Smart Math Saves Time and Improves Communication

Laura Nielsen

US Environmental Protection Agency

Nielsen.laura@epa.gov

Susan Day

Eastern Research Group

Susan.day@erg.com

Proceedings of the
2018 Federal Committee on Statistical Methodology (FCSM) Research Conference
Washington, DC
March 7-9, 2018

1. INTRODUCTION:
Why consider upfront design of mathematical organization and sequence?

Federal agencies collecting information from regulated communities have the responsibility under the Paperwork Reduction Act (PRA) to inform the public of the industry burden associated with the information collection. To this end, burden estimates encompass, "…the total time, effort, or financial resources expended by persons to generate, maintain, retain, disclose, or provide information to or for a federal agency." Analysts at federal agencies routinely develop burden estimates that must consider and reflect a variety of information collection conditions including the level at which the information is organized and reported (e.g. per site), the amount and type of information reported, the type of staff responsible for reporting, and the time frame over which reporting occurs.

Methods for estimating burden can have more than one possible formulation given the fundamental laws of mathematics, which include the communicative, associative, and distributive laws. For new information collections, burden estimate methodology can implement the heuristics and design principles presented in this paper to prevent future problems. However, the easiest way to illustrate such potential problems is to examine results from less robust designs—and show how using Smart Math addresses problems. For example, it is not unusual to need to modify burden estimates based on changes in policy. However, in the event that key estimates central to a methodology are adjusted without attention to the whole system of estimates, trouble ensues. Such changes can occur without attention to important key methodological principles, including: internal consistency, parsimony, and transparency. The results can be sub-optimal, especially where:

- categories of respondents are numerous and overly specific,
- origins of estimates cannot be quantitatively identified or verified, and
- burden estimation methods have progressed on a piecemeal basis.

In this paper, the authors have observed overly complex methodology and potentially internally inconsistent estimates. Better designs are provided with problems prevented using Smart Math techniques, including: algebraic simplification, definition of per-submission unit of analysis to consolidate multi-scale activity-level burdens into a unified scale, and management of temporal effects. The benefits of using Smart Math are associated with the objective production of more accurate, robust, and intuitive estimates delivered in a timely manner in a variety of policy/regulatory contexts. As an additional benefit, the estimates often provide useful metrics for communication and back-of-the envelope estimates. Moreover, the cost of generating and maintaining estimates is reduced because Smart Math simplifies reporting presentations with fewer report tables and less work during quality control procedures. Therefore, burden reports offer greater integrity and reliability, with improvements in transparency plus sustained cost savings.

Studies used in this paper are drawn from reports of burden estimates by the US Environmental Protection Agency (EPA). EPA routinely collects information from industry across multiple time intervals (i.e, episodic, annual, biennial, etc) as part of its mission to protect human health and the environment. Data collections at EPA may support surveys, permit applications, questionnaires, regulatory requirements established by rulemaking, and reports. Examples of such collections at EPA include annual reporting on routine and accidental chemical releases, periodic pesticide registrations, and one-time, annual, and occasional submission of records and reports related to topics such as refrigerant releases during refrigerant recovery, recycling, and reclamation. For any collection where information is to be obtained from more than nine respondents, EPA must prepare an Information Collection Request (ICR) identifying the estimated burden and cost to affected respondents. ICRs must be approved by the Office of Management and Budget (OMB) before data can be collected, and thereafter renewed every three years. Also, economic analyses (EAs) supporting rulemakings that mandate data collection must estimate incremental burden and cost to affected respondents. Note that the applications of Smart Math apply broadly to EPA ICRs, and Economic Analyses (EAs) with associated preambles, as well as to similar documents at other agencies subject to PRA.

Given the examples in this report, and as a matter of context on ICR format, please note that EPA uses a handbook developed to help analysts prepare ICRs. This guidance identifies the activities that should be considered when developing the ICR including rule familiarization, compliance determination, form completion, and recordkeeping.

The handbook includes an established outline for how labor and non-labor burden and costs should be estimated and presented in the ICR Supporting Statement. Within labor costs, the handbook also identifies the major categories of managerial, technical, clerical labor.

Based on multiple experiences with methodology revisions in ICR renewals and EAs in EPA's Office of Pollution Prevention and Toxics, the authors employ two key questions: 1) What is the simplest and easiest way to calculate burden? and 2) How can the Agency best provide clearly defined and consistent estimates? Key strategies for Smart Math implementation include:

1) *Simplify with Algebraic Reduction*: as opposed to using repetitious component calculations,

2) *Define Per-Submission Unit of Analysis:* with a focus on the respondent perspective; as a likely follow-on, consolidate multi-scale activity-level burdens into a unified scale,

3) *Avoid Potential Internal Inconsistencies*: with assessment of relationships between burden estimates for interrelated subpopulation categories, and implementation of ratio or other models, and

4) *Manage Temporal Effects*: with attention to timing issues and periodicity differences between reporter submission activities and ICR renewal needs.

This paper discusses these four strategies supported by simple examples in Section 2: Background and Basic Heuristics. In Section 3, two case studies that are complex examples of applying Smart Math are presented. Conclusions, including benefits and long-term implications, are discussed in Section 4.

2. BACKGROUND AND BASIC HEURISTICS

This section explains the fundamentals in applying Smart Math to burden estimate analysis. The key strategies stated above are used to organize the discussion. Examples in this section and for the case studies in the following sections are drawn from burden reports for EPA's programs including the Toxics Releases Inventory (TRI), and the Notices of Activity (NOAs) for the TSCA Inventory, and TSCA section 4 testing).[1]

For discussions of this section, examples are drawn from the recent information collection called "Notices of Activity," which provide an updated status indicator in the TSCA Inventory. The TSCA Inventory is a compilation of chemical substances manufactured (including imported) or processes in the US. The purpose of the Inventory is to define, for the purpose of TSCA, what chemical substances exist in U.S. commerce. At any point in time subsequent the initial reporting effort in 1977, substances not included on the Inventory are considered to be new substances that are subject to the Premanufacture Notification (PMN) requirements which provide a mechanism for adding the new chemicals to the TSCA inventory, once commenced.

In June 2016, Congress passed the Frank R. Lautenberg Chemicals Safety for the 21st Century Act which established additional requirements for maintenance of the TSCA Inventory. These requirements included a "mass reporting" effort to identify chemical substances active in commerce for a ten-year lookback period ending June 2016, with provisions for updates. In the first part of the mass reporting effort, manufacturers were required to submit NOAs (termed "Start-up Reporting – Phase I" in economics documents).

To reference some burden estimate terminology: activity-based unit burden estimates are provided as fundamental building blocks for burden analysis. An activity may be broad—such as recordkeeping for a comprehensive submission, or specific—such as providing information for a single data element, in which case the burden assigned includes time for preparation (including calculation) plus time to enter the information on a form or via electronic format. An example from the NOA, Form A in Figure 1. The informational benefit of an activity-level unit burden rests in its face validity: Does this amount of time sound reasonable for the effort required to complete the task? Is this estimate a reasonable representation of the average conditions for which universe estimates will be used to scale to the total burden estimate?

Table 1: Activity-Level Unit Burden Example — Notice of Activity (NOA) Form A

Activity-Level Unit Burdens for NOAs During Start-up, Phase I (Manufacturers) Reporting					
Activity	**Unit of Analysis**	**Managerial Burden (hours)**	**Technical Burden (hours)**	**Clerical Burden (hours)**	**Activity-Level Unit Burden (hours)**
Chemical Name and Identifier	Chemical	0.000	0.083	0.000	0.083

Source: EPA, 2017

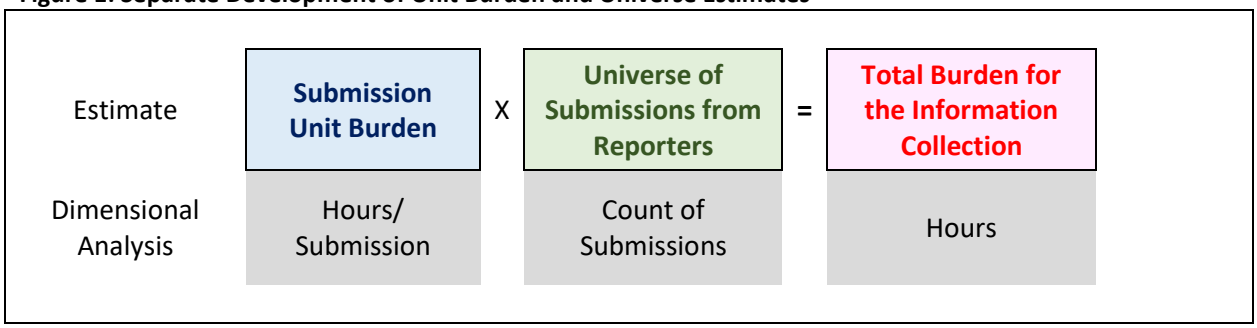
In contrast, the total burden estimate is used to assess the magnitude of the burden for the overall information collection effort (e.g. Submission and Recordkeeping burdens for all NOAs), on an annual basis.

[1] TRI authority under EPCRA section 313 (42 USC 11023**),** NOA authority under TSCA section 8(b), (15 USC 2607(b)), and Section 4 Testing authority under TSCA section 4(a) (15 USC 2603).

Simplify With Algebraic Reduction

In conducting methodology revisions that apply Smart Math, the division between unit burden per response and universe estimates is an important one. Note that it is best to develop calculation procedures for these two constructs separately before multiplying them together to get total burden, as illustrated in Figure 1. Oftentimes, multiple variants of the calculation in Figure 1 are presented according to subpopulations or according to different activities with differing units of measure. Examples in this paper show that the alternative approach of building a consolidated version of the unit burden term and applying it the to a minimum number of subpopulations prevents errors, as well as produces useful communication metrics. The organizing principle displayed in Figure 1 is consistently used in applications of Smart Math presented in this paper. Note that that Figure 1 also presents a dimensional analysis, as a useful tool to employ when addressing scaling issues, as shown in the next section.

Figure 1: Separate Development of Unit Burden and Universe Estimates



Assess Levels of Information and Define Per-Submission Unit of Analysis

There are often intervening factors that influence the aggregation of activity-level unit burdens to per-response and total burden estimates, as required in documents associated with PRA requirements. For the purposes of this paper, the authors recommend organizing the analyses in terms of the respondent's "per-submission" requirements and then converting to "per-response" and "per-respondent" bases.

