

APPENDIX 1

Litigation Simulations and Litigation Report

In August 2016, two years before JOEH published the SR, Fries et al. conducted the “in-field exposure study” (i.e., “litigation simulations”) to determine: a) levels of airborne benzene exposures experienced by an automobile mechanic while he/she sprayed aerosolized non-chlorinated mixtures, and b) the benzene content of the mixtures. The findings of the litigation simulations were memorialized in an unpublished report (i.e., “litigation report”) prepared for the industry sponsor CRC Industries.¹ According to that report, the non-chlorinated mixtures (referred to in the litigation report as “blends” and “formulas”) used in the litigation simulations were prepared in single batches by a CRC analytical chemist, after which someone transferred them to nine aerosol cans. The litigation report, AM, and SR do not include records pertaining to the preparation of the non-chlorinated mixtures; thus, the grades and provenance of toluene (the principle benzene-containing ingredient) and other chemicals used to prepare the mixtures are unknown. The litigation report does not specify when the non-chlorinated mixtures were prepared, or provide their chain of custody prior to being sent out for analytical testing.

The litigation simulations did not involve any manufactured Brakleen® products. According to the litigation report, the non-chlorinated mixtures prepared by the chemist were based on an “historical” CRC Brakleen® brake cleaner (product ID #05088). CRC is a defendant in lawsuits in which the benzene content of that product, as well as benzene exposures arising from its use in occupational settings, are at issue. The percentages of acetone, methanol, and toluene in the non-chlorinated mixture of interest (Blend A) corresponded to Brakleen® brake cleaner #05088 sold in 2005.² An off-the-shelf Brakleen® brake cleaner (#5088) sold in 2016 was available to Fries et al., but was not used. Its composition was markedly different from the 2005 version that the mechanic used.³ Blends B and C were prepared by “spiking” Blend A with pure benzene to achieve “targeted” benzene contents of 100 parts per million (ppm) and 1,000 ppm, respectively. This exercise suggests that “historical” non-chlorinated Brakleen® brake cleaners (Blend A) never contained more than 1,000 ppm benzene. This value is an important threshold in benzene exposure litigation because under the applicable Hazard Communications Standard (HCS), Material Safety Data Sheets (MSDSs) for the “historical” CRC Brakleen® 05088 product were required to list benzene as a hazardous ingredient if it was present at a concentration of 1,000 ppm or higher.⁴ The MSDS for the version of Brakleen® brake

cleaner (#5088) sold in 2005 does not even mention benzene.²

Since the CRC chemist did not know the benzene content of Blend A before creating Blends B and C, it is unclear how he/she knew the correct amount of benzene to use in the “spiking” exercise. ALS Global (“ALS”) performed all the bulk analytical testing. Blend A was reported by ALS to have a benzene content of 1.4 ppm. If that analytical result is correct, it follows that the toluene used in the blends contained approximately 3.6 ppm benzene. These findings suggest that either the CRC analytical chemist used a highly purified grade of toluene, not the commercial-grade used to manufacture Brakleen® and similar products, or there was an error in the ALS Global result.

All Results in the AM and SR are from the Litigation Report

The AM and SR do not reflect any exposure simulations aside from those performed in the August 2016 “in-field exposure study.” All results in the AM and SR are taken directly from results tabulated in the litigation report. For instance, three ALS reports (all dated August 11, 2016) reflect results from analytical testing of bulk samples ALS received on July 20, 2016.⁵ The ALS-determined compositions of the non-chlorinated mixtures are tabulated in Appendix 2 of the litigation report and in Supplemental Table 1 of the AM and SR. The AM and SR refer to 104 charcoal samples collected during the “in-field exposure study,” the same number of airborne samples for which analytical results are provided in Appendix 3 of the litigation report. Supplemental Tables 2, 3, and 4, as well as Figure 2 of the AM and SR are constructed directly from the 104 tabulated results in Appendix 3 of the litigation report. They are identical in terms of amount of product sprayed and measured airborne concentrations. The only difference is the presentation of this information. Appendix 3 of the litigation report tabulates 104 airborne benzene levels below the detection limit, while the published article consolidates the same results in a sentence on page 534, “Benzene was not detected in any of the personal, area, and background samples at a detection limit of approximately 0.3 mg/mg³ (0.1 ppm).”

Uncertainties to Consider in Evaluating the Significance of Reported Exposures

Fries et al. report that all benzene exposures experienced by the mechanic subject were below the analytical detection limit of 0.1 ppm v/v. The industrial hygiene usefulness of the results is to be questioned in light of the fact that the “in-field exposure study” did not control or record, a) temperature of the aerosolized brake cleaners during application, b) temperature of the surfaces that were sprayed, and c) mass of sprayed

aerosol that evaporated while air samples were collected; in each simulation an *unknown* amount of sprayed brake cleaner was collected in an elevated container and thus did not cause airborne benzene exposures. Additional concerns include a) uncertainties acknowledged in the litigation report about measured airflows in the mechanic's breathing zone, b) "study limitations" set forth by the authors in the AM and SR, and c) analytical chemistry anomalies discussed below.

