



DREXEL UNIVERSITY
Dornsife
School of Public Health

*Department of Environmental &
Occupational Health*

Arthur L. Frank, MD, PhD
Professor, Chair Emeritus

November 15, 2017

Rebecca Stanger
Journal Publisher Liaison
National Library of Medicine
National Institute of Health and Human Services
US Department of Health and Human Services
8600 Rockville Pike
Bethesda, MD 20894
LSTRCinfo@mail.nlm.nih.gov

Dear Ms. Stanger,

The Editorial Board of the *International Journal of Occupational and Environmental Health (IJOEH)* requests that the National Library of Medicine rescind the listing of *IJOEH* in Medline, require the new owner of *IJOEH*, Taylor & Francis, to submit a new application for listing of *IJOEH* in Medline, and then reject that renewal application when it is submitted.

We make this request on the grounds that Taylor & Francis have acted in a profoundly unethical fashion in dismissing the previous editor of *IJOEH* without explanation and without consulting the journal's Editorial Board; in rescinding the Pub Med listing of a manuscript that had been previously published in *IJOEH* in 2016; and in blocking the publication of additional manuscripts that had been submitted to *IJOEH*, passed peer review and been accepted for publication. All of these actions constitute clear violations of the Ethical Guidelines and the Principles of Best Practice in Scholarly Publishing of the Committee on Publication Ethics (COPE). And we note additionally that manuscripts that were pulled from publication by Taylor & Francis appear to be reports whose findings might have adversely affected the commercial interests of industry.

We have already written to Taylor & Francis requesting an explanation for their actions and urging reconsideration. We (including all but one of the current members of the Editorial Board) have also written to

COPE to request their intervention. After many weeks, we have received no answers from either Taylor & Francis or COPE.

The following sections provide a detailed description and chronology of these disturbing events.

Background

Taylor & Francis (T&F) purchased Maney Publishing in 2015. The *International Journal of Occupational and Environmental Health (IJOEH)* passed to the new publisher with this acquisition. A new IJOEH Editor-in-Chief was appointed by T&F without any discussion with Dr. David Egilman who for the preceding 10 years served in this role. Dr. Egilman was dismissed without the consent of, or consultation with, the existing Editorial Board. Shortly thereafter, T&F withdrew a peer-reviewed paper published in IJOEH in 2016 authored by Dr. Egilman. The paper was critical of Union Carbide corporate consultants. Moreover, T&F indicated that three other articles were also being considered for retraction. These retractions were undertaken unilaterally by the publisher without the consent of Dr. Egilman or Dr. Andrew Maier, the newly-appointed IJOEH Editor-in-Chief. Moreover, the retractions were undertaken without any consultation with the Editorial Board. The unilateral withdrawal of published and accepted papers by the publisher is an extreme measure.

Suppression of an accepted paper is a direct assault on academic freedom. On April 26, 2017, all the members of the Editorial Board wrote to the Chief Executive Officer of the publisher to express their concern about the lack of transparency in the appointment of a new Editor-in-Chief and the retraction of peer-reviewed articles. On June 2, 2017, the Editorial Board reported these and other ethics violations to the Committee on Publication Ethics (COPE). COPE has yet to respond in writing to the Editorial Board's letter.

Past History

The *International Journal of Occupational and Environmental Health (IJOEH)* was begun by Hanley & Belfus, Inc. of Philadelphia in 1995. The Founding Editor-in-Chief was Dr. Joseph LaDou of the University of California, San Francisco. The publisher instituted a publication policy consistent with the Committee on Publication Ethics (COPE) Code of Conduct for Journal Publishers. The Editor-in-Chief instituted an editorial policy in full conformity with COPE Guidelines for Journal Editors. Moreover, he appointed an international

group of scholars and practitioners to serve as the initial Editorial Board. During the first years of IJOEH publication, application was successfully made to the National Library of Medicine, Medline, for IJOEH to be included in the List of Journals Indexed for MEDLINE.