The definition of per-submission unit of analysis flows directly from the assessment of levels of information. Regarding levels of information and activity, once the per-submission unit of analysis is defined, multiple levels of information and activity (e.g., per-site and per chemical) are easy to accommodate conceptually and mathematically, using scaling techniques—more specifically, applying a "roll-up" calculation.

With Smart Math, the per-submission unit burden occurs at the level of information at which unit burden estimates may be communicated prior to aggregating to total burden. Referring back to Figure 1, the per-submission unit burden is the consolidated unit burden. The examples below show how assessing levels of information leads to a purposefully defined per-submission unit of analysis and also to a good metric for use in burden estimates and communications.

For example, in TSCA Inventory NOA-Form A, [2] some information is required for the site, such as site name and recordkeeping; and some information is required according to chemical, for one or more chemicals manufactured at the site. In short, the underlying structure of the information being collected involves multiple levels of information, with measures that have different units of analysis.

Defining the per-submission unit of analysis is typically best done by considering the perspective of the reporter under the conditions of the submission. How does the transaction or collection of transactions make sense from the reporter's perspective? In the NOA example, a typical submission is a company-level report that provides

[2] See Appendix for sample Notice of Activity Form A.

information on one or more chemicals. Therefore, the per-submission unit of analysis is at the company level with the understanding that information for some average number of chemicals is involved.

Combining activity-level burdens for companies and chemicals to formulate a per-submission unit burden requires scaling considerations. This roll-up calculation also requires knowledge of the reporting universe: How many chemicals, on average are reported on a NOA Form A? Based on readily available information, an estimated average of eighteen chemicals per company are predicted. Therefore, for the NOA Form A, the company-level activity burdens are counted once (e.g. company name and address), and the chemical level activity burdens (e.g. chemical name and identifier as shown in Table 1) are counted 18 times. Table 2 presents the unit burden for the submission in accord with the principle presented Figure 1 – one consolidated unit burden to be applied to the population of companies submitting a NOA Form A. In PRA terms, the submission corresponds to a single response, making the number of responses equal to the number of submissions. Similarly, with one NOA Form A submitted per company for one or more chemicals, the number of respondents is also equal to the number of submissions.

Often the outcome of the above exercise produces useful metrics for concise communication in management presentations and for back-of-the envelope estimates. As shown in Table 2, using NOA average conditions for Form A submission unit burden provides a means to focus on the bottom line per-submission impact of 14.930 hours while at the same time highlighting the average conditions—such as the fact that the average company reports on 18 chemicals.

Table 2: Per-Submission Unit Burden — NOA Form A Example

Notice of Activity (NOA): Average Unit Burden Per Multi-Chemical Submission for Phase I Start-Up Conditions		
Activity	**Unit of Analysis**	**Unit Burden per Submission (Hours)**
Rule Familiarization	Per Company	4.00
Multi-chemical Compliance Determination (18 chemicals)	Per Company	1.994
Multi-Chemical Form Completion (18 chemicals)	Per Company	8.811
Recordkeeping	Per Company	0.125
Total, Average Unit Burden per Company		**14.930**

Source: EPA, 2017

Remove Potential Internal Inconsistencies via Modeling

Some systems of burden estimates can become overly detailed and complex. Note that the base activity-level unit burden estimates are subjective measures. Therefore, high degrees of precision are not available for distinguishing activity burden under base conditions from activity burden under most differing conditions identified as important to the analysis. At a minimum, the practice of deriving additional activity-level unit burdens outside of base conditions produces over-specificity and/or creates a false sense of precision;[3] under the worst possible circumstances, the practice creates internal inconsistences between the sets of unit burdens and within total burden estimates.

Another way of thinking about the problem is in terms of reporter subpopulations. The greater the number of subpopulations with differing conditions, the greater the likelihood for internal inconsistency. Internal inconsistencies result from over-reliance on the analyst's ability to precisely differentiate the absolute values of detailed estimates between reporter subpopulations.

Consider a base population of experienced reporters and a secondary subpopulation of new reporters. It makes sense to estimate burden for the two groups separately—we know that certain tasks or types of tasks take longer the first time you go through them. Therefore, it is not unusual to put together an overall estimate reflective of a reporting universe comprised of new and experienced reporters. However, keep in mind that when we develop the base set of estimates for the experienced reporters, we are dealing with a set of subjective measures. Therefore, high degrees of precision are not available for distinguishing the differences between activities for new and experienced reporter burden, say on a data-element by data-element basis. Figure 2 presents two options for handling this scenario. On the left-hand-side is the more complicated approach, with separate estimates for every element of activity-level burden. On the right-hand-side is a simple solution that avoids potential internal consistencies. The simple solution retains the

base set of detailed subjective estimates, but applies an overarching factor to obtain an estimate for the secondary subpopulation at a higher level of aggregation. The factor, here called the First-Time Factor, or FTF, is a ratio model that provides a useful metric for understanding the new reporter burden relative to experienced reporters.

[3] For example, in the TRI RBBM development document, the authors state that highly specified estimates are not necessarily more precise (and hence not necessarily more accurate) than less specified estimates. "In the context of TRI's uncalibrated estimates, increasing specificity (i.e., adding variables) adds complexity without necessarily increasing precision." EPA concludes that neither TRI's pre-2011 nor revised methodologies require additional specificity (EPA, 2011-see pg 7).

Figure 2: Hypothetical Case for Internal Inconsistency

Separate Sets of Unit Burdens for Experienced and New Reporters

			Managerial	Technical	Clerical	Total
Experienced Reporter	Site	Rule Familiarization	2	2	0	4
	Site	Compliance Determination	0	2.5	0	2.5
	Chemical	Calculations and Form Completion	20	40	20	80
	Chemical	Recordkeeping	0.75	1.5	0.75	3
					Overall Total	89.5

			Managerial	Technical	Clerical	Total
New Reporter	Site	Rule Familiarization	9	19	0	28
	Site	Compliance Determination	0	2.5	0	2.5
	Chemical	Calculations and Form Completion	25	50	25	100
	Chemical	Recordkeeping	0.75	1.5	0.75	3
					Overall Total	133.5

Smart Math: One Set of Unit Burdens for Base Conditions Plus a Ratio Model

			Managerial	Technical	Clerical	Total
Experienced Reporter	Site	Rule Familiarization	2	2	0	4
	Site	Compliance Determination	0	2.5	0	2.5
	Chemical	Calculations and Form Completion	20	40	20	80
	Chemical	Recordkeeping	0.75	1.5	0.75	3
					Overall Total	89.5

First-Time Factor (FTF) = 1.49

Manage Temporal Effects

Timing and periodicity of reporter activities in comparison to the ICR renewal three-year cycle creates challenges in presentation and as well as accounting difficulties. This consideration is best addressed by defining the most sensible time period for the reporting requirement for use in burden estimate development, and then recalculating in accord with ICR time frames. For the example in Table 3 (presented in more detail as a case study), the submission involves multiple transactions across three years that have to be recalculated for an annual basis to meet the needs of the ICR Supporting Statement.

Table 3: TSCA Section 4 ICR Case Study Test Rule Annual Average Burden and Cost for the ICR Renewal Period

Burden Category	3-Year Cycle Total Burden (Hours)			Annual Average Burden (Hours)		Annual Average Cost (2014$)	
	Year 1	Year 2	Year 3	Per Chemical	Total	Per Chemical	Total
Test rules' activities and transmittals for the full battery of tests	2,080			69.33	$18,074.44	693.33	$180,744.40
Number of Responses and Respondents[1]	10			10		10	

[1]Ten chemicals are tested, based on the assumption that two test rules address five chemicals each. Also, one sponsor per chemical is assumed.

Source: EPA 2016. Note that estimate procedure has been revised for this paper's purposes.

3. CASE STUDIES USING SMART MATH

3.1 Case Study #1: Toxics Release Inventory Ratio Based Burden Methodology (RBBM)

Under section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA), certain facilities that manufacture, process, or otherwise use specific toxic chemicals in amounts above reporting threshold levels must report annually to EPA on the release and waste management of these chemicals. EPA compiles and stores this information in a publicly accessible database known as the Toxics Release Inventory (TRI). Facilities may use either the EPA Toxics Release Inventory Form R (Form R), or, if they meet alternate threshold requirements, the EPA Toxics Release Inventory Form A Certification Statement (Form A). Form R, the more complex and time intensive of the two, applies to a single chemical with up to approximately 150 data elements requiring completion. On Form A, eligible facilities report minimal facility or chemical specific information for one or more chemicals and certify that the annual reportable amount of the chemical did not exceed the established threshold.[4]

TRI reporting sites complete one or both TRI forms: Form R (single chemical) and Form A (short form with one or more chemicals). Reporting may involve two chemical types: (1) persistent, bioaccumulative, toxic chemical (PBT), or (2) non-PBT chemical. Form level burden includes rule familiarization, compliance determination, calculations and form completion, and recordkeeping. Sites are also subject to non-form burden, which includes supplier notification, non-reporter compliance determination, and petitions.[5] Note that form level burden can be further subdivided in to facility-level activities (rule familiarization and compliance determination), and chemical-level activities (form completion and recordkeeping). For facility-level activities, the facility incurs the burden once, regardless of the number of chemicals on which it reports. For chemical-level activities, burden is incurred separately for each chemical.

In 2011, during TRI ICR Renewal work, EPA decided to undertake a methodology revision because the existing methodology had a number of shortcomings, due in part to having designs develop in a piecemeal fashion. The pre-2011 system was artificially complex, which made use and maintenance of burden estimates difficult. Moreover, the pre-2011method had been reviewed and commented on over the years with a range of feedback about the validity of the estimates themselves. EPA therefore decided to restructure the system for several reasons: 1) calculations could be greatly simplified via algebraic reduction, 2) relationships between interrelated categories could be specified via ratio models to remove internal inconsistencies, 3) corrections needed to be made to per-submission unit burdens so that multiple scales were incorporated into a unified scale in order to prevent double-counting.[6]

Prior to the ICR Renewal in 2011, the methodology for estimating burden hours and costs associated with TRI reporting was based on a system of 96 factors organized into four categories as shown in Figure 3. There were 96 total factors because each of the four categories (defined by chemical type (e.g., PBT) and reporter experience) included 12 factors (two for each facility-level and form-level, estimated across three labor categories - managerial, technical and clerical). Taking those 12 factors across four categories and two Forms (R and A) yielded a total of 96 factors. For each category's set of factors, such as Form R non-Persistent Bioaccumulative Toxic (PBT) chemical subsequent year unit burdens, a relevant subpopulation TRI chemical count had to be provided – for example, the number of subsequent year non-PBT Form R chemicals. The factors in Figure 3 were the unit burdens officially approved by the Office of Management and Budget (OMB) for use in estimating TRI Program burden. Note that prior to its revisions, this methodology was considered the Agency's most complex.[7] This overly complex system information creates excessively laborious reporting formats, as well as a vast potential for internal inconsistencies.