Other Undisclosed Facts and COIs

The Commentary discusses undisclosed facts and COIs having to do with the litigation report. Additionally, as an author, Dr. Maier received funding from chemical manufacturers and chemical trade associations, including the American Chemistry Council (ACC) and the American Petroleum Institute (API). The ACC Hydrocarbon Solvents Panel presented unpublished benzene contents of petrochemical solvents that do not comport with peer-reviewed sources.⁶ API has funded benzene exposure research and supported the "China initiative" to "respond to allegations" in an extensively referenced study conducted by the National Cancer Institute and the Chinese Academy of Preventive Medicine.⁷ Fries et al. do not indicate whether they advised NIOSH and the Industrial Review Board (IRB) that their "in-field exposure study" would be used in litigation.

Measurement Uncertainty in the Bulk Blend Analyses

Supplemental Table 1 in the AM and SR, and Appendix 2 in the litigation report, present the ALS-determined compositions of the three non-chlorinated mixtures. The tabulated results, which are rounded to two significant figures, reflect significant measurement uncertainties that the authors neither explain nor acknowledge. For Blends A and C the reported chemical compositions add up to 942,000 ppm and 971,400 ppm, respectively; the results do not account for 58,000 ppm and 28,600 ppm, respectively, of chemical content in the blends. Since the results are rounded, it is possible that more than 73,000 ppm (7.3%) of blend A are unaccounted for in the bulk analyses.

Measurement uncertainties are known to stem from interferences and many other factors that require explicit evaluation in order to properly understand test results and deviations from true values.⁸ In this instance, measurement uncertainties (unaccounted for composition) raise the possibility that aliphatic compounds, ethyl benzene, water, and other impurities found in commercial grades of toluene (including benzene not measured by ALS) comprise several percent of the bulk non-chlorinated mixtures.

Known Interferences in Method used to Analyze Charcoal Samples

Acetone (a ketone) and methanol (an alcohol) comprise more than 60% of the non-chlorinated brake cleaners utilized in the litigation simulations; therefore, they were present in all the charcoal samples analyzed by ALS Global. Potential interferences posed by ketones and alcohols in NMAM 1501 determinations are acknowledged in the litigation report, but are not mentioned in the SR.⁹ A possibility is to use OSHA Method 12 for the analysis of the charcoal samples.¹⁰ It has minimal interferences and is offered in the ALS Global test catalog.¹¹

Bulk Brakleen® Analytical Chemistry Anomalies

The litigation report and AM state that bulk Brakleen® samples were analyzed by "gas chromatography coupled with a flame ionization detector (GC/FID)." As discussed above, the litigation simulations utilized non-chlorinated mixtures prepared by a CRC chemist; *they did not involve any manufactured Brakleen® products*. Letter 1 pointed out to the EIC that "GC/FID" simply refers to generic analytical equipment, and is not descriptive of the relevant analytical testing method or the specific equipment used. Substantive revisions published in the SR in response to Letter 1 create additional doubt about the reliability and scientific tenability of analytical results. For instance:

- Analysis of the bulk blends was said to have been performed by "*the same analytical method [NIOSH Method 1501] and quality control procedures as for the charcoal air samples*" (Emphasis added). It is fair to question how bulk Brakleen® samples could have been analyzed by NIOSH 1501 since that method applies *to air samples only*.⁹
- An Agilent DB-MTBE capillary column was ostensibly used for all the bulk analyses. That column differs markedly from the one specified in NIOSH 1501 documentation (i.e., fused silica PEG capillary column or equivalent having *polar* properties); the Agilent DB-MTBE is a *non-polar* column for determining the concentration of MTBE in *soil and water*.¹²
- Three ALS Global reports⁵ identified "Gas-Chromatography-Rinsate IH-001" ("IH-001") as the method used to analyze the bulk Brakleen® blends (not NIOSH Method 1501 as indicated in the SR). Method "IH-001" is not offered in the ALS Test Catalog and Fee Schedule.¹¹

Procedure to Reliably Determine Benzene Content of Brakleen® Blends

Fries et al. could have obtained the benzene content of the non-chlorinated brake cleaners used in a straightforward and reliable manner. First, a laboratory accredited in ASTM D-7504 or ASTM D-2360 could have determined the benzene content of toluene used by the CRC chemist to formulate Blend A.^{13,14} The benzene content of Blend A could have easily and accurately been calculated from the ASTM D7504 or ASTM D-2360 determined result.