In 2007, Dr. David Egilman, Clinical Professor of Family Medicine of Brown University, became the Editor-in-Chief of IJOEH. The editorial policy of the journal continued without interruption for 22 years. In all this time, LaDou and Egilman were assisted by Editorial Boards that actively participated in the editorial policy of the journal. The IJOEH has become a widely respected source of important scientific articles on occupational and environmental health hazards, policy and prevention. The IJOEH has a reputation for publishing articles that provide a critical analysis of science in the field of occupational and environmental health throughout the world. Moreover, it promotes access for scientists in developing countries to publicize regional occupational and environmental health and safety issues as well as their research. On two occasions, IJOEH was nominated for the National Magazine Award by the Columbia University Graduate School of Journalism on behalf of the American Society of Magazine Editors.

Maney Publishing, a UK firm, became the publisher in 2010 continuing the publishing and editorial policies that characterized IJOEH. Maney Publishing stated that, "The IJOEH is an authoritative, interdisciplinary resource covering occupational health, environmental health, and consumer health. It publishes original scientific and social scientific research, as well as commentary and analysis in the broad fields of occupational and environmental health. IJOEH is read by researchers, practitioners, policy makers, and activists in the fields of occupational, environmental, and consumer health. Its international readership extends across disciplines, including epidemiology, occupational and environmental medicine, sociology, toxicology, and related fields."

In 2015, Maney Publishing was purchased by Taylor & Francis, a large international publisher. Taylor & Francis publish a range of scientific journals, including *Health Risk and Society*, *Global Public Health*, *Reproductive Health Matters*, and the *Archives of Occupational and Environmental Health*.

Improper Editorial Changes Made by Taylor & Francis

Events following the acquisition of Maney by Taylor & Francis (T&F) raise serious questions about research integrity and the independence of scientific journals in the face of corporate pressure. This has led the members of the Editorial Board of IJOEH to unanimously express their concern about the future scientific integrity of the journal.

Over many years of quarterly publications, meticulously referenced papers

have raised questions about corporate influence on the standards of practice and scientific literature in the field of occupational and environmental health. Many articles and editorials in IJOEH have also pointed out that national and international agencies often fail to adequately disclose and prevent conflicts of interest in dealing with regulatory and enforcement activities.

Last year, T&F replaced Dr. Egilman with a new Editor-in-Chief without the consent of, or consultation with the existing Editorial Board. The Editorial Board learned of the appointment only through after-the-fact correspondence. The Committee on Publication Ethics (COPE) Code of Conduct Guidelines for Journal Publishers state that any change in the direction of the journal should be discussed with the Editorial Board. The new Editor-in-Chief, Dr. Andrew Maier of the University of Cincinnati, is a widely known consultant to government and industry. Had the Editorial Board been asked to participate in the appointment of a new Editor-in-Chief, it is highly unlikely that it would have approved T&F's selection.

On February 11, 2017, members of the Editorial Board wrote to T&F to express their concern about the lack of transparency in the appointment of Dr Maier. They wrote:

“We are writing, first of all, to fully inquire about the process you followed in the selection of Dr. Maier. Secondly, we request your confirmation that all contributions that were accepted under Dr. Egilman’s editorship shall soon be published as accepted in IJOEH. And third, we want to know what assurance the publisher can possibly offer to readers around the world, who have come to admire and rely on this journal, that it has not just been subjected to a corporate takeover.”

Receiving no response to their questions, all of the current members of the Editorial Board wrote to the Chief Executive Officer of T&F on April 26, 2017. On May 8, 2017, Ian Bannerman, the Managing Director for Journals at T&F, responded to the Editorial Board’s letter. He indicated that the publisher had, a year prior, consulted one of the members of the IJOEH Editorial Board, Jukka Takala, on the appointment of Andrew Maier as Editor-in-Chief. Dr. Takala kept a record of the phone conversation with Andrew Kelly of T&F which took place on March 14, 2016. Mr. Kelly introduced himself as the new Managing Editor for IJOEH. The conversation was limited to Dr. Takala’s opinion about the substance of the journal contents and the overall image of the journal. Dr. Takala expressed his satisfaction with the contents and the image of the journal. Regarding the assertion that he had agreed to changes being made by T&F, Dr. Takala now states that, “There was absolutely nothing [discussed] on editorial board memberships or editors, nothing on Editor-in-Chief selection. I had never heard of Dr Maier before our inquiry recently.”