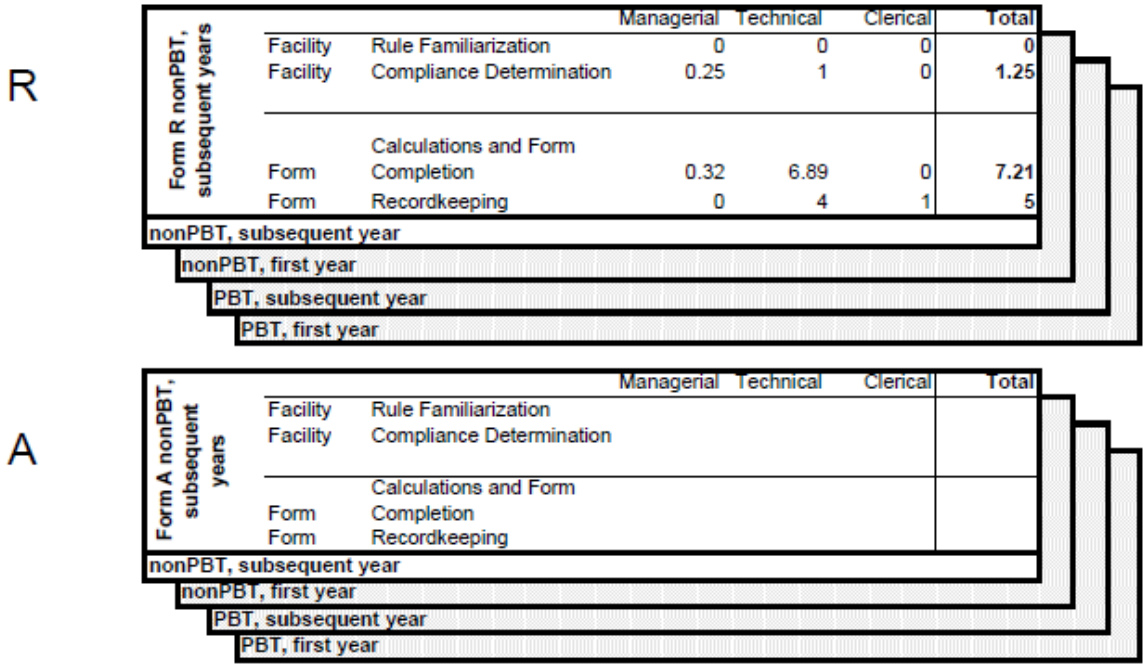
[4] See Appendix for sample Form R and Form A.

[5] Supplier notification affects certain suppliers of mixtures or trade name products containing reportable substances. They must annually notify their customers of the product's composition, if the customer is subject to EPCRA section 313 reporting. Non-reporter compliance determination refers to the compliance determination burden experienced by facilities that make a determination as to whether to report to TRI but do not ultimately need to report.

[6] Under the pre-2011 methodology, the double-counting potential exists due to the facility-level unit burdens in two situations 1) via the structure by which Form A and Form R reporting is estimated separately with both estimates counting facility burden 2) the rulemaking context in which additional reports are added from facilities that already handle facility level burden regardless of the changes imposed by the rule. Both these sources of error are prevented in RBBM.

[7] Per Rick Westlund, OEI Office of Information Collection, 1/13/2010.

Figure 3: Pre-2011 Methodology Complexity: Numerous Burden Factors and Chemical Counts



Source: EPA 2011

Levels of Information

The levels of information associated with TRI site submissions include: the respondent (a site), the responses of Form R(s) and/or a Form A, and the chemicals. The pre-2011 methodology makes it difficult to focus on levels of analysis due to its overly complex nature. The levels of information are summarized below.

For the TRI Form R:

- Sites that report to TRI
- Chemicals reported via Form R (one chemical per form)
- Subpopulations of interest:
    - PBT, non-PBT chemicals
    - First year, subsequent year of reporting (experience level)

For the TRI Form A:

- Sites that report to TRI
- Chemicals reported via Form A (one or more chemicals per form)
- Subpopulation of interest:
    - PBT, non-PBT chemicals
    - First year, subsequent year of reporting (experience level)

There are two per-submission units of analysis: one each for Form R chemical and Form A chemical. Note however that the unit burden for a given chemical on a Form A is related to the unit burden for a Form R, as Form A consists of a subset of data elements from the Form R. Moreover, sites that report on Form Rs overlap with sites that report on a Form A. Additionally, new reporter (first year) estimates can be based on a First-Time Factor (FTF_f) applied to the experienced reporter (steady state) estimates. Last, the distinction between PBT vs non-PBT chemicals can be neglected by assuming that PBT chemical reporting is the same as non-PBT reporting, pending availability of

quantitative information by which to change the default ratio model with a value of one. Each of these metrics is discussed in more detail below.

Smart Math RBBM

A structural comparison between the pre-2011 methodology and RBBM as applied to Form R burden is provided in Table 4. RBBM consolidates site-level and chemical-level activity burdens for both chemical types (PBT and non-PBT) within the base "Form R unit burden" to yield one unit burden per Form R. Moreover, this single unit burden is comprehensive and thus incorporates all activities (e.g. rule familiarization, form completion, etc.) that contribute to the burden of Form R reporting. Therefore, in addition to requiring fewer unit burdens (with fewer subpopulations to track), RBBM's comprehensive unit burden permits the estimation of total Form R burden by simply multiplying just one unit burden by the total number of Form R chemicals. Likewise, for Form A burden, only one unit burden—derived as a ratio to the Form R unit burden—is multiplied by the total number of Form A chemicals.

Table 4: Burden Methodology Calculation Factors & Unit Burdens—Form R and Form A

Burden via Pre-2011 Methodology	Steady State Burden via RBBM
Estimate Description: Sum the numerous products of factors multiplied by chemical counts or facility counts (depending on the scale of the factor).	***Estimate Description: multiply the comprehensive unit burden by total number of chemicals.***
<u>Estimation Factors</u> Per (chemical) form-level A and R: • hrs per PBT, subsequent year, • hrs per non-PBT, subsequent year Per facility-level A and R: • hrs for PBT and non-PBT, subsequent year <u>Reported Unit Burdens A and R</u> (do not include related facility-level burden) ➔ 29.66 hrs per Form R non-PBT (subsequent year) ➔ 53.34 hrs per Form R PBT (subsequent year)	<u>Estimation Factor</u> Per (chemical) form-level: • hrs per Form R chemical* • *A/R* = 0.615 • *PBT/non-PBT=1* <u>Reported Unit Burden A and R</u> ➔ 35.7 hrs per Form R ➔ 22.0 hrs per Form A

* Incorporates all the same considerations as the pre-2011 methodology.
<u>Source: EPA 2011</u>

Calculation of the *Steady State Total Burden,* RBBM's primary method, is presented in the next section's Figure 4. *Steady State Total Burden* is the estimate of the ongoing TRI Program burden, as updated by rulemakings' permanent impacts (e.g., changes to reporting requirements) but absent any first-time filer (e.g., facilities reporting for the first time or existing facilities getting up to speed with new policies and requirements) impacts. Note that the only inputs required for this estimate are the total counts of Form R and Form A chemicals.

Key Factors within RBBM's Reformulated Structure

The *Nominal Form R unit burden* provides the base number for the entire methodology.

Form A unit burden is defined as *Nominal Form R unit burden* multiplied by *A/R*, a model of the ratio of Form A single-chemical burden to Form R burden. The per-submission unit of analysis for Form R is a Form R chemical; the per-submission unit of analysis for Form A is a Form A chemical. *A/R* specifies the relationship between Form A and Form R burden. The value for *A/R* is derived by assessing the Form R burden for activities similarly required to

complete a Form A.[8] The examples in Table 4 and Figure 4 illustrate that RBBM incorporates the same components of the pre-2011 methodology, but offers a much simpler formulation. Furthermore, the use of ratio models such as *A/R* ensures internal consistency within the new structure.

The *First Time Filer Factor (FTF$_f$)* is used to estimate first-time filing burden that affect new entrants to the reporting community as a result of policy change. The model by which *FTF$_f$* is derived provides a consistent basis to estimate the first year burden relative to steady state burden for both Form R and Form A and therefore removes potential internal inconsistencies via modeling. The *FTF$_f$* is developed using the ratio of the sum of activity-level burdens associated with first-time Form R reporting activities to the comparable unit burdens associated with steady state Form R reporting activities.

The FTF$_f$ is calculated at 2.1 and has the following interpretation: "for any comparison of first-time filer to ongoing filer burden, the elevated startup effort is roughly twice the normal ongoing burden." Note that first-time filer burden is a transient effect that will decrease to steady state burden levels in the second year.

The last key factor of the reformulated structure is the PBT/Non-PBT ratio model, which is set to a value of one in order to manage the unsubstantiated difference made between reporting on PBT vs non-PBT chemicals. This analytical decision reflects a synthesis of considerations. Mainly, although reporters could easily argue that there were reasons for PBT reporting burdens to be greater than for Non-PBT reporting, the analysts were at a loss for a method by which to quantify the differences—even at the higher aggregate levels. Second, accounting for PBT and non-PBT burden separately increases the complexity for the system of burden estimates—which the analysts wanted to avoid. Review of history and public comment detail led to the final design decision.

During the 2004 TRI ICR renewal cycle, EPA staff sought to update the magnitude of estimates and related unit burdens, which had not been updated since the beginning of the TRI program. After the public comment period and OMB review, partial revisions were implemented which, among other things, reduced the amount of Form R Non-PBT unit burden, while holding PBT unit burden constant, thereby unintentionally imposing a distinction in which PBT burden is 1.73 of non-PBT burden (i.e., 73% higher). Note that this piecemeal change occurred as an offshoot of the revision process, rather than as a deliberate specification and later could not be verified.

Given the overall pattern: abundance of public comments arguing for increased burden estimates for PBT reporters, while at the same time a lack of specific information to use for the basis of the increase, the model for PBT/non-PBT =1 was created as a placeholder, subject to revision (awaiting quantitative evidence). To date, no quantitative evidence to change the placeholder model has surfaced.