Unidentified Certificates of Analysis (COAs) are *not* Laboratory Records

Fries et al. assert in the SR that the benzene content of Blend A is “consistent with” COAs for toluene (i.e., the COAs corroborate their benzene content results for the blends used in the litigation simulations). As noted in the commentary, COAs do not constitute surrogate laboratory records and do not satisfy the JOEH requirement pertaining to authors making “raw data” records available to other scientists.¹⁵ CRC Industries does not perform testing to determine the benzene content of Brakleen® products or ingredients used to manufacture them.¹⁶

Dr. Williams only *summarized* toluene COAs that were issued by a major manufacturer and distributor of toluene and produced to CRC in two expert reports she prepared for CRC Industries.^{17,18} ASTM D2306 was listed in her tabulated COAs summary as the analytical test used to determine the benzene content of toluene. It is a fact that ASTM D2306 has nothing at all to do with assaying benzene in toluene; it is used to determine the distribution of ethyl benzene and three xylene isomers present in *xylene mixtures*.¹⁹ Dr. Williams disclosed in her two expert reports that some of the COAs sent to CRC communicated the benzene content of toluene as 0.0 ppm.^{17,18} This result is impossible - even for laboratory grades of toluene. While the Williams expert reports clearly identify D2306 as the test used by Ashland to measure the benzene content of toluene, the unpublished Fries et al. response to Letter 3 (discussed in the Commentary) contended that ASTM *D2360* was, in fact, the test relevant to the COAs. That assertion is certainly incorrect; the sworn testimony of Mr. Ernest Perdue (an Ashland analytical chemist) was that ASTM D2360 *was not used*, and that Ashland utilized a modified version of ASTM D2306 to determine the benzene content of toluene.²⁰

Unrealistically Low Benzene Content of Toluene

Based upon the ALS Global result of 1.4 ppm benzene in Blend A, it is deduced that the toluene used contained approximately 3.6 ppm benzene. That level is below what is normally present in a laboratory-grade toluene reagent, which is far too expensive for use in a commercial brake cleaner.²¹ Even ultrapure (>99.9%)

TDI-grade toluene may contain 300 ppm benzene, up to 82-fold higher than the level deduced from the SR results.²² Dr. Williams has testified that nitration grade toluene is used to manufacture Brakleen® products.²³ Nitration grade toluene has never had an ASTM benzene specification and until 2013 had no minimum purity requirement.^{24,25}

The prospect that toluene used in commercial Brakleen® products contains only 3.6 ppm benzene, at present and in the past, is highly improbable. Moreover, any suggestion that current benzene levels in toluene are lower than in the past is incorrect because the benzene content of toluene is unchanged since 1970.²⁶ The refinery process for manufacturing commercial grades of toluene consists of catalytic reforming, followed by extraction to remove aliphatic chemicals, followed by distillation.²⁷

Inaccurate Referencing of Cited Sources and Misattribution of Laboratory Accreditation in IRB Application

The IRB application prepared by Drs. Williams and Maier cited two articles authored by Williams et al. One was funded by ExxonMobil and referred to thousands of benzene exposure lawsuits.²⁸ The other article has no relevance to the IRB applications since it offers no information about the benzene contents of non-chlorinated brake cleaners and does not present monitoring data purporting to represent benzene exposures arising from their use.²⁹

Other sources cited in the IRB application were inaccurately referenced. For instance, three cited sources do *not* support the representation made that low levels of benzene exposure are to be expected from products containing less than 0.1% benzene. Two of the references (OSHA 1994 and OSHA 2012) do not even mention “benzene,” while the third (OSHA 1987) clearly warns that administrative and engineering controls are needed for confidence that 8-hour time-weighted average (TWA) benzene exposures could be controlled at less than 1 ppm.^{30,31,32}

Two sources do *not* support the representation that “the benzene content of most commercial petroleum-derived solvents has been <0.1% since at least the late 1970s or early 1980s.” Since the first source (Hillman 1978) was issued in 1978, it could not have contained information about the benzene contents of petrochemicals in the 1980s.³³ It did, however, identify toluene (the petrochemical ingredient of the Brakleen® responsible for its high benzene content) as a “benzene critical” solvent. The second source is the aforementioned ExxonMobil-funded article by Williams et al.; it makes the same *unreferenced claim*.

Additionally, three cited sources do *not* corroborate the representation that “petroleum-derived

products that might contain trace levels of benzene are unlikely to yield airborne concentrations of benzene that exceed current OELs.” One of the sources (the Hillman report) does not even mention benzene exposures; neither does the second reference (EPA 1991).³⁴ The third source was the ExxonMobil-funded article by Williams et al. that discusses 22 handpicked exposure settings (including two litigation-related simulations involving solvents containing less than 10 ppm benzene) involving uncommonly utilized solvents (such as cutting oil) that contained almost no benzene.²⁸

Contrary to what is asserted in the IRB application (and the AM), ALS Global lacks AIHA accreditation to conduct bulk analytical testing. In 2018 (two years after submitting the IRB application) Fries et al. acknowledged in the SR that ALS Global lacks AIHA accreditation for bulk testing.