Dr. Andrew Maier is well-known as a researcher whose interpretation of

data has been highly sympathetic to parties with an economic interest in favorable outcomes. An example of this bias is shown in the case of diacetyl, a food additive widely used in the food industry. Diacetyl has been linked to serious, disabling lung disease in exposed workers. For that reason, the National Institute for Occupational Safety and Health (NIOSH) recommends a highly protective health-based exposure limit. Dr. Maier published an analysis in *Regulatory Toxicology and Pharmacology*, (2010;58:285-96) that recommended an occupational exposure limit (OEL) for diacetyl that was 20 to 40 times less protective than the OELs recommended by NIOSH and the American Conference of Governmental Industrial Hygienists.

Dr. Maier's analysis of diacetyl was prepared by his organization Toxicology Excellence for Risk Assessment (TERA). He describes it as a "non-profit organization dedicated to the best use of toxicity data for risk values." Dr. Maier characterized his analysis of diacetyl as an "Independent Toxicology Assessment" yet it was financially supported by Conagra Foods, Cargill, Coca Cola, Frito-Lay, General Mills, Proctor & Gamble, and Unilever. Dr. Maier and TERA have a long history of working for a range of companies and industry trade associations, including the American Petroleum Institute, the American Cleaning Institute, Crop Life America, American Chemistry Council, Chemical Producers and Distributors Association, Consumer Specialty Products Association, Personal Care Products Council, Society of Chemical Manufacturers and Affiliates, and the Styrene Information and Research Center. Rather than advancing public health and safety protections, these organizations use analyses such as those prepared by TERA to sow doubt about the health hazard of their products.

Dr. Egilman analyzed Dr. Maier's study on diacetyl. He published a critique that highlighted how Dr. Maier discarded or omitted crucial research data (IJOEH, 2011;17:122-34). Dr. Egilman concluded that when human data were taken into account, the recommended exposure limit for diacetyl should be even lower than those proposed by the ACGIH and NIOSH.

Unilateral Retraction of Papers by Taylor & Francis

In March, 2017, without consulting or even informing its Editorial Board, and without giving reasons, T&F unilaterally withdrew a paper written by Dr. David Egilman. It had been peer reviewed, accepted for publication, and published in IJOEH in 2016 (2016;22:18-26). The paper was titled "The Production of Corporate Research to Manufacture Doubt about the Health Hazards of Products: An Overview of the Exponent Bakelite™ simulation study". The paper examined the efforts sponsored by Union Carbide to generate data to oppose existing and future claims arising from past exposure to the company's asbestos-containing plastic.

The Abstract of the paper states:

“Although corporate sponsorship of research does not necessarily lead to biased results, in some industries it has resulted in the publication of inaccurate and misleading information. Some companies have hired scientific consulting firms to retrospectively calculate exposures to products that are no longer manufactured or sold. As an example, this paper reviews one such study – a litigation-engendered study of Union Carbide Corporation’s asbestos-containing product, Bakelite™. This analysis is based on previously secret documents produced as a result of litigation. The study published asbestos fiber exposure measurements that underestimated actual exposures to create doubt about the hazards associated with the manufacture and manipulation of Bakelite™.”

Apparently, Dr. Egilman’s analysis was not acceptable to T&F management. The publisher notified Dr. Egilman that his published paper was being officially withdrawn. The unilateral withdrawal by T&F of published and accepted papers is an extreme measure. Suppression of an accepted paper is a direct assault on academic freedom.

Upon written inquiry by the IJOEH Editorial Board, the Editor-in-Chief, Dr. Andrew Maier, wrote on May 5, 2017: “I have no involvement or decision authority on any manuscripts that were accepted or published prior to my tenure with IJOEH.”