Note that whatever true differences may exist between PBT and non-PBT reporters, they are unmeasured. Therefore, the burdens for both PBT and Non-PBT reporters are absorbed—in proportion to their influences on the total burden—in the base average unit burden (i.e., Nominal Form R Unit Burden).

Note that *FTF$_f$ and PBT/non-PBT*, as adjustments to the overall burden calculation, improve the methodology in two ways. First, they keep the equation simple. Had these simplifications not been made, the calculation would have required tracking subpopulations of PBT chemical filers and first-time filers,[9] making the method more complex. A second benefit from these simplifications is the sophistication of a single unit burden for *Nominal Form R* unit burden with Form A reporting burden closely linked.

[8] The bases for *A/R* include detailed burden estimates by task, making the *A/R* model verifiable and readily subject to validation.
[9] Note that for TRI reporting on an annual basis, absent changes via rulemakings, the % New Reporters is relatively small and typically a neglected effect.

Figure 4: Ratio-Based Burden Methodology
—Two Unit Burdens; Two Chemical Counts; One Wage Rate

Steady State Total Burden Calculation

Steady State Total Burden
= Form R Burden + Form A Burden + Non-Form Burden
= Nominal Form R Unit Burden# Form R Chemicals*
+ [Nominal Form R Unit Burden (A/R)*(# Form A Chemicals)] + Non-Form Burden*

First-Time Filer Estimation

First-Time Filer Burden
*= FTFf * (Relevant Steady State Burden)*
*= FTFf *[(Nominal Form R Unit Burden* # New Form R Chemicals)]*
*+ [(A/R) * Nominal Form R Unit Burden * # New Form A Chemicals]*

Cost Conversion

*Steady State Total Cost = (Steady State Total Burden)*WAWR*

Note: Terms highlighted in red refer to universe estimates, as compared to unit burden estimates.

RBBM Benefits

This case study illustrates the benefits of applying several of the heuristics presented in Section 2. By consolidating and unifying per form and per facility burden into the per-submission unit burden, EPA is able to reduce the unit burden calculation to one number for the *Nominal Form R.* The *Nominal Form R unit burden* then reflects overall "average" conditions, without the need to add variables and provides a single focal point for discussions about methodology accuracy. This approach provides focus on the average burdens per form at 35.7 hrs per Form R and 22.0 hrs per Form A.

In choosing to use a null ratio model as a placeholder to address the potential difference between PBT and non-PBT burden, EPA removes separate distinct estimates for the subpopulation of PBT chemical reports. Although the potential exists for differences in burden for PBT chemical reporting, in RBBM's final formulation, the method allows these differences to remain unmeasured and reflected in the overall average. This design choice is made because there are no substantiated (i.e., measured) differences in unit burden between PBT and non-PBT chemical reports. Therefore, removing the unsubstantiated distinction reduces complexity and avoids internal inconsistencies in burden estimates. Last, use of the FTF_f also avoids internal inconsistencies by providing a consistent basis to estimate the first year burden relative to steady state burden for both Form R and Form A. Taken together, these methodology improvements ensure that analysts will spend less time and effort creating TRI reporting burden estimates. The effects on reduced report complexity are dramatic—page space devoted to analytical tables is reduced by 61%, from 18 pages to seven pages.

In addition to saving time, RBBM enhances administrative consistency with shorter, more straightforward procedures that are readily replicated and consistently communicated. Moreover, such methods can increase transparency because burden information is available in a more accessible, compact, and comprehensive format that is easier to use. As a result, analysts and the general public will obtain an increased understanding of the key drivers of burden estimation for a variety of purposes, including those encountered in the context of public policy changes. A comparison of the TRI ICR Renewal annual burden statement pre and post methodology revision highlights the improved utility that can result from streamlined methodology:

Before RBBM Simplifications:

> *The annual public burden related to Form R for calculations, report completion, recordkeeping and submission, which is approved under OMB Control No. 2070-0093, is estimated to average 51.34 hours per response for PBT chemicals and 29.66 hours for Non-PBT chemicals (all estimates include proposed changes). There is additional burden associated with rule familiarization, compliance determination, and supplier notification. The annual public burden for calculations, report completion, recordkeeping and submission, which is approved under OMB Control No. 2070-0143, is estimated to average 20.52 hours for a facility that certifies one Non-PBT chemical per Form A Certification Statement and 35.89 hours for a facility that certifies one PBT chemical per Form A Certification Statement (all estimates incorporate proposed changes)*.

After RBBM Simplifications:

> *EPA estimates the annual public burden for form calculations such as rule familiarization, compliance determination, calculations and form completion, and recordkeeping, which is approved under OMB Control No. 2025-0009, to average 35.7 hours per response for a facility filing a Form R and 22 hours for a facility filing a Form A for one chemical.*

Additionally, ratio models are useful standalone metrics because they quantify key relationships between two elements. For example, the *A/R* ratio is calculated at .615, reflecting the burden of a Form A as 61.5% of the burden of a Form R, and implying that filing a Form A instead of a Form R yields a 38.5% burden reduction per chemical. Similarly, the FTF_f is calculated at 2.1, indicating that start-up activities will take reporters twice as much effort in the first year of a policy or regulatory change than in following years.

3.2. Case Study #2: Toxic Substances Control Act (TSCA) Section 4 Testing Restructured Methodology

Section 4 of TSCA gives EPA the authority to require chemical manufacturers and processors to test existing chemicals. Under section 4, EPA can by rule require testing after finding that (1) a chemical may present an unreasonable risk of injury to human health or the environment, and/or the chemical is produced in substantial quantities that could result in significant or substantial human or environmental exposure, (2) the available data to evaluate the chemical are inadequate, and (3) testing is needed to develop the needed data. The data collection is designed to provide EPA with necessary information on health effects, ecological effects, and environmental fate in order to predict the probable impacts on human health and the environment that may present unreasonable risk. EPA uses the information collected under TSCA section 4 to assess risks associated with the manufacture, processing, distribution, use or disposal of a chemical, and to support any necessary regulatory action with respect to that chemical.

As required by the test rule, reporters submit a collection of transmittals pertaining to testing management and test results. Transmittals are reports pertaining to chemical substances that are the subject of a test rule. The required testing may occur over a long period of time, depending on the tests. Types of transmittals include: Letter of Intent with study plans for tests, annual progress report, final report, and robust summary. Overall, total reporter burden depends on the number of test rules promulgated—including number of chemicals addressed in rules, and on the specific requirements of the test rules regarding number and type of tests. Activity-level unit burdens are estimated according to transmittal type (e.g., final report). Reporting frequency is conducted according to requirements of the test rule, with no set reporting frequency that is consistent across all reporters.

For purposes of ICR renewal, a standard set of assumptions is employed that establishes the costs per chemical substance to include ten tests, three of which are long duration and defined to take three years, and seven of which are short duration and defined to take one year. The standard assumptions are used because test rules are highly context specific and potentially spread out over extended periods of time. In having the standard assumptions, the analyst is able to simplify the analysis in the ICR renewal without accounting for lingering disparate effects of rules from the past, but instead combine such effects with the best estimate for the future effects (as estimated using the standard assumptions). Therefore, when the analyst updates the number of rules and chemicals per rule, the estimate for the ICR renewal period covers all effects to be experienced in the next three years.

At the time that work began for the ICR renewal in Summer 2015, EPA found the methodology and format in the ICR Supporting Statement difficult to follow and decided to pursue a redesign that would improve transparency and ease maintenance in ICR renewals.

Table 5 displays the details for the battery of ten tests, revised slightly from the pre-2015 version with the additional detail of long-term studies identified.

Table 5: TSCA Section 4 ICR Case Study Standard Assumption of Ten Tests

"Standard" Testing Battery Laboratory Costs (2014$), Per Chemical				
Test Protocol Name	**Protocol Number**	**Date of Estimate**	**Mean Cost Estimate (2014$)[a]**	**Validation Costs (2014$)**
Algal Acute Toxicity	797.105	8/3/1990	$12,132.58	$4,398.95
Daphnid Acute Toxicity	797.13	4/25/1996	$11,965.05	$4,398.95
Fish Acute Toxicity	797.14	4/25/1996	$18,285.73	$4,398.95
Gene Mutations in Somatic Cells	798.53	8/16/1994	$25,366.24	$4,398.95
Subchronic Oral Toxicity	870.31	9/3/2005	$167,921.14	$4,398.95
Prenatal Developmental Tox. (2 species)[b]	870.37	1/1/2010	$152,450.48	$10,683.16
Reproduction/Fertility Effects[b]	870.38	1/1/2010	$422,689.97	$10,683.16
Salmonella Reverse Mutation Assay	870.5265	9/16/1996	$9,792.46	$4,398.95
In vivo Bone Marrow Cytogenetics	870.5395	2/27/2005	$24,968.83	$4,398.95
Developmental Neurotoxicity[b]	870.63	1/1/2010	$754,982.00	$10,683.16
Subtotal			$1,600,554.48	$62,842.13
Total Laboratory Cost			**$1,663,397**	

Footnotes:

[a] Where multiple versions of a test have been assessed by EPA (e.g., covering different species or routes of exposure), the mean cost estimate is used. All testing costs are updated to 2014 dollars.

[b] Designated as "long duration" studies.

Sources:

1. U.S. Bureau of Labor Statistics. July 2015, Employment Cost Index (ECI) Continuous Occupational and Industry Historical Listing Series, September 1975 to Present. Series: All Private Workers Total Compensation (not seasonally adjusted).

2. U.S. EPA. 2013. Office of Pollution Prevention and Toxics, Economic and Policy Analysis Branch. Filename: Standard Nano Test Costs 9-01-2013.xls.

3. Piccirillo 2004. Vincent Piccirillo, personal communication. September 20, 2004.

Source: EPA, 2016

Table 6 displays the pre-2015 table for burden estimation. The per-submission unit of analysis is unclear, as some activities are per sponsor, some per chemical, and some per rule. Unit burden and universe estimates are not segregated, resulting in premature aggregation (see e.g., "Number of Letters of Intent/Study Plans per Sponsor" and "Total Letters of Intent/Study Plans.")

