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Nullify This Hypothesis!

Last year's TSCA amendments did not change the default assumption
for reviewing new chemicals – especially since there isn't one.

By James W. Conrad, Jr.[1]

The biggest surprise in EPA's implementation of last year's amendments to the Toxic Substances Control Act (TSCA) has been the paralysis gripping EPA's new chemicals program. The popular consensus had been that these amendments were intended to formalize what EPA had done before under TSCA Section 5, but did not change that section's underlying decisionmaking standard. But important EPA staff have taken precisely the opposite view: they see the amendments as having switched the "null hypothesis" in the Section 5 decisionmaking paradigm. In this article, I argue that these EPA staff are mistaken, and I urge EPA to clarify this issue, publicly and promptly. New chemicals hold the key to a cleaner and safer chemical ecology, and amended TSCA was supposed to help turn that key – not change the locks.

Background

TSCA was 40 years old when it was overhauled on June 22, 2016 by the Frank R. Lautenberg Chemical Safety for the 21st Century Act (LCSA), and critics correctly contended that the law had largely failed to perform as intended. The new chemicals program, by contrast, was widely seen as the one part of TSCA that basically worked. This was universally the view in industry, but it was shared by many in government and elsewhere. Indeed, the House-passed version of the Lautenberg bill made no amendments whatsoever to Section 5.

The final version of the bill did contain changes deriving from the Senate bill; principally, requirements that EPA (i) issue explicit determinations regarding pre-manufacture notices (PMNs); and (ii) consider foreseeable conditions of use and their effects on potentially exposed or susceptible subpopulations in making those determinations. The bill also eliminated conditions on EPA's ability to seek additional information about a chemical from a submitter. But even the Senate bill omitted the more fundamental changes applicable to Section 5 once sought by Mr. Lautenberg, NGOs and some Democrats: (i) it retained the "unreasonable risk" safety standard (against calls for "reasonable certainty of no harm"); (ii) PMNs did not have to be accompanied by a minimum data set (indeed, EPA was prohibited from requiring one); (iii) future users of a chemical were not required to submit a

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new PMN for uses not contemplated in the original PMN; and (iv) EPA was not given more time to make determinations than the original law's 180-day review period (really a 90-day period, extendable by the same amount). Congress even included a "stick" to keep EPA within that timeframe: PMN submitters are entitled to a refund of the PMN fee if EPA does not act within the 180 days. But Congress evidently expected EPA to continue "dropping" reviews more quickly, as it also changed prior law to allow PMN submitters to commence manufacture as soon as EPA has approved the chemical, without having to wait for the conclusion of the initial 90-day review period. It seemed as though the Section 5 program could, and would, carry on essentially as before.

Things quickly went south after June 22, however. EPA immediately announced that the LCSA had, by operation of law, restarted the 90-day clock on the over 300 PMNs pending on enactment. While EPA never explained exactly which provision of the new law did this, the submitters of these PMN all acquiesced in EPA's action. (As will become clear, acquiescence by PMN submitters eager to win approval of their new chemical is a recurring problem in policing EPA's implementation of Section 5.) New chemical submissions continued to be filed, adding to those still pending, until the backlog reached around 600. Almost a month passed before EPA issued its first post-LCSA PMN approval. Approvals trickled out slowly for months, before finally picking up in the spring of 2017. By June 13, EPA had acted on 401 new chemicals since June 22. EPA is projecting that it will resolve the roughly 150 PMNs still remaining above the normal level of submissions under review (~300) by the end of July – a prediction that will be closely watched.

Career leadership of the TSCA program have insisted that the slow pace of PMN approvals is attributable to two features unique to the transition to the new law: (i) processing the PMNs pending on enactment, many of which had been sitting at EPA for a very long time, and (ii) developing internal consensus on terminology and clearance processes for the documents required to approve – or restrict – new chemicals.

But the problem is not just the backlog. Of the 401 new chemical submissions acted upon since June 22, EPA only allowed 87 to enter commerce without restriction. It imposed some sort of restriction on another 195 before they could enter commerce, and it banned 3 others pending testing. And 116 submissions were withdrawn. This is a dramatic change from practice over the previous four decades, when roughly 90% of PMN submissions were allowed to proceed to manufacture without restriction. This about-face by the new chemicals program is little short of a disaster for the U.S. chemical industry, and conflicts with statutory directions to promote chemical innovation. It also bodes ill for the environment and public health. The last part of this article explains these claims.