The decision to withdraw Dr. Egilman’s paper should have entailed careful review by the Editor-in-Chief, the Editorial Board, and if appropriate, with input from peer reviewers. The unilateral actions by T&F are inconsistent with the Committee on Publication Ethics (COPE) Code of Conduct Guidelines for Journal Publishers. COPE guidelines provides specific and onerous requirements that need to be met to retract a paper. There is no provision that a publisher may retract a paper without discussion and approval of Dr. Egilman or his new replacement, Dr. Maier, without involvement of the author or the Editor-in-Chief. In fact, COPE guidelines stress the independence of the journal editor from the publisher’s interests.

In its message to the T&F Chief Executive Officer, the entire membership of the IJOEH Editorial Board voiced concern about the restructuring and decision-making in the journal. Their letter stressed that T&F should either reinstate Dr. David Egilman as Editor-in-Chief of IJOEH, or recognize the authority of the Editorial Board to choose a successor. Furthermore, they urged T&F to commit to ensuring prompt publication of all already-accepted papers; involve the Editorial Board along with the IJOEH Editor-in-Chief prior to any decision to retract published papers (in conformance with COPE guidelines); and not to interfere in any decisions about Editorial Board membership, leaving that to the Editor-in-Chief and the Editorial Board.

The publisher's response on May 8, 2017 intensified the Editorial Board's concerns about T&F's compliance with COPE guidelines. The Editorial Board was informed that a published article was being withdrawn and that T&F was reviewing three more (presumably accepted but not yet published) for retraction. Mr. Bannerman characterized the manuscripts as articles 'of concern'. This contradicts an earlier statement by T&F that "articles accepted under the editorship of Dr. Egilman continue to be published in the form in which they were accepted." The Editorial Board wrote to Bannerman at T&F on May 15, 2017, "We are concerned that the 'concerns' of Taylor & Francis about these three papers reflect a change to the editorial freedom of the journal."

On June 2, 2017, the IJOEH Editorial Board submitted a complaint to COPE. The text of the COPE complaint follows.

Complaint: Actions of the publisher Taylor & Francis (T&F) regarding the International Journal of Occupational and Environmental Health (IJOEH) full text attached.

We write to lodge a formal Complaint about the actions of the publisher Taylor & Francis (T&F) regarding the International Journal of Occupational and Environmental Health (IJOEH). We write as all members of the current Editorial Board, several past members, and the founding editor. Dr David Egilman was Editor-in-Chief until his contract ended in December 2016, whereupon the Publisher unilaterally appointed a new editor, Dr Andrew Maier.

We have corresponded with T&F seeking clarification of the concerns. We have not received satisfactory responses. We then discovered additional improprieties that are violations of the COPE Guidelines. Therefore, we lodge this Complaint.

Our concerns are:

1. In April 2017, publisher unilaterally retracted a paper published 12 months previously in IJOEH. The paper was authored by the previous editor, Dr Egilman and published after peer review in 2016 [IJOEH 22(1):18-26]. The manuscript had been reviewed for publication under COPE Guidelines. Published IJOEH review processes for manuscripts submitted by an editor or member of the editorial board were followed.

No reasons for retraction were given despite repeated requests. The Managing Director for T&F journals said that the article had been "inadvertently published before the review process was completed, and was subsequently decided to be unsuitable for publication." Dr Maier confirmed he had had no involvement in the decision to withdraw the paper nor were any Editorial Board members consulted. The Publisher alone decided that the paper was unsuitable and instituted an undisclosed, post-hoc review to justify the retraction.

2. This violates COPE guidelines:
 - i. Publishers should foster editorial independence and support journal editors¹ in following the COPE Code of Conduct for Editors. The latter confirms that new Editors should not

¹ See COPE Code of Conduct for Journal Publishers: bullets 7 and 3

overturn previous decisions to publish ‘unless serious problems are identified,’² that decisions on publication should be made “without interference from the publisher”³ and that the ‘relationship of editors to publishers ... should be based firmly on the principle of editorial independence.’⁴ A publisher that withdraws a paper without providing reasons and bypasses both the editor-in-chief and editorial board undermines editorial independence.