Table 6: TSCA Section 4 ICR Case Study Pre-2015 Aggregation Strategy

Estimating Annual Activities for Chemicals Covered by a Test Rule				
Ref.	Description	**See discussion in ICR**	**Factor**	**Totals [1]**
a	Number of Test Rules Issued[2]	Section 6(b)(i)	6	
	1) HPV 3rd Group of Chemicals	Section 6(b)(i)(1)	1	
	2) Existing Testing	Section 6(b)(i)(2)	5	
b	Chemicals per Rule (max is based on last rule issued)	Section 6(b)(i)	15	
	1) HPV 3rd Group of Chemicals	Section 6(b)(i)(1)	15	
	2) Existing Testing	Section 6(b)(i)(2)	15	
c	Total Number of Chemicals (a × b)			90
d	Number of Chemicals per Sponsor	Section 6(a)(iii)	5	
e	Number of Sponsors per rule (b ÷ d)			3
f	Total Number of Sponsors (a × e)			18
g	Number of Letters of Intent/Study Plans per Sponsor	Section 6(a)(iii)	1	
h	Total Letters of Intent/Study Plans (f × g)			18
i	Number of Short-term Studies per Chemical	Section 6(a)(ii)	7	
j	Total Number of Short-term Studies (c × i)			630
k	Number of Long-term Studies per Chemical	Section 6(a)(ii)	3	
l	Total Number of Long-term Studies (c × k)			270
m	Total Number of Studies per Chemical (i + k)		10	
n	Total Number of Studies Under Test Rules (j + l)			900
o	Number of Semi-annual Progress Reports per Short-term Study Number of Semi-annual Progress Reports per Long-term Study	Section 6(a)(iii) Section 6(a)(iii)	0 5	
p	Total Number of Semi-annual Progress Reports per Short-term Study (o x j) Total Number of Semi-annual Progress Reports per Long-term Study (o x l)			0 1350
q	Number of Final Reports per Study	Section 6(a)(iii)	1	
r	Total Number of Final Reports (n × q)			900
s	Total Number of Robust Summaries [3]			90
t	Total Number of Reports (h + p + r + s)			2358
u	Total Number of Reports per Sponsor (t ÷ f)			131
v	Total Number of Reports per Rule (t ÷ a)			393
w	Total Number of Reports per Chemical (t ÷ c)			26.2

[1] Numbers are rounded - calculations may not appear exact.

[2] To account for the 86 chemicals that are still subject to testing, EPA assumed 5 rules with 15 chemicals a rule.

[3] For test rule submissions, only 10 percent of studies are expected to be accompanied by robust summaries because they are optional.

Source: EPA, 2012

Levels of Information

The levels of information associated with submission include: the respondent or respondents (consortium of sponsor(s)), the response as a collection of transmittals, the tests, and the chemicals. The organization of the pre-2015 analysis is hard to follow with the submission unit of analysis indirectly defined as transmittals for various purposes at varied frequencies. The levels of information can be summarized as:

- Consortiums of one or more sponsors incurring the burdens and costs for testing
- The battery of ten tests per chemical subject to test rule requirements
- Chemicals subject to testing as specified in one or more test rule(s)
- Reports sent to the agency as transmittals over a three-year period

Note, however that the levels of information are interconnected, as presented in the activity-level unit burdens and costs, which are itemized according to transmittals and pertain to the battery of ten tests for one chemical subject to one test rule's requirements.

EPA sought to identify a more natural organizational approach that better reflected the information collection, and noted that activities, including testing and test report transmittals, center around the requirements for a given chemical in a test rule. Therefore, it seemed that the analysis could be better organized according to the chemicals covered by a test rule. As a result of this thinking—and as a simplifying organization strategy, the per-submission unit of analysis is redefined as "per chemical." [10] The associated number of responses is the same as the numbers in rules (ten in this example) and the number of respondents is the same. Moreover, in order to manage temporal effects with uneven counts of transmittals over the three-year period, the period of time analyzed is a three-year period. Table 7 lays out the collection of transmittals for a chemical subject to test rule requirements according to the three-year cycle. The transmittals summarized in Table 7 correspond to activities associated with completion of the battery of tests presented in Table 5. Moreover, for purposes of post-2015 analyses, the number of sponsors per chemical is simplified and assumed to equal one.[11]

[10] The tables presented in this case study for the revised methodology reflect further revisions, using the same source information.

[11] In additional to providing simplification, this change is needed in order to better reflect conditions moving forward into the ICR renewal period, with much smaller counts of test rules and chemicals subject to test rules.

Table 7: TSCA Section 4 ICR Case Study
Summary of Transmittals According to Chemical

Respondent Activities	Total Counts, Three Year Period
Interim Reports	
Letter of Intent/Study Plans	1
Prepare Annual Progress Reports	5
Final Reports	
Short Duration Studies	7
Recordkeeping	7
Long Duration Studies	3
Recordkeeping	3
Robust Summaries	1

Notes:
1. A response is defined as the collection of related activities involving a battery of ten tests (seven short; three long) all of which pertain to one specified chemical. See previous table for additional detail.
2. Long duration studies are completed in three years; short duration studies are completed in one year. Only long term studies require annual progress reports.
3. Ten percent of studies are expected to be accompanied by robust summaries because they are optional.

Source: EPA 2016. Note that estimate procedure has been revised for this paper's purposes.

With the definition of the chemical as the per-submission unit of analysis and the period of time set to three years, the remainder of the analysis flows logically: report the consolidated unit burden per submission, and multiply by the total number of submissions to compute total burden. Results are shown in Table 8 and 9. One additional step is needed to prepare the estimates on an annual basis. The information required for this additional step is presented in Table 10.

Table 8: TSCA Section 4 ICR Case Study
—Test Rule Submission Unit Burden and Cost per Chemical, 3-Year Cycle (2014$)

Respondent Activities	Total Counts Three Year Period#	Burden per Activity (hours)	Unit Burden per Chemical (hours)	Cost per Activity	Unit Cost per Chemical
Interim Reports					
Letter of Intent/Study Plans	1	40.00	40.00	$2,888.80	$2,888.80
Prepare Progress Report	5	8.00	40.00	$577.76	$2,888.80
Final Reports					
Short Duration Studies	7	52.00	364.00	$3,803.44	$26,624.08
Recordkeeping	7	0.50	3.50	$15.63	$109.41
Long Duration Studies	3	95.00	285.00	$6,932.90	$20,798.70
Recordkeeping	3	0.50	1.50	$15.63	$46.89
Robust Summaries	1	12.00	12.00	$866.64	$866.64
Totals			**746.00**		**$54,223.32**

Source: EPA 2016. Note that estimate procedure has been revised for this paper's purposes.

Table 9: TSCA Section 4 ICR Case Study Test Rule Total Burden and Cost per -3 Year Cycle (2014$)

Respondent Activities	Number of Chemicals Addressed	Unit Burden per Chemical (hours)	Total Burden	Unit Cost per Chemical	Total Costs
Interim Reports					
Letter of Intent/Study Plans	10	40.00	400.00	$2,888.80	$28,888.00
Prepare Progress Report	10	40.00	400.00	$2,888.80	$28,888.00
Final Reports					
Short Duration Studies	10	364.00	3,640.00	$26,624.08	$266,240.80
Recordkeeping	10	3.50	35.00	$109.41	$1,094.10
Long Duration Studies	10	285.00	2,850.00	$20,798.70	$207,987.00
Recordkeeping	10	1.50	15.00	$46.89	$468.90
Robust Summaries	10	12.00	120.00	$866.64	$8,666.40
Totals		**764.00**	**7,640.00**	**$54,223.32**	**$542,233.20**

Source: EPA 2016. Note that estimate procedure has been revised for this paper's purposes.

Table 10: TSCA Section 4 ICR Case Study Test Rule Annual Average Burden and Cost for the ICR Renewal Period

Burden Category	3-Year Cycle Total Burden (Hours)			Annual Average Burden (Hours)		Annual Average Cost (2014$)	
	Year 1	Year 2	Year 3	Per Chemical	Total	Per Chemical	Total
Test rules' activities and transmittals for the full battery of tests	7,460			249	2,487	$18,074	$180,744
Number of Responses and Respondents[1]	10			10		10	

[1]Ten chemicals are tested, based on the assumption that two test rules address five chemicals each. Also, one sponsor per chemical is assumed.

Source: EPA 2016. Note that estimate procedure has been revised for this paper's purposes.

TSCA Section 4 Restructured Methodology Benefits

The results from this case study illustrate the benefits of applying several of the heuristics presented in Section 2. By assessing levels of information at the onset, the multiple levels of information and associated assumptions are observed to revolve around a given chemical, and thereby can be compartmentalized and better managed. It is easier to for the reader to follow the analysis with transmittals framed as a collection associated with a chemical. Subsequently, in defining the per-submission unit of analysis as the chemical that is the subject of the rule (and the subject of the battery of tests), calculations are kept whole through the presentation of analytical results, avoiding odd frequencies such as a fraction of a transmittal per year. To implement the revised per-submission unit of analysis, activity-level burdens are rolled up to a per-chemical basis, yielding metric that is more intuitive—for example 746 hours of labor per chemical tested. The resultant system of estimates is also easier to verify for accuracy as the estimates are developed and presented. It is also a cheaper approach, with fewer tables and less data in spreadsheets, analyst effort to generate, revise, and maintain estimates is reduced. In this particular application of Smart Math, page space devoted to analytical tables is reduced by 31%, from eight to five and one-half pages.

In conjunction with the per-chemical basis, setting the time period to three years better manages the temporal effects. Readers find it much easier to follow the transmittals once it is established that the group of transmittals submitted over the three years' time are in accord with a chemical being tested. For example, the transmittal of two long duration study final reports occur in the course of three years, consistent with the presentation in Table 5 in which two long duration studies are listed.

Resulting benefits include (1) simplified and accurate calculations—yielding fewer spreadsheets to check in quality control work, and (2) more transparent presentation of per-submission unit burden and total burden with corresponding cost estimates—improving estimate face validity.

4. CONCLUSIONS

The results presented in the background and case study sections of this paper provide consistent support that anticipated benefits from Smart Math are repeatedly obtained. Burden reporting reaches new levels of advancement as estimates become more accurate, more intuitive and transparent, and also serve to present useful metrics in communication. Such estimates are also cheaper.

First, assurances of computational accuracy provided by Smart Math lead to enhanced integrity in ICR and EA reporting, preventing problems in public comments that call for corrections. Examples from TRI and TCSA illustrate that although corrections had to made, the reoccurrence of such errors are prevented in future revisions due to the new methodological procedures. The most fruitful strategies in this regard are: defining per-submission unit of analysis and managing temporal effects. As seen in the TRI case study, defining per-submission unit of analysis as the Form R chemical (and Form A chemical) eliminates the over-count in site-level burden. As seen in the TSCA section 4 case study, defining per-submission unit of analysis as the chemical and managing the analysis to include events over three years in their totality prevents over-counting certain activities.