Referenced EPA Report Refutes SR Result and IRB Application

The 1991 EPA study referenced in the IRB application is also Reference #5 in the SR.³⁴ All but one of the brake cleaners (including a CRC product) in that study were *chlorinated*, and therefore not expected to contain much, if any, benzene. Relevant to the present discussion is a non-chlorinated Pyroil “carb cleaner” (EPA ID#525308) that was formulated with toluene, acetone, and methanol (same ingredients as Blend A). The EPA report communicates that the Pyroil “carb cleaner” contained 9,000 ppm benzene (6,429-fold higher benzene content than the 1.4 ppm benzene Fries et al. reported for Blend A). The second non-chlorinated carburetor cleaner (EPA ID#225108) in the study contained 2,000 ppm benzene (1,429-fold higher benzene content than reported for Blend A). The referenced EPA report refutes the “minute” benzene content representation made in the IRB application and underscores doubts about the scientific tenability of benzene content results for the non-chlorinated mixtures reported by Fries et al.

The benzene content of toluene used to manufacture carb cleaner #525308 in the EPA study was clearly well in excess of 0.9% (9,000 ppm). That is the case because the product also contained significant amounts of methanol and acetone, which are not expected to contain much (if any) benzene. The benzene content of toluene deduced from the reference cited by Fries et al. is consistent with the benzene content for commercial grades of toluene.^{34,35,36}

Mischaracterizing Exposures as “Typical” and “Worst Case”

There are no statistics to support the Fries et al. “typical” and “worst case” global exposure claims. To determine “typical use,” one would need to look at the variation in aerosol brake cleaner use by a sizable

random sample of mechanics performing the same type of brake job(s). That database is nonexistent. Exposure determinants that pertain to “typical use” are: a) the total volume of solvent sprayed per wheel in a specified time period; b) the fraction of sprayed solvent that runs off into a drip basin or onto the floor (reported by Fries et al. - but not measured); c) the temperature of the sprayed surface and aerosol product (which need not be the same as the air temperature); and d) the proportion of the task period (say, 15 minutes) that the mechanic’s face is close to the evaporating solvent and the timing of cleaning. The authors report data related to item (a) in Figure 3, but report no data for items (b)-(d). By the timing of cleaning, I refer to whether the mechanic begins cleaning a surface immediately after spraying it, or whether the mechanic walks away after spraying the surface to perform a different task or to let the solvent act on grime, and then returns to the sprayed surface some minutes later. The former timing would lead to a higher breathing zone solvent exposure intensity compared to the latter timing.

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APPENDIX 2 - ANNOTATED TABLE OF COMMUNICATIONS

Acronyms

EIC: JOEH Editor in Chief (Dr. Renee Anthony)

JP: JOEH Associate Editor (Ms. Jennifer Patterson)

PS: President, JOEH Board of Directors (Dr. Philip Smith)

MK: Author of Commentary and four Letters to the Editor

VHH: Attorney Mr. Vic Henry, "CRC Industries counsel on various matters"

JB: Attorney Jennifer Bonneville represented CRC in benzene exposure case ending in 2015

MCAP: JOEH Manuscript Central Authors Page

Date	Document Type	Summary
4/19/18	"Accepted manuscript" ("AM")	Fries et al. AM published on JOEH website with instructions for citing it
4/20/18	Email (MK to EIC)	MK intends to submit a Letter to the Editor ("Letter") regarding the Fries et al.
4/20/18	Email (EIC to MK)	EIC says forthcoming Letter to the Editor is "not good news" because she takes them "personally." EIC provides 2,000-word limit for Letters to the Editor. EIC does <i>not</i> say MK should hold off submitting a Letter to the Editor because the "Accepted" manuscript was <i>not</i> a published article or because it was to undergo substantive revisions.
4/25/18	Email (MK to ALS Global)	MK informs ALS Global (the lab that performed analytical testing for Fries et al. in the 2016 litigation study) about the forthcoming Letter to the Editor. MK requests specific details about the analytical testing done for Fries et al. and the scope of its AIHA accreditation.
4/25/18	Email (MK to EIC)	MK expresses concern about analytical testing results and ALS AIHA accreditation in the Fries et al. "Accepted" article. MK attaches the 4/25 (MK to ALS) email.
4/25/18	Email (EIC to MK)	EIC confirms that bulk testing is the analytical issue and commits to obtaining "verification documentation and errata" from Fries et al.
4/25/18	Email (EIC to MK)	EIC confirms she notified the authors about the "important [analytical chemistry] issue" and that she required them to provide JOEH with analytical testing details or "someone else" would. EIC promises to "ferret out the truth" about analytical testing issues. EIC refers to JOEH requirement for authors to maintain testing documentation. EIC says, "I wholeheartedly thank you for your thoroughness on this one" and concedes, " <i>Both I and my reviewers missed the bulk analysis issue.</i> " (Emphasis added) NOTE: Based on this email communication, MK expected the EIC to fully address numerous analytical testing anomalies in the article.
4/25/18	Email (EIC to MK) - same Email as above	EIC says, "Bad news for you is that I am moving your name to a rather elite list of " <i>articles of sensitive topics</i> ", aka " <i>the legal sniff test.</i> " (Emphasis added)
4/26/18	Email (MK to EIC)	MK sends EIC an article that discusses the common practice of reporting inaccurate (i.e., too low) benzene levels of petrochemicals in published articles; the benzene contents were obtained by unpublished analytical testing methods that the journal had not scrutinized in the peer review process - just as with the AM and SR.

