which time is wasted by waiting for something to occur
   iv. Handoffs: Number of times work is passed from one person to another

b. Following adoption of the written delegations and implementation of the new work flow, these more detailed metrics may be helpful:

   i. Number of applications requiring more than one round of review prior to final approval
   ii. Number of clarifications of written delegations requested by staff

3. Situation: A substantial number of permits issued each year end up being litigated by permittees or intervenors due to alleged failure to provide an opportunity for review and comment by other affected jurisdictions or to apply to the correct permitting authority given the geographic location of the permitted activity. Based on a wishbone analysis, staff developed a fact sheet describing the consultation and jurisdictional issues associated with the permit type, as well as a user-friendly, online GIS-based system for applicants to compare the location of the proposed activity with the geographic boundaries of the different jurisdictional authorities.

a. Initial potentially helpful metrics: If the following metrics were not already in place, they could be implemented to provide baseline information:

   i. Number and percentage of issued permits that are appealed
   ii. Ratio of number of potentially affected governmental entities given participation opportunity to total number of potentially affected governmental entities

b. Following development and implementation of the fact sheet and GIS tool, these more detailed metrics may be helpful:

   i. Number of appeals that result in a finding that the applicant applied to the incorrect authority
   ii. Number of appeals that result in a finding that all potentially affected jurisdictions were not notified of the opportunity to review and comment.

4. Situation: Applicants are frequently contacting the agency to inquire about the status of and likely date of action on a submitted application, and the agency is unable to find a record of the application being placed into the queue for technical review. An A3 exercise is undertaken, which finds that many filed applications are missing basic components such as signatures or permit fees, but the applicant is not immediately notified. Countermeasures implemented by staff include establishing checklists for administrative completeness, modifying the application form to more clearly show all required data items, conducting administrative completeness reviews within one business day of receipt of all applications, and returning all incomplete applications to the applicants with a checklist showing the missing items.

    a. Initial potentially helpful metrics: If the following metrics were not already in place, they could be implemented to provide baseline information:

        i. Ratio of administratively or technically complete applications to total number of applications received
        ii. Number of status inquiries received per day regarding the status of permit applications
        iii. Elapsed time and process time necessary to search database and paper records to locate an application file and determine its status, and to relay this information to the inquiring party

    b. Following implementation of the countermeasures, these more detailed metrics may be helpful:

        i. Number of incomplete applications filed by the same party following the first time an incomplete application is returned to them
        ii. Elapsed time and process time to conduct an administrative completeness review and notify the applicant of determination