Moreover, the enforcement of internal consistency improves estimate accuracy with the added bonus of preventing conditions by which the agency publishes information that is internally inconsistent and gets "painted into a corner." This vulnerability is ripe for attack in public comment settings, and once manifested, undermines the defensibility of the entire associated system of estimates.

Second, the increased transparency that accompanies corrections made using Smart Math provides estimates that are more intuitive. As a result, Smart Math produces useful metrics for communications products and for back-of-the envelope estimates. The TRI nominal Form R unit burden at 35.7 hours per Form R chemical provides a point of focus for the burden per chemical and can be applied readily to a rough version of the aggregate total burden estimate. For example, when asking: What is the incremental burden for this change that adds 7,000 (10%) additional Form R reports in TRI, the rough estimate is 35.7x 7,000= 249,900 hours.

Third, Smart Math is faster and cheaper. Smart Math simplifications yield fewer report tables, with smaller spreadsheets housing less data to review during quality control procedures. As seen in this report's case studies, page space spent on analytical tables is reduced by 31%, and 61% for TSCA section 4 and TRI, respectively. From economist time to generate and check estimates to reader comfort in reviewing more concise report presentations, implementing Smart Math saves time. In the context of ICR renewals and EAs for rulemakings, project schedules for economic reports are susceptible to being "squeezed," as pre-requisite project steps undergo delays while management and/or statute-imposed deadlines for final completion are fixed. Smart Math can reduce lead time for economic work and help reduce deadline pressure.

In sum, results from examples and case studies reveal a wide range of benefits from using Smart Math. Short term benefits include better estimates that are more intuitive and easier to consume. Long term benefits flow from the increased robustness of estimates and include: sustained burden report integrity and reliability via sustained accuracy, and sustained savings via reduced effort in production and quality control. The latter issue of time savings also yields strategic advantages for quick turnaround revisions in the events of policy changes and data updates.

5. REFERENCES

Paperwork Reduction Act of 1995. Public Law 104-13. 44 U.S.C. § 3501 et seq.

US EPA, 2011. U.S. EPA, Office of Chemical Safety and Pollution Prevention, *TSCA Section 4 Test Rules, Consent Orders, and Test Rule Exemptions*, EPA ICR No.: 1139.08, OMB Control No.: 2070-0033. August, 2011.

US EPA, 2011. U.S.EPA, Office of Environmental Information, Office of Information Analysis and Access, TRI Regulatory Development Branch, TRI Program Division. *Revising TRI Burden to Ratio-Based Methodology*, February, 2011.

US EPA, 2016. U.S. EPA, Office of Chemical Safety and Pollution Prevention, *TSCA Section 4 Test Rules, Enforceable Consent Agreements (ECAs), Voluntary Testing Agreements (VTAs), Voluntary Data Submissions, and Exemptions from Testing Requirement*, EPA ICR No.: 1139.11, OMB Control No.: 2070-0033, Docket ID No.: EPA-HQ-OPPT-2015-0436. June, 2016.

US EPA, 2017. U.S. EPA, Office of Chemical Safety and Pollution Prevention *TSCA Section 8(b) Reporting Requirements for TSCA Inventory Notifications.* EPA ICR No.: 2565.01 OMB Control No.: 2070-0201. August, 2017.

6. APPENDIX: REPORTING FORMS

TSCA NOA Form A
TRI Form R
TRI Form A

EPA	**U.S. Environmental Protection Agency NOTICE OF ACTIVITY OF MANUFACTURE, IMPORT, OR PROCESSING – FORM A**	Submission Date:	
		Revised Date:	

Part I – Submitter Identification

Manufacturer, Importer, Processor (in U.S.)	Name of Authorized Official	Mailing Address (street, city, zip code)	CBI*
	(first) (last)		
	Company Name	Mailing Address (street, city, zip code)	
Technical Contact (in U.S.)	Name	Telephone Number	
	(first) (last)		

* CBI refers to the term "Confidential Business Information." Mark (X) in the CBI box(es) if the submitter information is to be held confidential.

Part II – Chemical Substance Identity

CASRN	TSCA Inventory Chemical Name (if specific chemical identity is not CBI)	
Accession Number	Generic Chemical Name (if specific chemical identity is CBI)	

Part III – Status of Confidential Chemical Substance Identity

	I am seeking to maintain an existing claim of confidentiality for the specific chemical identity, as listed on the TSCA Inventory.
	I am not seeking to maintain an existing claim of confidentiality for the specific chemical identity, as listed on the TSCA Inventory.

Part IV – Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision and the information contained therein, to the best of my knowledge is, true, accurate, and complete. I also certify that I have manufactured the above chemical substance between the dates of June 21, 2006 and June 21, 2016. I am aware there are significant penalties for submitting incomplete, false and/or misleading information, including the possibility of fine and imprisonment for knowing violations under 18 U.S.C. § 1001.

Signature of authorized official:		Date:	

Domestic manufacturers and importers must submit a completed notice not later than 180 calendar days after [insert date the final rule is published in the Federal Register]. Processors can voluntarily submit a completed notice not later than an additional 180 days after EPA published a draft Inventory with activity designations from both the interim list and from manufacturer reporting. Requests to maintain an existing CBI claim for specific chemical identity must be substantiated according to the Review Plan required under TSCA (not yet published, as of [insert date], but may be substantiated at the time this notice is submitted. Assertions of CBI claims for data elements other than specific chemical identity must be substantiated at the time this notice is submitted.

The public reporting and recordkeeping burden for this collection of information is estimated to average [insert] hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed EPA Form [insert] to this address.

EPA Form [insert]

Part V - CBI SUBSTANTIATION

This substantiation contains CBI: Yes ☐ No ☐

Pursuant to Section 14(c)(3) of TSCA, you must substantiate any CBI claims for information elements other than specific chemical identity at the time this notice is submitted. EPA guidance for complying with §14(c)(3) may be found at https://www.epa.gov/tsca-cbi/substantiating-cbi-claims-under-tsca-time-initial-submission. You may also substantiate a request to maintain an existing CBI claim for a specific chemical identity at the time this notice is submitted, but this is not required. Rather, you must substantiate CBI claims for the specific chemical identity by the deadline established in a forthcoming Review Plan, to be promulgated at a later date in accordance with TSCA section 8(b)(4)(C).

If you do not assert a CBI claim at time of submission of this form, or otherwise fail to assert a proper CBI claim, the information shall be treated as not subject to a CBI claim, and may be made public without further notice. If a single substantiation response applies for all information claimed as CBI, you should indicate this in your substantiation response. If different substantiation responses are necessary to support CBI claims for different information types, you should provide separate substantiation responses for each information type, clearly identifying the information for which each substantiation applies in the free text boxes (e.g. Question A.1. or 2) or in the additional information box at the end of this form.

Information element(s) that you identified as CBI in previous parts:

☐ Name of Authorized Official/Mailing address (Part I)

☐ Company Name/Mailing Address (Part I)

☐ Technical Contact/Telephone Number (in U.S.) (Part I)

☐ Specific Confidential Chemical Identity (as listed on the TSCA Inventory) (Part II/III)

A. REQUIRED FOR ANY IDENTIFIED CBI CLAIM

1. Do you believe that any information element claimed as CBI is exempt from substantiation pursuant to TSCA section 14(c)(2)[i]?

☐ Yes

☐ No

If you answered yes, you must identify the specific information element(s), specify the applicable exemption(s), and answer no further questions with respect to the identified information element(s). For any information element that is not exempt, please respond to all of the questions below.

If the Agency disagrees with this assertion, you may be asked to provide additional information to support your claim.

Click or tap here to enter text.

2. Will disclosure of any information element claimed as CBI likely result in substantial harm to your business's competitive position?

☐ Yes

☐ No

If you answered yes, please describe with specificity the substantial harmful effects that would likely result to your competitive position if the CBI element is made available to the public.

If, for example, it is not publicly known that the submitter manufactures, imports or processes the reported chemical, describe with specificity the harmful effects that would result if this information were made available to the public. If you are claiming technical contact name or name of authorized official as CBI, describe with specificity the harmful effects that would result if this information were made available to the public.

If you are claiming multiple information elements as CBI, please provide information for EACH element you identified above. If a single substantiation response applies for all information claimed as CBI, you should indicate this in your substantiation response.

Click or tap here to enter text.

3. To the extent your business has disclosed any information to others (both internally and externally), what precautions has your business taken? Please identify the measures or internal controls your business has taken to protect the information claimed as confidential.

1. Non-disclosure agreement required prior to access.	☐ Yes	☐ No
2. Access is limited to individuals with a need-to-know	☐ Yes	☐ No
3. Information is physically secured (e.g. locked in room or cabinet) or electronically secured (encrypted, password protected, etc.).	☐ Yes	☐ No
4. Other internal control measure(s). *If yes, please explain below.*	☐ Yes	☐ No

Click or tap here to enter text.

4. Does any of the information claimed as confidential appear in any public documents, including (but not limited to) safety data sheet, advertising or promotional material, professional or trade publication, or any other media or publications available to the general public? *If you answered yes, please explain why the information should be treated as confidential.*	☐ Yes ☐ No

Click or tap here to enter text.

5. If you assert a claim of confidentiality that is intended to last less than 10 years (see TSCA section 14(e)(1)(B)[ii]), then please indicate the number of years (between 1-10 years) or specific date/occurrence after which the claim is withdrawn?

Click or tap here to enter text.

6. Has the EPA, another federal agency, or court made any confidentiality determination regarding information associated with this substance? *If you answered yes, please explain the outcome of that determination and provide a copy of the previous confidentiality determination or any other information that will assist in identifying the prior determination.*	☐ Yes ☐ No

Click or tap here to enter text.

Additional comments:

Click or tap here to enter text.

B. APPLICABLE ONLY TO CHEMICAL IDENTITY CBI CLAIMS

1. Are you seeking to maintain a specific confidential chemical identity as CBI? *If you answered yes, please respond to questions below.* *If you answered no, please leave all questions below blank.*	☐ Yes ☐ No
2. Are you providing a substantiation at this time to maintain a specific confidential chemical identity as CBI? *If you answered yes, please respond to questions below and in Section A.* *If you answered no, please leave all questions below blank. You must substantiate by the deadline established in a forthcoming Review Plan, to be promulgated at a later date in accordance with TSCA section 8(b)(4)(C).*	☐ Yes ☐ No

3. Is the confidential chemical substance publicly known to have ever been offered for commercial distribution in the United States? *If you answered yes, please explain why the information should be treated as confidential.*	☐ Yes ☐ No
Click or tap here to enter text.	
Additional comments:	
Click or tap here to enter text.	