But first, the article addresses what appears to be the real reason for the slowdown and new conservatism of the new chemicals program: the view of many EPA staff that Congress required them to switch the "null hypothesis" in the threshold

question of whether a new chemical is likely to pose an unreasonable risk, from "presume safe" to "presume unsafe." This article will discuss the changes to relevant portions of TSCA that are being cited as requiring this switch, and will explain why they do not require it – why, in other words, EPA should stop hearing what Congress didn't say.

Congress Formalized Practices that EPA Already Engaged in Under Section 5 – It Did Not Require EPA to Do Things Differently

As noted earlier, TSCA program leadership identify non-recurring reasons for the large and growing backlog of pending PMNs. But I and others have spoken informally to career EPA staff within and supporting the new chemicals program who have explicitly contended that, intentionally or not, Congress switched the null hypothesis under Section 5 when it enacted the LCSA. Their principal argument derives from the requirement that EPA "determine" that a new chemical is unlikely to pose an unreasonable risk to health or the environment – and to publish that determination in the Federal Register – before the chemical can be manufactured commercially, conjoined with the deletion of limits on EPA's ability to obtain information regarding the potential risks of new chemicals. Secondarily, these staff also point to previously-noted new requirements that EPA consider the "reasonably foreseen" conditions of use of a chemical and, in so doing, consider the effects on "potentially exposed or susceptible subpopulations." Each of these arguments is addressed below.

EPA was historically able to get sufficient information to make decisions on PMNs

The principal argument of these EPA staff is that old TSCA did not give EPA the authority it needed to make fully-informed decisions on PMNs, and so EPA was forced to allow chemicals about which staff had concerns to proceed to market. Looking solely at statutory language pre- and post-amendment, this argument has superficial appeal. Pre-LCSA, Section 5 established what was essentially a delayed "notice and go" mechanism: a would-be manufacturer of a new chemical would submit a PMN on Day 0. Upon Day 90, if EPA had not timely initiated a legal process to limit or prohibit manufacture of the chemical, the submitter could commence manufacture. EPA was not required to publish a formal finding that the chemical was unlikely to pose an unreasonable risk. As noted, EPA could extend the 90 days – but only for a total of 90 more days, and only with "good cause" – and such extensions had to be published in the Federal Register.

And EPA's powers to restrict or prohibit manufacture under Section 5 were, on paper, subject to limits. To act permanently, EPA had to conclude that the chemical "presents or will present an unreasonable risk. . . ." Even where EPA concluded that it lacked "sufficient information to . . . permit a reasoned evaluation of the health and environmental effects of a chemical substance," it could not restrain manufacture pending generation of new information unless it could determine that manufacture

"may present an unreasonable risk of injury to health or the environment" – or that the chemical would be produced in substantial quantities and would either enter the environment in substantial quantities or produce significant human exposures, terms which EPA in practice applied in ways that caught only 10% of new chemicals. These constraints gave rise to what was probably the single biggest rap against Section 5 of old TSCA: that it put EPA in a Catch-22 situation where the Agency had to have information about the potential toxicity of a chemical before it could limit the chemical's manufacture on the basis that it did not have such information.

Now, by contrast, Section 5 requires EPA to make a reasoned determination that a new chemical is likely either to pose, or not to pose, an unreasonable risk. If EPA concludes that it has insufficient information to make either of these determinations, it is required to issue an order prohibiting or limiting manufacture "to the extent necessary to protect against an unreasonable risk" until it is provided with such information. In so doing, it need not make any threshold finding about what risk a chemical "may" pose or whether it will be produced in substantial quantities (although it retains authority to make those findings as well).