- ii. The retraction by the Publisher violates COPE guidelines. No reasons are provided⁵; the unsupported conclusion that the publication was ‘unsuitable’ is not consistent with the specific criteria in the guidelines justifying retraction: misconduct or error leading to unreliable findings; redundant publication, plagiarism, unethical research⁶. Retraction is reserved for extreme cases of scientific misconduct or findings so wrong as to be misleading⁷ - neither applies here. The publishers also undermined the requirement that the editor “should always have the final decisions about retracting material.”⁸ The guidelines also envisage retraction a last resort after all other efforts have failed.⁹ A sudden unilateral, unexplained decision by the Publisher is incompatible with the guidelines.
 - iii. COPE guidelines for publishers indicate that “publishers should work with journal editors to... publish corrections, clarifications, and retractions.”¹⁰ The Publisher failed to engage either the Editor-in-Chief or the Editorial Board.
3. The Publisher also indicated that a further “three publications accepted under Dr Egilman’s tenure for publication, have been flagged up as raising potential concerns.” COPE Guidelines state clearly that a new editor “should not overturn decisions to publish submissions made by the previous editor unless serious problems are identified.”¹¹ No such evidence has been provided. It appears that the Publisher, with or without the involvement of the new Editor-in-Chief, is acting in disregard of this guideline.
 4. The Publisher implied that legal/libel issues are at stake in the “flagged” papers but declined to disclose even the identities of the papers to the Editorial Board, even confidentially. This violates the guidelines that editors should “champion freedom of expression¹²,” “preclude business needs from compromising intellectual standards¹³” and “maintain the integrity of the academic record¹⁴”.
 5. The Publisher also confirmed they wish to reposition the journal (called a ‘change of tack’), which they already started doing without informing, or consulting the Editorial Board. This

² Code of Conduct and Best Practice Guideline for Journal Editors: 3.3

³ Code of Conduct and Best Practice Guideline for Journal Editors: 6.2

⁴ Code of Conduct and Best Practice Guideline for Journal Editors: 6.1

⁵ See Retraction Guidelines – bullet 7 under “notices of retraction”

⁶ See Retraction Guidelines – bullets 1 to 4 in the first paragraph under “Journal editors should consider retracting a publication if...”

⁷ See Retraction Guidelines – third paragraph, page 3.

⁸ See Retraction Guidelines – first paragraph, page 4.

⁹ Code of Conduct and Best Practice Guideline for Journal Editors: 11.4 and 11.5

¹⁰ Code of Conduct for Journal Publishers: page 1, bullet 7

¹¹ Code of Conduct and Best Practice Guideline for Journal Editors: 3.3

¹² COPE Code of Conduct, 2008; General duties and responsibilities of editors: bullet 4

¹³ COPE Code of Conduct, 2008; General duties and responsibilities of editors: bullet 6

¹⁴ COPE Code of Conduct, 2008; General duties and responsibilities of editors: bullet 5

disregards COPE's guidelines which identifies the need to keep editorial board members "updated on new policies" and recommends as best practice "consulting editorial board members periodically ... to gauge their opinions about the running of the journal, informing them of any changes to journal policies..."¹⁵

As of October 22, 2017, the IJOEH Editorial Board confirmed that COPE had not received a response from T&F about the complaint.

Conclusion

This struggle reflects a growing phenomenon in scientific publication –the ascendancy of corporate interests over independent science in the public interest.

T&F wrote to the IJOEH Editorial Board that it has no intention of reappointing Dr. Egilman as Editor-in-Chief. T&F also states that it plans to consider withdrawing other articles reviewed and accepted under the tenure of Dr. Egilman as Editor-in-Chief. The dismissive attitude given to the concerns of the Editorial Board reflect that the publisher does not care if the Editorial Board approves or disapproves of its actions.

Proposal

Members of the IJOEH Editorial Board are in agreement that the National Library of Medicine rescind the listing under Medline of IJOEH. The IJOEH now published by Taylor & Francis is not the journal previously approved to be indexed by MEDLINE. The new publisher should be required to reapply to be included in the List of Journals Indexed for MEDLINE as did Hanley & Belfus, Inc. when IJOEH was founded. While the National Library of Medicine reviews the IJOEH application, the post-2016 issues of the journal should not be included in Medline. In this way, T&F will be held accountable for their publication policies, many of which are inconsistent with COPE Guidelines. Failure to require T&F to reapply for Medline listing will result in the further corporatization of medical journals, in this instance by the acquisition of an independent journal whose unbiased contribution to the National Library of Medicine will be sorely missed.