C. CERTIFICATION

Do you wish to claim this substantiation as CBI? *By marking yes, you are certifying to the truth of the below statements.*	☐ Yes ☐ No

I hereby certify to the best of my knowledge and belief that all information entered on this form is complete and accurate.

I further certify that, pursuant to 15 U.S.C. § 2613(c), for all claims for confidentiality made with this submission, and all information submitted to substantiate such claims is true and correct, and that it is true and correct that

(i) My company has taken reasonable measures to protect the confidentiality of the information;
(ii) I have determined that the information is not required to be disclosed or otherwise made available to the public under any other Federal law;
(iii) I have a reasonable basis to conclude that disclosure of the information is likely to cause substantial harm to the competitive position of my company; and
(iv) I have a reasonable basis to believe that the information is not readily discoverable through reverse engineering.

Any knowing and willful misrepresentation is subject to criminal penalty pursuant to 18 U.S.C. § 1001.

[i] **TSCA Section 14(c)(2) states:**
Information generally not subject to substantiation requirements
Subject to subsection (f), the following information shall not be subject to substantiation requirements under paragraph (3):

(A) Specific information describing the processes used in manufacture or processing of a chemical substance, mixture, or article.
(B) Marketing and sales information.
(C) Information identifying a supplier or customer.
(D) In the case of a mixture, details of the full composition of the mixture and the respective percentages of constituents.
(E) Specific information regarding the use, function, or application of a chemical substance or mixture in a process, mixture, or article.
(F) Specific production or import volumes of the manufacturer or processor.
(G) Prior to the date on which a chemical substance is first offered for commercial distribution, the specific chemical identity of the chemical substance, including the chemical name, molecular formula, Chemical Abstracts Service Registry number, and other information that would identify the specific chemical substance, if the specific chemical identity was claimed as confidential at the time it was submitted in a notice under section 2604 of this title.

[ii] **TSCA section 14(e)(1)(B) states**

(B) in the case of information other than information described in subsection (c)(2)—

(i) for a period of 10 years from the date on which the person asserts the claim with respect to the information submitted to the Administrator; or

(ii) if applicable before the expiration of such 10-year period, until such time as—

(I) the person that asserted the claim notifies the Administrator that the person is withdrawing the claim, in which case the information shall not be protected from disclosure under this section; or

(II)the Administrator becomes aware that the information does not qualify for protection from disclosure under this section, in which case the Administrator shall take any actions required under subsections (f) and (g).

EPA United States Environmental Protection Agency

FORM R

Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986, also Known as Title III of the Superfund Amendments and Reauthorization Act

TRI Facility ID Number
Toxic Chemical, Category, or Generic Name

This section only applies if you are revising or withdrawing a previously submitted form, otherwise leave blank.	**Revision (Enter up to two code(s))**	**Withdrawal (Enter up to two code(s))**

IMPORTANT: See instructions to determine when "Not Applicable (NA)" boxes should be checked.

PART I. FACILITY IDENTIFICATION INFORMATION

SECTION 1. REPORTING YEAR _____

SECTION 2. TRADE SECRET INFORMATION

2.1 Are you claiming the toxic chemical identified on page 2 as a trade secret?

☐ Yes (Answer question 2.2; attach substantiation forms)

☐ No (Do not answer 2.2; go to Section 3)

2.2 Is this copy ☐ Sanitized ☐ Unsanitized (Answer only if "Yes" in 2.1)

SECTION 3. CERTIFICATION (Important: Read and sign after completing all form sections.)

I hereby certify that I have reviewed the attached documents and that, to the best of my knowledge and belief, the submitted information is true and complete and that the amounts and values in this report are accurate based on reasonable estimates using data available to the preparers of this report.

Name and official title of owner/operator or senior management official:	Signature:	Date signed:

SECTION 4. FACILITY IDENTIFICATION

4.1	Facility or Establishment Name	TRI Facility ID Number	
	Physical Street Address	Mailing Address (if different from physical street address)	
	City/County/Tribe/State/ZIP Code	City/State/ZIP Code	Country (Non-US)

4.2 This report contains information for: (Important: Check a or b; check c or d if applicable) a. ☐ An entire facility b. ☐ Part of a facility c. ☐ A federal facility d. ☐ GOCO

4.3	Technical Contact Name		Telephone Number (include area code and ext.)
	Email Address		
4.4	Public Contact Name		Telephone Number (include area code and ext.)
	Email Address		

4.5	NAICS Code(s) (6 digits)	Primary a.	b.	c.	d.	e.	f.
4.6	Dun & Bradstreet Number(s) (9 digits)	a.					
		b.					

SECTION 5. Parent Company Information

5.1	Name of U.S. Parent Company (for TRI Reporting purposes)		☐ No U.S. Parent Company (for TRI Reporting purposes)
5.2	Parent Company's Dun & Bradstreet Number	**NA** ☐	

EPA form 9350 -1 (Rev 06/2014) – Previous editions are obsolete.

FORM R

Part II. CHEMICAL-SPECIFIC INFORMATION

TRI Facility ID Number

Toxic Chemical, Category, or Generic Name

SECTION 1. TOXIC CHEMICAL IDENTITY

(Important: DO NOT complete this section if you are reporting a mixture component in Section 2 below.)

1.1 CAS Number (Important: Enter only one number exactly as it appears on the Section 313 list. Enter category code if reporting a chemical category.)

1.2 Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.)

1.3 Generic Chemical Name (Important: Complete only if Part I, Section 2.1 is checked "Yes". Generic Name must be structurally descriptive.)

SECTION 2. MIXTURE COMPONENT IDENTITY

(Important: DO NOT complete this section if you completed Section 1.)

2.1 Generic Chemical Name Provided by Supplier (Important: Maximum of 70 characters, including numbers, letters, spaces, and punctuation.)

SECTION 3. ACTIVITIES AND USES OF THE TOXIC CHEMICAL AT THE FACILITY

(Important: Check all that apply.)

3.1 Manufacture the toxic chemical:	**3.2** Process the toxic chemical:	**3.3** Otherwise use the toxic chemical:
a. ☐ Produce b. ☐ Import If Produce or Import c. ☐ For on-site use/processing d. ☐ For sale/distribution e. ☐ As a byproduct f. ☐ As an impurity	a. ☐ As a reactant b. ☐ As a formulation component c. ☐ As an article component d. ☐ Repackaging e. ☐ As an impurity	a. ☐ As a chemical processing aid b. ☐ As a manufacturing aid c. ☐ Ancillary or other use

SECTION 4. MAXIMUM AMOUNT OF THE TOXIC CHEMICAL ON-SITE AT ANY TIME DURING THE CALENDAR YEAR

4.1 (Enter two digit code from instruction package.) ☐

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM ON-SITE

			A. Total Release (pounds/year*) (Enter a range code** or estimate)	**B. Basis of Estimate** (Enter code)	**C. Percent from Stormwater**
5.1	Fugitive or non-point air emissions	NA ☐			
5.2	Stack or point air emissions	NA ☐			
5.3	Discharges to receiving streams or water bodies (Enter one name per box)	NA ☐			
Stream or Water Body Name		Reach Code (optional)			
5.3.1					
5.3.2					
5.3.3					

If additional pages of Part II, Section 5.3 are attached, indicate the total number of pages in this box ☐

and indicate the Part II, Section 5.3 page number in this box. ☐ (Example: 1, 2, 3, etc.)

EPA form 9350 -1 (Rev. 06/2014) – Previous editions are obsolete. *For Dioxin or Dioxin-like compounds, report in grams/year.

**Range Codes: A= 1-10 pounds; B= 11-499 pounds; C= 500-999 pounds.

FORM R

Part II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI Facility ID Number
Toxic Chemical, Category, or Generic Name

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM ON-SITE (continued)

		NA	**A. Total Release** (pounds/year*) (Enter a range code** or estimate)	**B. Basis of Estimate** (Enter code)
5.4-5.5	Disposal to land on-site			
5.4.1	Class I Underground Injection Wells	☐		
5.4.2	Class II-V Underground Injection Wells	☐		
5.5.1A	RCRA Subtitle C landfills	☐		
5.5.1B	Other landfills	☐		
5.5.2	Land treatment/application farming	☐		
5.5.3A	RCRA Subtitle C surface impoundments	☐		
5.5.3B	Other surface impoundments	☐		
5.5.4	Other disposal	☐		

SECTION 6. TRANSFER(S) OF THE TOXIC CHEMICAL IN WASTES TO OFF-SITE LOCATIONS

6.1 DISCHARGES TO PUBLICLY OWNED TREATMENT WORKS (POTWs) **NA** ☐

6.1.	POTW Name						
POTW Address							
City		County		State		ZIP	

A. Quantity Transferred to this POTW (pounds/year*) (Enter range code**or estimate)	B. Basis of Estimate (Enter code)

If additional pages of Part II, Section 6.1 are attached, indicate the total number of pages in this box and indicate the Part II, Section 6.1 page number in this box. ☐ (Example: 1, 2, 3, etc.)

SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS **NA** ☐

6.2.	Off-Site EPA Identification Number (RCRA ID No.)						
Off-Site Location Name:							
Off-Site Address:							
City		County		State		ZIP	Country (non-US)

Is this location under control of reporting facility or parent company? ☐ Yes ☐ No

EPA form 9350 -1 (Rev. 06/2014) – Previous editions are obsolete. *For Dioxin or Dioxin-like compounds, report in grams/year.
**Range Codes: A= 1-10 pounds; B= 11-499 pounds; C= 500-999 pounds.

FORM R

Part II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI Facility ID Number
Toxic Chemical, Category, or Generic Name

SECTION 6.2. TRANSFERS TO OTHER OFF-SITE LOCATION (CONTINUED)

A. Total Transfer (pounds/year*) (Enter a range code** or estimate)	**B. Basis of Estimate** (Enter code)	**C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery** (Enter code)
1.	**1.**	**1. M**
2.	**2.**	**2. M**
3.	**3.**	**3. M**
4.	**4.**	**4. M**

6.2_____Off-Site EPA Identification Number (RCRA ID No.)