5/2/18	Email (MK to EIC)	MK informs EIC that his Letter to the Editor is progressing and mentions that ALS Global has not responded to the 4/25/18 email.
5/2/18	Email (EIC to MK)	EIC says the authors are “communicating with the lab to get information on the bulk analysis.”
5/2/18	Email (MK to EIC)	MK will seek analytical testing details from the entity that paid for the analytical testing, CRC Industries.
5/3/18	Email (MK to CRC)	MK makes numerous information requests about the ALS analytical testing and other details about the Fries et al. study, all relevant to their 2018 article published by JOEH. MK provides the 4/25/18 email sent to ALS in which he conveyed 10 specific requests regarding the analytical testing. MK indicates a CRC response would be incorporated in his forthcoming Letter to the Editor.
5/9/18	Email (MK to EIC)	MK asks if EIC received a response from Fries et al. regarding the demands she made to the authors about analytical chemistry results.
5/9/18	Email (EIC to MK)	EIC says she “finally made contact with the authors.” [NOTE: Her 5/2 email <i>also</i> said she had made contact with the authors and requested the analytical details.] EIC says MK should “wrap up the letter with the [analytical testing] information [MK] has.” EIC claims the “reviewers were aware of the roles of all parties in the study.” EIC says the <i>current</i> “Accepted” manuscript is “pre-proof”
5/9/18	Email (MK to EIC)	MK asks if there is a second online version of the article, and if so, whether additional COIs were disclosed. MK asks for the updated article in the event one existed - so the Letter “reflects the facts.”
5/10/18	Email (MK to EIC)	MK attaches draft Letter 1 to make sure EIC had no objections.
5/11/18	Email (EIC to MK)	MK was advised to formally submit the Letter. EIC did not look at the draft attached to 5/10/18 email.
5/14/18	Letter 1 submitted JOEH-18-0117	
6/15/18	Email (EIC to MK) Letter 1 decision email	EIC expressed no scientific objections. EIC said Letter 1 was “general in nature”, “lacking data”, and was related to litigation. EIC referred for the first time to a “final” manuscript and said it was scheduled for publication in the August JOEH issue. EIC claimed that the “final” manuscript reflected only two “Typesetting” revisions to the “Accepted” manuscript. EIC requests that MK provide relevant legal “case documents.” EIC admitted, “JOEH readers should understand that this study provides a case study with findings limited to the conditions reported in the study undertaken.” Even though my Letter 1 never discussed IARC, the EIC alluded to actions taken by IARC after the publication of a New Solutions commentary.
6/15/18	“Final manuscript” (Fries et al. “Short Report”) published in the August 2018 issue of the JOEH	As discussed in the Commentary, the “final manuscript” reflected at least nine substantive changes to the “Accepted” manuscript directly in response to my Letter 1.
6/18/18	Email (MK to EIC)	MK provided a point-by-point refutation of the 6/15/18 decision email. MK wrote, “It would seem clear that the authors were given a mulligan, of sorts, in order to smooth over serious bumps in the ‘accepted version.’ Most assuredly, had I known the authors would be permitted to make substantive changes to the ‘accepted version’ that I based my letter on, I would have

		waited to send you my letter.”
6/19/18	Email (MK to attorney JB with copy to EIC)	JB represented CRC in 2015 benzene exposure litigation. MK requested permission to provide relevant case documents pursuant to the EIC’s request made in her 6/15 email. MK copied EIC to show he was attempting to obtain permission to provide the “case documents” she requested.
6/19/18	Email to MK from attorney VHH representing CRC in benzene litigation (EIC copied)	Attorney for CRC responded to MK’s request to a CRC VP for analytical testing information and details of the litigation study that were not discussed in the article. Referred to MK as “professional expert witness” working against CRC in civil cases. Asked me to refrain from contacting CRC.
6/19/18	Email (MK to VHH with copy to EIC)	MK explained the reason that ALS and CRC were contacted: “Please be assured that I do not seek any proprietary information about CRC products. The fact is your client and one of its testifying experts chose to initiate a scientific study and to have the results of that study published in a peer-reviewed journal. I seek to write a letter to the editor to discuss aspects of the published article that I disagree with. It is only fair that I be provided with the materials that the authors cite and refer to in their article. Dr. Williams and her co-authors will have an opportunity to respond to my letter. That is how the system is intended to work.”
6/20/18	Email (MK to VHH)	MK attached a CRC air monitoring data report that he sought to reference in his Letter to the Editor as well as a protective order requested by VHH.
6/20/18	Email (MK to EIC)	MK pointed out that the “final” manuscript reflected substantive revisions to the “Accepted” manuscript of 4/19/18 and asked why the EIC’s 6/15/18 email stated there were only the 2 revisions - which she previously characterized as “typesetting.” MK requested the Certificates of Analysis (COAs) the authors introduced in the “final” manuscript.
7/2/18	Email (MK to EIC)	MK informed the EIC about the letter to the editor (Letter 2, JOEH-18-0117.R1) he submitted in response to the “final” manuscript.
7/3/18	Email (EIC to MK)	EIC obtained lab reports from the authors.
7/3/18	Email (EIC to MK)	Transmitted ALS lab reports concerning bulk testing.
7/3/18	Email (MK to EIC)	MK expressed concern about the Letter 2 submission from July 2nd since it did not take into account the lab reports. MK requested that the EIC enlist people other than the original Fries et al. peer reviewers for Letter 2 (the June 15th EIC email indicated that the EIC used the Fries et al. reviewers to peer review Letter 1). MK suggested two potential reviewers who serve on the JOEH editorial review board.
7/3/18	Email (EIC to MK)	EIC said MK may “‘unsubmit’ so you can revise” Letter 2. EIC indicated she is “glad to have a fresh set of eyes on the next round.”
7/5/18	Email (attorney VHH to MK; EIC copied)	VHH criticized attempts by MK to obtain analytical data from his client Email stated, “As you know CRC funded the CRC product simulation study analysis, and the release of any data retained by the laboratory requires the consent of CRC. Please refrain from contacting the laboratory that performed the air and bulk liquid sampling analysis for the product used for the study and asking for data from the lab about the study, <i>which data you clearly intend to use in your advocacy as a plaintiff’s professional expert witness in product liability litigation</i> , without first contacting me on behalf of CRC.” (Emphasis added)
7/5/18	Email (MK to attorney VHH; EIC copied)	MK explained the purpose of his communication with ALS and took issue with statements by VHH in his email.