The implication of this difference is that, prior to the LCSA, EPA lacked authority to adequately evaluate new chemicals, and thus allowed chemicals to come onto the market without a reasoned assessment of their potential risks. The problem with this argument is that, in practice, EPA was actually not so limited. PMN submitters by definition want to start making a new chemical product. They have every incentive to get EPA's OK. Submitters also have limited incentives to challenge any EPA action under Section 5, since by definition the new chemical is generating zero revenue – and likely never will, if it becomes the subject of a controversial legal battle over its health or environmental effects. The more a company has invested in the development of a new chemical – potentially including health or environmental testing – the more it has to lose if it does not win EPA's approval in a reasonable timeframe.

These facts have given EPA tremendous leverage under Section 5. Early on, EPA hit upon the idea of submitters "voluntarily suspending" the 90-day limit, so that EPA as a practical matter had as much time as it wanted to review a chemical. A submitter that refused to suspend would find itself facing an order and prospective injunction, or a proposed rule, limiting or prohibiting manufacture. As a result, PMN submitters regularly suspended the deadline – or simply gave up.

EPA routinely used the same leverage pre-LCSA to persuade submitters to generate health or environmental effects data when EPA felt that it had insufficient information to make determinations about potential unreasonable risk. These demands were, of course, subject to negotiation, and the relatively small group of EPA scientists and practitioners in the area could argue about what sorts of demands were reasonable in light of information that EPA had regarded as sufficient in previous cases. But these "precedents" were never published, and EPA was always free to demand more than it had in the past based on emerging concerns –

something it had done in recent years, particularly on the topic of aquatic toxicity.

The upshot is that EPA staff were, as a practical matter, able to get the information they wanted in order to make determinations about the potential risks of new chemicals. Sometimes the information could be identified or generated while the 90-day limit remained suspended. Sometimes it was generated pursuant to a Section 5(e) consent order. But no order under Section 5(e) was ever even challenged in court during the 40 years preceding enactment of the LCSA. Rather, PMN submitters either provided EPA with enough information consensually or threw in the towel.

The previous paragraph consciously referred to EPA making "determinations" under old TSCA. As discussed above, old TSCA did not require EPA to make an explicit determination that a new chemical was unlikely to pose an unreasonable risk before it could allow manufacture to commence without restriction. Now, EPA is required to make such a determination and to publish it. The question is whether that actually requires EPA to make a fundamental change in its Section 5 practice. Again, the answer is no. As a practical matter, when EPA "dropped" its review of a PMN, or lifted an order after submission of needed information, EPA was making the determination that a chemical was unlikely to pose an unreasonable risk of harm. It would be astonishing if any EPA official would testify otherwise now. This is not to diminish the additional attention that these determinations likely receive now, since EPA actually has to write them down for all the world to see. But EPA is not required to make these determinations any differently than it did before.

EPA already considered reasonably foreseeable conditions of use and potentially exposed or susceptible subpopulations

Amended Section 5 requires EPA's determinations regarding the likelihood that a new chemical will or will not pose an unreasonable risk to health or the environment – so-called "(A)" and "(C)" determinations – to take into account any "unreasonable risk to a potentially exposed or susceptible subpopulation identified as relevant by the Administrator under the conditions of use." "Potentially exposed or susceptible subpopulation" means "a group of individuals within the general population identified by the Administrator who, due to either greater susceptibility or greater exposure, may be at greater risk than the general population of adverse health effects from exposure to a chemical substance or mixture, such as infants, children, pregnant women, workers, or the elderly." "Conditions of use" is defined as "the circumstances, as determined by the Administrator, under which a chemical substance is intended, known, or reasonably foreseen to be manufactured, processed, distributed in commerce, used, or disposed of."

Commentators have noted, as an initial matter, that since "conditions of use" in Section 5 is used only in connection with "potentially exposed or susceptible subpopulations," the conditions of use of a chemical should thus not be relevant to EPA's assessment under Section 5 of risks to the general population or the

environment. They have also noted that neither of these defined terms is used in the portion of Section 5 governing so-called "(B)" determinations, where EPA concludes it does not have sufficient information to make an (A) or (C) determination (although they are used in Section 5(e), the provision that determines what restrictions EPA may impose following a (B) determination while required data are developed). They interpret this omission as meaning that, when EPA determines whether it has sufficient information regarding a chemical, it may only consider the conditions of use identified in the PMN.[2]