¹⁵ Code of Conduct and Best Practice Guideline for Journal Editors: 5.1, bullet 4

Current IJOEH Editorial Board members

Aurora Aragon aurora.aragon@cm.unanleon.edu.ni
Arthur Frank arthur.l.frank@drexel.edu
Bhaswati Ganguli bgstat@gmail.com
Morris Greenberg morrisgreenberg1@gmail.com
Fu Hua hfu@shmu.edu.cn
James Huff huff1@niehs.nih.gov
Tushar Kant Joshi kantjoshi@gmail.com
Barry S. Levy blevy@igc.org
Leslie London leslie.london@uct.ac.za
David Madigan david.madigan@columbia.edu
Jock McCulloch jock.mcculloch@rmit.edu.au
Rene Mendes rene.mendes@uol.com.br
Iman Nuwayhid nuwayhid@aub.edu.lb
Domyung Paek paekdm@snu.ac.kr
Alison Reid alison.reid@curtin.edu.au
Ellen Rosskam ellenrosskam@gmail.com
Vilma Sousa Santana vilma_santana50@hotmail.com
Ken Takahashi ken.takahashi@sydney.edu.au
Jukka Takala jukka_takala@wshi.gov.sg
Benedetto Terracini benedetto.terracini@fastwebnet.it
Andrew Watterson a.e.watterson@stir.ac.uk
David Wegman david_wegman@uml.edu

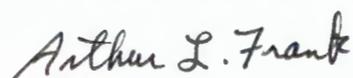
Past IJOEH Editorial Board members

Barry Castleman barry.castleman@gmail.com
Thomas Gassert tomgassert@gmail.com
Peter Infante pinfante@starpower.net
Rob McConnell rmcconne@hsc.usc.edu
Ron Melnick ron.melnick@gmail.com
Daniel Teitelbaum toxdoc@ix.netcom.com
Jung-Der Wang jdwang121@gmail.com
Catharina Wesseling inekewesseling@gmail.com

Founding Editor-in-Chief

Joseph LaDou drjoeladou@gmail.com

For the above signatories,



Arthur L. Frank, MD, PhD

Attachments

Letter from Editorial Board to T&F Managing Editor, February 11, 2017

Letter from Editorial Board to T&F CEO, April 26, 2017

Letter to Editorial Board from Andrew Maier, May 5, 2017

Letter to Editorial Board from T&F Executive Bannerman, May 8, 2017

Letter from Editorial Board to T&F Managing Editor, May 15, 2017

Letter to Editorial Board from T&F Managing Editor, May 25, 2017

The Bakelite™ paper, Egilman DS, IJOEH, 2016;22:18-26

Letter to IJOEH Publisher, Taylor & Francis

We are writing to inquire about the internet posting of a change of editor-in chief for IJOEH, from Dr. David Egilman to Dr. Andrew Maier. This change occurred with no notice to or involvement of the Editorial Board. As present and past members of the Editorial Board, we are writing to express our concerns and inquire about the process followed.

The International Journal of Occupational and Environmental Health has been a leading journal where scientific issues could be presented, free from corporate influence and control, as frequently was the case in other journals before IJOEH started in 1995 and continues to be. It had always been the view of prior editors Joseph LaDou and David Egilman that the free and open reporting of science be a guiding principle of this journal.

The newly-listed editor works for a corporate consulting firm, TERA, which developed as part of a growing industry of scientific consultants publishing what have come to be called "product defense" articles in scientific journals. The business model of such consultants is to derive their primary income from corporations and corporate trade groups seeking to create and support their defenses against the costs of regulation and liability. This is not in keeping with the spirit of this journal which so many around the world have come to respect.