7/5/18	Email (MK to EIC)	MK informed the EIC about the unpublished study (i.e., “litigation study” used by Dr. Williams as a CRC expert witness) and referred to the July 5 th VHH emails. MK stated that he is not involved in a CRC legal case and that the Fries et al. article concerned litigation, not science. MK stated that VHH copying the EIC on his email was inappropriate and constituted interference in JOEH work.
7/5/18	Email (EIC to MK)	EIC said JP would handle Letter 2 submission paperwork and requested that copies of emails and other materials be furnished to JP.
7/6/18	Email (MK to JP)	MK wrote to JP pursuant to EIC request in her 7/5 email. MK discussed VHH’s role as CRC’s attorney in litigation.
7/9/18	Letter 2 submitted (JOEH 18-0117)	Responsive to the “Final” manuscript. Addressed the substantive differences between the “final” and “Accepted” manuscripts and explained that the only differences between AM and SR came directly from points in my Letter. Mentioned communications between MK and the EIC and identified numerous undisclosed conflicts of interest that Fries et al. should have acknowledged.
7/20/18	Email (EIC to MK); decision on Letter 2	EIC rejected Letter 2, saying personal communications with the EIC are unacceptable, as are comparisons between the “Accepted” and “final” manuscripts. EIC said MK could not mention Letter 1 because it “ <i>does not “exist” as a thing that anyone can see but you and me.</i> ” (Emphasis added) Curiously, the EIC wrote that a sentence from Letter 1 was in Letter 2; however, this sentence was not in letter 2. [“That [the Fries et al. description of the test used to measure benzene in the non-chlorinated brake cleaners] is analogous to providing a chocolate cake recipe that says only that one should bake the cake in an oven.”]
7/24/18	Email (MK to Dr. O’Reilly - President of JOEH Board of Directors)	MK chronicled his attempts to get a Letter to the Editor published in JOEH pertaining to the Fries et al. article. Details about the “Accepted” and “final” manuscripts were identified (including the EIC sending Letter 1 to Fries et al and allowing them to create the “final” article based on its content. MK informed Dr. O’Reilly about the emails from CRC’s attorney that the EIC was copied on. MK requested intervention by the Board of Directors.
8/9/18	Email (Dr. O’Reilly to MK)	JOEH Board of Directors (BOD) only provides financial and administrative oversight. BOD relies on EIC as the arbiter on what to publish. BOD supports actions taken by the EIC.
8/16/18	Email (EIC to MK)	EIC wanted to know if MK intends to submit a revised letter taking into account her 7/20 decision email. EIC said the authors would be allowed to respond to such a letter.
8/16/18	Email (MK to EIC)	MK intended to submit a revised letter but stated concerns with the 1,000 words limit the EIC set in her July 20 th email.
8/16/18	Email (EIC to MK)	EIC thanked me for letting her know and said she wouldn’t pick on words, but asked me to “do [my] best.” She said “in the ballpark” of her limit is “a place to aim for.”
8/17/18	Email (MK to EIC)	MK provided draft of Letter 3 that contained only 1,219 words.
8/21/18	Email (EIC to MK)	EIC said the Letter 3 draft is “much improved.” She had a few “subtle concerns” (not identified in the email).
8/27/18	Email (EIC to MK)	EIC said Letter 3 “is much improved and lays out the concerns fairly clearly.” She would be requesting a few modifications of the August 17 th draft.
8/27/18	Email (EIC to MK)	The EIC provided her marked up version of the 8/17 draft along with her