Off-Site Location Name:									
Off-Site Address:									
City		County		State		ZIP		Country (non-US)	

Is this location under control of reporting facility or parent company? ☐ Yes ☐ No

A. Total Transfer (pounds/year*) (Enter a range code** or estimate)	**B. Basis of Estimate** (Enter code)	**C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery** (Enter code)
1.	**1.**	**1. M**
2.	**2.**	**2. M**
3.	**3.**	**3. M**
4.	**4.**	**4. M**

SECTION 7A. ON-SITE WASTE TREATMENT METHODS AND EFFICIENCY

☐ Not Applicable (NA) - Check here if no on-site waste treatment method is applied to any waste stream containing the toxic chemical or chemical category.

a. General Waste Stream (Enter code)	b. Waste Treatment Method(s) Sequence (Enter 3- or 4-character code(s))								c. Waste Treatment Efficiency (Enter 2 character code)
7A.1a	**7A.1b**		1		2				**7A.1c**
	3		4		5				
	6		7		8				
7A.2a	**7A.2b**		1		2				**7A.2c**
	3		4		5				
	6		7		8				
7A.3a	**7A.3b**		1		2				**7A.3c**
	3		4		5				
	6		7		8				
7A.4a	**7A.4b**		1		2				**7A.4c**
	3		4		5				
	6		7		8				
7A.5a	**7A.5b**		1		2				**7A.5c**
	3		4		5				
	6		7		8				

If additional pages of Part II, Section 6.2/7.A are attached, indicate the total number of pages in this ☐ box and indicate the Part II, Section 6.2/7.A page number in this box. ☐ (Example: 1, 2, 3, etc.)

EPA form 9350 -1 (Rev. 06/2014) – Previous editions are obsolete. *For Dioxin or Dioxin-like compounds, report in grams/year.
**Range Codes: A= 1-10 pounds; B= 11-499 pounds; C= 500-999 pounds.

Form Approved OMB Number: 2025-0009
Approval Expires: 11/30/2017

FORM R
Part II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI Facility ID Number	6
Toxic Chemical, Category, or Generic Name	

SECTION 7B. ON-SITE ENERGY RECOVERY PROCESSES

☐ NA Check here if no on-site energy recovery is applied to any waste stream containing the toxic chemical or chemical category.

Energy Recovery Methods (Enter 3-character code(s))

1 ☐ 2 ☐ 3 ☐

SECTION 7C. ON-SITE RECYLING PROCESSES

☐ NA Check here if no on-site recycling is applied to any waste stream containing the toxic chemical or chemical category.

Recycling Methods (Enter 3-character code(s))

1. ☐ 2.. ☐ 3. ☐

SECTION 8. SOURCE REDUCTION AND WASTE MANAGEMENT

		Column A Prior Year (pounds/year*)	Column B Current Reporting Year (pounds/year*)	Column C Following Year (pounds/year*)	Column D Second Following Year (pounds/year*)
8.1 – 8.7 Production-Related Waste Managed					
8.1a	Total on-site disposal to Class I Underground Injection Wells, RCRA Subtitle C landfills, and other landfills				
8.1b	Total other on-site disposal or other releases				
8.1c	Total off-site disposal to Class I Underground Injection Wells, RCRA Subtitle C landfills, and other landfills				
8.1d	Total other off-site disposal or other releases				
8.2	Quantity used for energy recovery on-site				
8.3	Quantity used for energy recovery off-site				
8.4	Quantity recycled on-site				
8.5	Quantity recycled off-site				
8.6	Quantity treated on-site				
8.7	Quantity treated off-site				
8.8	Non-production-related waste managed**				
8.9	☐ Production ratio or ☐ Activity ratio (select one and enter value to right)				
8.10	Did your facility engage in any newly implemented source reduction activities for this chemical during the reporting year? If so, complete the following section; if not, check NA. **NA** ☐				

	Source Reduction Activities (Enter code(s))	Methods to Identify Activity (Enter code(s))			Estimated annual reduction (Enter code(s)) (optional)
8.10.1		**a.**	**b.**	**c.**	**d.**
8.10.2		**a.**	**b.**	**c.**	**d.**
8.10.3		**a.**	**b.**	**c.**	**d.**
8.10.4		**a.**	**b.**	**c.**	**d.**

EPA form 9350 -1 (Rev. 06/2014) – Previous editions are obsolete. *For Dioxin or Dioxin-like compounds, report in grams/year.
**Includes quantities released to the environment or transferred off-site as a result of remedial actions, catastrophic events, or other one-time events not associated with production processes

FORM R **Part II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)**	TRI Facility ID Number Toxic Chemical, Category, or Generic Name

SECTION 8.11. DISPOSAL OR OTHER RELEASES, SOURCE REDUCTION, AND RECYCLING ACTIVITIES

8.11	If you wish to submit additional optional information on source reduction, recycling, or pollution control activities, provide it here.

SECTION 9. MISCELLANEOUS INFORMATION

9.1	If you wish to submit any miscellaneous, additional, or optional information regarding your Form R submission, provide it here.

Form Approved OMB Number: 2025-0009
Approval Expires: 11/30/2017

EPA United States Environmental Protection Agency

TOXICS RELEASE INVENTORY FORM A

	TRI Facility ID Number

This section only applies if you are revising or withdrawing a previously submitted form, otherwise leave blank.	**Revision (Enter up to two code(s))**	**Withdrawal (Enter up to two code(s))**

IMPORTANT: See instructions to determine when "Not Applicable (NA)" boxes should be checked.

PART I. FACILITY IDENTIFICATION INFORMATION

SECTION 1. REPORTING YEAR _____

SECTION 2. TRADE SECRET INFORMATION

2.1	Are you claiming the toxic chemical identified on page 2 as a trade secret? ☐ Yes (Answer question 2.2; attach substantiation forms) ☐ No (Do not answer 2.2; go to Section 3)	**2.2**	Is this copy (Answer only if "Yes" in 2.1) ☐ Sanitized ☐ Unsanitized

SECTION 3. CERTIFICATION (Important: Read and sign after completing all form sections.)

I hereby certify that to the best of my knowledge and belief, for each toxic chemical listed in this statement, the annual reportable amount as defined in 40 CFR 372.27(a), did not exceed 500 pounds for this reporting year and that the chemical was manufactured, processed, or otherwise used in an amount not exceeding 1 million pounds during this reporting year.

Name and official title of owner/operator or senior management official:	Signature:	Date signed:

SECTION 4. FACILITY IDENTIFICATION

4.1	Facility or Establishment Name		TRI Facility ID Number	
	Physical Street Address		Mailing Address (if different from physical street address)	
	City/County/Tribe/State/ZIP Code		City/State/ZIP Code	Country (Non-US)
4.2	This report contains information for: (Important: Check c or d if applicable)		c. ☐ A Federal facility	d. ☐ GOCO
4.3	Technical Contact Name		Telephone Number (include area code and ext.)	
	Email Address			
4.4	Public Contact Name		Telephone Number (include area code and ext.)	
	Email Address			

4.5	NAICS Code(s) (6 digits)	Primary a.	b.	c.	d.	e.	f.
4.6	Dun & Bradstreet Number(s) (9 digits)	a.					
		b.					

SECTION 5. PARENT COMPANY INFORMATION

5.1	Name of U.S. Parent Company (for TRI Reporting purposes)		No U.S. Parent Company (for TRI Reporting purposes) ☐
5.2	Parent Company's Dun & Bradstreet Number	NA ☐	

EPA Form 9350 -2 (Rev. 06/2014) - Previous editions are obsolete.

Form Approved OMB Number: 2025-0009
Approval Expires: 10/31/
Page____of ____

EPA FORM A PART II. CHEMICAL IDENTIFICATION Do not use this form for reporting PBT chemicals, including Dioxin and Dioxin-like Compounds*	TRI Facility ID Number

SECTION 1. TOXIC CHEMICAL IDENTITY	**Report____of ____**
1.1	CAS Number (Important: Enter only one number exactly as it appears on the Section 313 list. Enter category code if reporting a chemical category.)
1.2	Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.)
1.3	Generic Chemical Name (Important: Complete only if Part 1, Section 2.1 is checked "Yes". Generic Name must be structurally descriptive.)
SECTION 2. MIXTURE COMPONENT IDENTITY (Important: DO NOT complete this section if you completed Section 1 above)	
2.1	Generic Chemical Name Provided by Supplier (Important: Maximum of 70 characters, including numbers, letters, spaces, and punctuation.)
SECTION 1. TOXIC CHEMICAL IDENTITY	**Report____of ____**
1.1	CAS Number (Important: Enter only one number exactly as it appears on the Section 313 list. Enter category code if reporting a chemical category.)
1.2	Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.)
1.3	Generic Chemical Name (Important: Complete only if Part 1, Section 2.1 is checked "Yes". Generic Name must be structurally descriptive.)
SECTION 2. MIXTURE COMPONENT IDENTITY (Important: DO NOT complete this section if you completed Section 1 above)	
2.1	Generic Chemical Name Provided by Supplier (Important: Maximum of 70 characters, including numbers, letters, spaces, and punctuation.)
SECTION 1. TOXIC CHEMICAL IDENTITY	**Report____of ____**
1.1	CAS Number (Important: Enter only one number exactly as it appears on the Section 313 list. Enter category code if reporting a chemical category.)
1.2	Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.)
1.3	Generic Chemical Name (Important: Complete only if Part 1, Section 2.1 is checked "Yes". Generic Name must be structurally descriptive.)
SECTION 2. MIXTURE COMPONENT IDENTITY (Important: DO NOT complete this section if you completed Section 1 above)	
2.1	Generic Chemical Name Provided by Supplier (Important: Maximum of 70 characters, including numbers, letters, spaces, and punctuation.)
SECTION 1. TOXIC CHEMICAL IDENTITY	**Report____of ____**
1.1	CAS Number (Important: Enter only one number exactly as it appears on the Section 313 list. Enter category code if reporting a chemical category.)
1.2	Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.)
1.3	Generic Chemical Name (Important: Complete only if Part 1, Section 2.1 is checked "Yes". Generic Name must be structurally descriptive.)
SECTION 2. MIXTURE COMPONENT IDENTITY (Important: DO NOT complete this section if you completed Section 1 above)	
2.1	Generic Chemical Name Provided by Supplier (Important: Maximum of 70 characters, including numbers, letters, spaces, and punctuation.)

*See the TRI Reporting Forms and Instructions manual for the list of PBT Chemicals (including Dioxin and Dioxin-like Compounds)

EPA Form 9350 -2 (Rev. 06/2014) - Previous editions are obsolete. **(Make additional copies of this page, if needed)**