A measure of what such a change in IJOEH editors would mean is indicated by the contrast between occupational exposure limits recommended for diacetyl by Dr. Maier (Reg. Tox. Pharmacol. 58: 285-296, 2010) and by Dr. Egilman (IJOEH 17: 122-134, 2011 and 20: 4-8, 2014). Diacetyl is a flavoring chemical used in microwave popcorn that caused devastating lung damage to workers. Dr. Maier and his co-workers at TERA recommended a limit of 200 parts per billion in air, based on a study in which 15 mice were exposed up to 30 hours/week for 12 weeks. Dr. Egilman and co-workers criticized TERA for discarding epidemiologic data and recommended 1 ppb or less in their analysis including extensive human data. The National Institute for Occupational Safety and Health recommended a limit of 5 parts per billion in air. The American Conference of Governmental Industrial Hygienists recommended 10 ppb. Egilman et al. also included significant information revealed in litigation from Con-Agra, the corporate sponsor of the TERA report, while of course acknowledging Dr. Egilman's involvement in that litigation.

We have the following three requests:

1. Please describe to us the process that you followed in selecting Dr. Maier.
2. Please confirm that all manuscripts that were accepted for publication when Dr. Egilman was editor will be published, in the form in which they were accepted, in the near future.
3. Please offer assurance to us and to IJOEH readers around the world that the journal will continue to be free from corporate influence.

Signers: IJOEH Editorial Board

Arthur Frank	arthur.l.frank@drexel.edu
Morris Greenberg	morrisgreenberg1@gmail.com
James Huff	huff1@niehs.nih.gov
Tushar Kant Joshi	kantjoshi@gmail.com
Barry S. Levy	blevy@igc.org
Leslie London	leslie.london@uct.ac.za
David Madigan	david.madigan@columbia.edu
Jock McCulloch	jock.mcculloch@rmit.edu.au
Rene Mendes	rene.mendes@uol.com.br
Iman Nuwayhid	nuwayhid@aub.edu.lb
Domyung Paek	paekdm@snu.ac.kr
Alison Reid	alison.reid@curtin.edu.au
Ellen Rosskam	ellenrosskam@gmail.com
Vilma Susa Santana	vilma_santana50@hotmail.com
Sara Shuman	sshumans@gmail.com
Ken Takahashi	ktaka@med.uoeh-u.ac.jp
Jukka Takala	jukka_takala@wshi.gov.sg
Benedetto Terracini	benedetto.terracini@fastwebnet.it
Andrew Watterson	a.e.watterson@stir.ac.uk
David Wegman	david_wegman@uml.edu

Signers: Past Members IJOEH Editorial Board

Barry Castleman	barry.castleman@gmail.com
Thomas Gassert	tomgassert@gmail.com
Peter Infante	pinfante@starpower.net
Rob McConnell	rmcconne@hsc.usc.edu
Ron Melnick	ron.melnick@gmail.com
Daniel Teitelbaum	toxdoc@ix.netcom.com
Jung-Der Wang	jdwang121@gmail.com
Catherina Wesseling	inekewesseling@gmail.com

February 8, 2017

[e-mailed to Andrew Kelly at T&F on Feb. 11, 2017 by Andrew Watterson for IJOEH editor signatories]

April 26, 2017

Dear Mr. Horton,

We are all current and several former members of the Editorial Board of the *International Journal of Occupational and Environmental Health* (IJOEH), a journal Taylor & Francis (T&F) acquired in taking over the former publisher, Maney, in 2015.

We have expressed grave concerns about several matters to Dr. Andrew Kelly at T&F in the past several months. As we have received no answers, we are writing to you now with some urgency about questions central to the scientific integrity of this journal. IJOEH has stood in a class by itself in publishing critical analyses and challenges of improper corporate influence on the standards of practice and scientific literature in our field.

Originally, we raised serious concern that the Editorial Board was never consulted or informed by T&F about the change of editors, replacing Dr. David Egilman with corporate consultant Dr. Andrew Maier. We wrote to the publisher on February 11 requesting to know the process and justification for changing editors of a scientific journal without involving the Editorial Board. We also asked for assurance that all the new, reviewed and already-accepted papers would soon be published in the journal.