In any event, there is no question that EPA's review of PMNs before the LCSA took into account conditions of use beyond those anticipated in the PMN. Protecting against exposures produced by such uses was the reason that EPA invented "non-5(e)" significant new use rules (SNURs). Such rules were EPA's response to situations where the submitter only anticipated uses that involved no exposures of concern – on-site use as an intermediate, for example – but EPA was concerned that the submitter or others might use the chemical in the future in ways that might pose an unreasonable risk. A "non-5(e)" SNUR applies not only to the submitter but to anyone who might engage in any of those other uses. EPA staff have conceded in multiple public fora that the existence of non-5(e) SNURs demonstrates that EPA previously took reasonably foreseeable conditions of use into account in the new chemicals program pre-LCSA.

By definition, non-5(e) SNURs also took account of "potentially exposed" individuals, since they would not have been exposed by the submitter's intended uses of the chemical. Certainly EPA considered workers – a subpopulation with greater exposure than the general public – as many non-5(e) SNURs have required workplace precautions. The extent to which EPA routinely took into account subpopulations that are more susceptible than the general public (e.g., children) is unclear. But it is also clear that Congress did not intend for Section 5 reviews to become consumed with evaluating the potential for such exposures and any associated risks. For one thing, approval under Section 5 merely makes a new chemical an existing chemical, and thus eligible for a full evaluation under Section 6. A Section 5 determination is just a prediction of what EPA is likely to conclude at that point. Also, Congress plainly intended for Section 5 reviews to continue to occur in the previous, 90 to 180-day timeframe – as noted above, it entitled submitters to a refund of fees if EPA did not make its mind up by then, and it authorized submitters to commence manufacture when EPA concluded its review in less than 90 days – as EPA previously did in the vast majority of cases. Even the Senate Environment & Public Works Committee – the source of all changes to Section 5 – seemed to envision that the 90-day review period would remain standard practice: "[T]he Agency should continue the practice of completing new chemical reviews within 90 days to the maximum extent practicable." So, to the extent the daunting prospect of evaluating effects on potential subpopulations leads EPA to conclude that PMN reviews should regularly take more than six months, that

[2] *Id*. at B-5.

conclusion is not consistent with legislative intent.

Is There a "Default" Presumption under Section 5?

The concept of a "null hypothesis" comes from the process of hypothesis testing, a key practice in the field of inferential statistics. Faced with the reality that no amount of observational data can guarantee the truth of an empirically-grounded hypothesis, hypothesis testing takes the opposite hypothesis (e.g., that observed results occurred by chance), and then evaluates how unlikely the observed results would have been in that case. The opposite hypothesis is called the "null hypothesis." The argument of EPA staff with whom I have spoken is that old Section 5 established "presume safe" as the null hypothesis for evaluation of a new chemical, with EPA then forced to assess how unlikely it would have been for data tending to indicate human or environmental toxicity to have been generated if that hypothesis were true. If EPA was unable to compile enough data indicating harm, it was (supposedly) compelled to accept the null hypothesis and allow the chemical to be manufactured.

The contention of EPA staff now is that the LCSA has flipped the null hypothesis, so that EPA must presume a chemical is unsafe, unless the submitter (or EPA) can assemble enough data showing no adverse effects to justify rejecting the null hypothesis.

The shortest answer to this contention may be that Congress chose to retain, unchanged, the "unreasonable risk" standard that governs decisions under Section 5 (and Section 6), despite pleas that it switch to some assertedly more protective standard like "reasonable certainty of no harm." The most reasonable deduction from this choice is that Congress did not intend to change any presumptions about the safety of a new chemical.

As for the parts of Section 5 that Congress *did* change, this article has reviewed all the provisions that EPA staff have suggested require them to switch the null hypothesis, and has explained why these do not in fact require EPA to do anything qualitatively different than it did pre-LCSA. But I want to make the stronger claim that TSCA did not previously, and does not now, establish any null hypothesis or default presumption regarding the safety of a new chemical. Rather, Section 5 is agnostic. EPA is presented with a chemical; it reviews data and other information about that chemical, or justifiable analog chemicals, and it makes a prediction based on the weight of the evidence. If the evidence is that the chemical is likely to present an unreasonable risk, EPA restricts or prohibits it. If the evidence runs the other way, EPA allows it to be made. If the evidence is insufficient to justify either conclusion, EPA requires the submitter to generate the information that *would* allow EPA to decide, and allows manufacture to commence under whatever restrictions are appropriate, unless the "extent necessary" language in Section 5(e)(1)(A) requires a ban pending testing.