		requested changes (that are all dated 8/21/18). She also requested the unpublished report (i.e., CRC “litigation report”).
8/30/18	Letter 3 JOEH-18-0117.R2	The EIC or JP submitted the finalized Letter 3 after MK made all the changes requested by the EIC in her August 28 th email.
8/30/18	Email (EIC to MK)	EIC said the authors are working on a rebuttal letter that she presumed “will take a few weeks.” <i>NOTE: It took about three months.</i> EIC said JOEH “cannot publish the referenced report (‘unpublished CRC report.pdf’)” EIC said Fries et al. would have to assign the copyright to the author before MK could refer to it in his letter. EIC said the authors were addressing the unpublished report with her directly, and that she “is willing to simply strike the parenthetical sections that reference this [litigation report] in the letter submitted.” EIC said MK could modify his Letter 3 by deleting all references to the unpublished report.
8/30/18	Email (MK to EIC)	In response to the August 30 th EIC email, MK indicated his preference was for the EIC to work things out with Fries et al. regarding referring to the unpublished CRC report in Letter 3.
9/20/18	Email (MK to EIC)	MK inquired about status of author response letter.
9/24/18	Email (EIC to MK)	EIC again said (as she did in her August 30 th email) the authors “are working on their response” to Letter 3. EIC requested that MK send selected references from Letter 3 that are not on the websites.
9/24/18	Email (MK to EIC)	MK attached the references requested in the 9/24/18 email. MK informed the EIC that he would be deposed 9/25 in a lawsuit in which one of the authors (Dr. Williams) is an opposing expert, something that was not disclosed to MK until 8/30/18. MK informed the EIC that he would produce Letter 1 at the deposition if necessary. Williams referenced the SR in her expert report in this case days after the EIC published it in JOEH.
9/24/18	Email (EIC to MK)	EIC said Letter 3 should not be distributed as it is only “under review” hopefully with “minor modifications.”
9/26/18	Email (MK to EIC)	MK informed the EIC that at his deposition he testified about the “accepted” and “final” manuscripts. MK also testified that he was unaware of Williams’s involvement in the lawsuit until four months after he wrote to the EIC regarding the “Accepted” manuscript.
10/20/18	Email (MK to EIC)	MK inquired about the status of publishing Letter 3 and asks why the EIC was allowing so much time for the author response. MK said that the previous JOEH editors (Dr. Morgan and Dr. Nicas) allowed only 30 days for his author response.
10/31/18	Email (EIC to MK)	In response to MK’s October 20 th email, the EIC said the author rebuttal letter requires revision. EIC says, “the two authors [MK and Williams] are fighting about court cases in the journal.”
10/31/18	Email (MK to EIC)	MK responded at length to the 10/31/18 EIC email, taking issue with her court-case-argument conclusion and other issues. MK wrote that his Letter 3 was entirely science based and respectful, per her request. Dr. Williams had already used the Fries et al. Short Report in a court case. “Your readers can judge for themselves the scientific merit of the article in question and of the issues raised in my letter. Undoubtedly, some of those readers may be interested parties in court cases. That would not be unusual

		since science often paves the way for a fair resolution of lawsuits.”
11/20/18	Email (MK to EIC)	MK inquired, “can you provide an update on when my letter will be published?” <i>NOTE: It had been 12-weeks since the EIC said she presumed the author rebuttal would take a few weeks.</i>
11/20/18	Email (EIC to MK)	EIC said she is expecting author-revised response in a few weeks. EIC had requested a “toning down” of their rebuttal letter. Said her “request for civility is not one sided.” If MK made no revisions to Letter 3 based on the author rebuttal letter (and if their letter addressed her concerns) then Letter 3 and the author response will be published in February or March JOEH issue. “But if [MK] responds to their letter and this goes back and forth another round, who knows the timeline.”
11/21/18	Email (EIC to MK)	EIC provided the author response and asked if MK wanted to “review” it. The EIC requested MK’s review in two weeks to the author response. In her 11/20/18 email the EIC indicated that MK might want to revise his letter in response to what the authors say in their letter.
11/21/18	Author response JOEH-18-0426.R1	<i>The Fries et al. rebuttal had numerous scientific errors and incorrect facts.</i>
11/26/18	Email (MK to EIC)	MK informed EIC that he is “somewhat taken aback by the tone of their [authors] letter.” MK informed the EIC that he will respond to the letter by December 13 th . Based on the 11/20 EIC email, MK concluded that he could respond by revising Letter 3.
11/28/18	Email (EIC to MK)	EIC said she would not publish a “response to a response.” She asked MK “Please provide your concerns to me and revise your letter, and I will communicate with the other authors.” <i>[The EIC did not communicate any limitations regarding the extent of the revisions that would be allowed.]</i>
12/13/18	Fries et al. rebuttal letter Downloaded on December 13, 2018 by MK (JOEH-18-0426.R1)	Fries et al. disputed issues set forth in Letter 3 and said that MK undermined the integrity of the peer review process. Asserts the unidentified toluene Certificates of Analysis (COAs) in the SR confirm the accuracy of the benzene contents they reported for the CRC-specially prepared brake cleaners used in the 2016 simulation study. Makes unsubstantiated claims about the bulk analytical testing done by ALS Global. Denies the unpublished report that Dr. Williams uses as an expert witness for CRC is a “litigation” report. Denies that results in the AM and SR came directly from the litigation report (that was not referenced in the AM and SR). <i>Note: The EIC allowed Fries et al. to discuss the litigation report in their rebuttal letter, and to deny that data in their JOEH SR came entirely from it; however, her August 30, 2018 email made it clear that MK could not refer to the litigation report in a published letter if Fries et al. did not want to make the litigation report available.</i>
12/13/18	Letter 4 submitted to the JOEH as JOEH-18-0117.R2	Consistent with the 11/28/18 email from the EIC, MK revised Letter 3 (i.e., “Letter 4”). Letter 4 did not mention the author response or the first three submissions and is devoid of personal attacks. The scientific criticisms and undisclosed conflicts of interest in the Fries et al. Short Report remained the same as Letter 3. MK Letter 3 table was deleted to limit length. Letter 4 contains 1,614 words, about 350 words longer than Letter 3 that the EIC was willing to publish as is.