Whatever the default assumption may have been pre-LCSA, amended TSCA points clearly to the agnostic position. Section 5(a)(3) lays out EPA's options symmetrically and even handedly: Subparagraph (A) is "presents an unreasonable risk." At the other end of the continuum, Subparagraph (C) is "not likely to present an unreasonable risk." Located in between, subparagraph (B) covers the situation where insufficient information exists to support either (A) or (C) determinations. And Sections 26(h) and (i) require EPA to make these determinations – like all other decisions under Sections 4, 5 and 6 – on the basis of the weight of the best available scientific evidence. There are no grounds in any of these provisions for a presumption of unreasonable harm.

In fact, the statistical concept most relevant to Section 5 determinations is Bayes Theorem, which establishes the rules for determining the likelihood of some proposition to be true given what one already knows about the probability of such a proposition being true. Over TSCA's first four decades, EPA reviewed over 40,000 PMNs under the new chemicals program and allowed about 90% of them to proceed to manufacture. (About half of those actually were manufactured.) The accuracy of EPA's predictions under Section 5 has been generally confirmed in a variety of ways, including a review by the National Pollution Prevention and Toxics Advisory Committee's Broader Issues Work Group that compared two years of TSCA Section 8(e) "substantial risk" notices filed with EPA against PMN submissions, and a 1993 review jointly conducted by EPA and European Union (EU) staff that compared the output of the U.S. new chemicals program's structure activity relationship models for estimating physical/chemical, environmental fate, and health and environmental effect values against measured values for 144 chemicals that were notified in the E.U. The historical trend of new chemicals decisions makes sense in light of the fact that new chemicals tend to be developed at least in part because they are either safer or less polluting to manufacture, or environmentally friendlier, or both, than the existing chemicals they are intended to replace. If anything, EPA's experience over 40 years should be leading to faster new chemical reviews, not longer ones.

The Adverse Consequences of EPA Staff's New Position

As just noted, the new chemicals program has historically allowed about 90% of PMN chemicals to proceed to manufacture. Now, indications are that this percentage has almost been reversed – that submitters should expect a consent order or SNUR in the great majority of cases. Thus, not only does the null hypothesis appear to have been switched, but the resulting output of the new chemicals program has as well. Applications for exemptions from the requirement to file a PMN – most notably, low-volume exemption applications – are also moving more slowly than pre-LCSA and seem to be yielding fewer approvals.

In the LCSA, Congress intentionally chose not to make the new chemicals program a registration program, like the systems used to regulate pesticides and drugs. Rather, it intended to codify and "ensure[] transparency in" the program that was already in place. But EPA staff are grasping at legislative straws, or at least using the fact of the

reauthorization, to justify doing, in effect, what Congress sought to avoid doing in law.

Congress did not change the "policy of the United States" expressed in TSCA that EPA's "authority over chemical substances and mixtures should be exercised in such a manner as to not impede unduly or create unnecessary economic barriers to technological innovation . . . ." Historically, the United States has been the world leader in chemical innovation, with significant knock-on benefits throughout other areas of the economy and in our standard of living generally. That leadership could easily shift now to places like China. New chemicals are generally preferable to existing chemicals, and EPA should be interpreting new TSCA to create a bias toward new chemistry, not existing chemicals. To its credit, EPA held a public meeting on December 14, 2016 to discuss the status of the new chemicals program and to begin a dialogue on related issues (although the upshot of most of these issues – e.g., lung effects – would also seem to be a more precautionary program). TSCA program Deputy Director Jeff Morris promised a follow-up meeting, which last week he said will occur in September. Hopefully, by then, EPA will have made some sort of public declaration that the LCSA did not require EPA to presume new chemicals to be unsafe. Such a presumption is not likely to be sustainable, whether logistically, legally or politically.