		Letter 4 was given the same manuscript number as Letter 3, which was then removed from my MCAP.
12/14/18	Email (EIC to MK)	EIC rejected Letter 4 because it allegedly was “out of scope in responding to the Fries et al article.” EIC said she is officially closing the matter and not allowing a letter to the editor from MK to be published in JOEH. EIC claimed Letter 4 was 77% different from Letter 3. EIC said JOEH “readers know that AIHA has no accreditation process for bulk sample analysis.” EIC stated, inaccurately, that misrepresentation of laboratory accreditation was “your other main point of argument.” EIC stated (also inaccurately) that the Fries et al. “study was not intended to reflect “historical exposures of benzene, which was your original objection.”
12/15/18	Email (MK to EIC)	MK provided a lengthy point-by-point rebuttal of the EIC’s 12/14 email. MK informed the EIC that he “intends to make sure the scientific community gets the facts.”
1/10/19	Email (MK to EIC)	MK asked EIC to state her legal objections, if any, to MK providing the “Accepted” manuscript and draft author response (<i>JOEH-18-0426.R1</i>) as on-line supplements to a commentary that he would be seeking to have published.
1/10/19	Email (EIC to MK)	EIC claimed, inaccurately, that MK was “not willing to revise the R2 version of [his] letter regarding the first version of the rebuttal letter to [his].” [JOEH assigned the R2 designation to Letters 3 and 4] EIC said JOEH will not permit MK to provide the “Accepted” manuscript and Fries et al. rebuttal letter because JOEH owned their copyrights. EIC defended the changes she allowed Fries et al. to make to the “Accepted” manuscript because they were consistent with JOEH practice.
1/11/19	Email (MK to EIC)	MK said he would not provide the “Accepted” manuscript and draft rebuttal letter from Fries et al.
1/21/19	Email (PS to MK)	PS concluded that EIC acted appropriately and that he supported her decision not to publish Letter 4. PS said unauthorized production of published materials copyrighted by JOEH (i.e., “Accepted” manuscript and draft rebuttal letter) would “break the confidentiality of the editorial review process.”
1/21/19	Email (MK to EIC)	MK requested that EIC state her objections, if any, to providing email communications and the four submitted letters as Commentary supplemental materials, and the legal basis for any such objections.
1/21/19	Email (MK to PS)	MK forwarded to PS the email he just sent to the EIC and asked PS to state the legal basis for any objections to providing as Commentary supplemental materials the items discussed in the January 21 st email.
1/21/19	Email (PS to MK)	Reiterated that EIC has the support of the JOEH Board of Director for her handling of the matter of interest. PS reminded MK “not to break the confidentiality of the editorial review process.”
1/22/19	Email (MK to PS)	MK informed PS that the Commentary refers to both documents (“Accepted” manuscript and rebuttal letter). MK explained that EIC did not respect the confidentiality of the editorial review process he is concerned with.
3/21/19	Email (MK to EIC) PS is copied	MK reminded the EIC that his Commentary discussed his email communications with her.
3/21/19	Email (MK to PS)	MK requested that PS provide any legal objections to the use of communications discussed in 3/21/19 email to EIC.
3/25/19	Email (PS to MK)	PS said the same things that are in his January 21, 2019 email

4/5/19	Email (MK to VHH)	I requested permission to provide the litigation report as a Commentary supplemental material.
4/8/19	Email (VHH to MK)	Rejected notion that the unpublished report was a “litigation report.” He was under the impression that the “[simulation] Study is in the process of being published by its authors,” although [he] does not know the specifics of that publication.”
5/17/19	Email (MK to PS)	MK attached “Accepted” manuscript and asks PS to provide the legal basis supporting his objection to providing it as a supplemental material.