We illustrated our concern over the change of editors with the example of diacetyl:

“A measure of what such a change in IJOEH editors would mean is indicated by the contrast between occupational exposure limits recommended for diacetyl by Dr. Maier (Reg. Tox. Pharmacol. 58: 285-296, 2010) and by Dr. Egilman (IJOEH 17: 122-134, 2011 and 20: 4-8, 2014). Diacetyl is a flavoring chemical used in microwave popcorn that caused devastating lung damage to workers. Dr. Maier and his co-workers at [corporate consulting firm] TERA recommended a limit of 200 parts per billion in air, based on a study in which 15 mice were exposed up to 30 hours/week for 12 weeks. Dr. Egilman and co-workers criticized the TERA authors for discarding epidemiologic data and recommended 1 ppb or less in their analysis including extensive human data. The National Institute for Occupational Safety and Health recommended a limit of 5 parts per billion in air. The American Conference of Governmental Industrial Hygienists recommended 10 ppb. Egilman et al. also included significant information revealed in litigation from Con-Agra, the corporate sponsor of the TERA report, while of course acknowledging Dr. Egilman’s involvement in that

litigation.”

This month, T&F sent Dr. Egilman a “Withdrawal Statement” about a paper he had published in IJOEH in 2016 (“The production of corporate research to manufacture doubt about the health hazards of products: an overview of the Exponent Bakelite simulation study”). T&F stated, without any explanation, “This content has been removed by the publishers.” As most of the members of Editorial Board and several past members, we asked T&F to tell us what had happened, as no Editorial Board members were consulted or informed about the decision taken by the publisher.

We closed our message of April 13, asking about papers slated by T&F to be withdrawn/retracted, saying: “The concerns we raise relate to a desire to ensure the credibility and reputation of IJOEH both as a journal that publishes independent research free of corporate influence and one that is run efficiently and in line with good academic and scientific practice.”

We wish to see the following actions taken:

1. The contract with Dr. Egilman as IJOEH editor will be renewed or the Editorial Board authorized to choose his successor as Editor-in-Chief.
2. All already-accepted papers will be published promptly.
3. Taylor & Francis will recognize that the Editorial Board shares full responsibility with the Journal Editor, and as such must be party to any decision to retract published papers, and that only after accepted procedures for scientific journals are followed.
4. T&F will agree that any decisions to add or drop members of the Editorial Board will be made by the Editor-in-Chief and the Editorial Board, not by the publishing company.

We look forward to receiving your response.

Sincerely,

Andrew Watterson on behalf of those listed below.

Other current IJOEH Editorial Board members

Aurora Aragon aurora.aragon@cm.unanleon.edu.ni
Arthur Frank arthur.l.frank@drexel.edu
Bhaswati Ganguli bgstat@gmail.com
Morris Greenberg morrisgreenberg1@gmail.com

Fu Hua hfu@shmu.edu.cn
James Huff huff1@niehs.nih.gov
Tushar Kant Joshi kantjoshi@gmail.com
Barry S. Levy blevy@igc.org
Leslie London leslie.london@uct.ac.za
David Madigan david.madigan@columbia.edu
Jock McCulloch jock.mcculloch@rmit.edu.au
Rene Mendes rene.mendes@uol.com.br
Iman Nuwayhid nuwayhid@aub.edu.lb
Domyung Paek paekdm@snu.ac.kr
Alison Reid alison.reid@curtin.edu.au
Ellen Rosskam ellenrosskam@gmail.com
Vilma Sousa Santana vilma_santana50@hotmail.com
Ken Takahashi ken.takahashi@sydney.edu.au
Jukka Takala jukka_takala@wshi.gov.sg
Benedetto Terracini benedetto.terracini@fastwebnet.it
Andrew Watterson a.e.watterson@stir.ac.uk
David Wegman david_wegman@uml.edu

Past IJOEH Editorial Board members

Barry Castleman barry.castleman@gmail.com
Thomas Gassert tomgassert@gmail.com
Peter Infante pinfante@starpower.net
Rob McConnell rmcconne@hsc.usc.edu
Ron Melnick ron.melnick@gmail.com
Daniel Teitelbaum toxdoc@ix.netcom.com
Jung-Der Wang jdwang121@gmail.com
Catharina Wesseling inekewesseling@gmail.com

Founding Editor-in-Chief

Joseph LaDou drjoeladou@gmail.com

May 5, 2017

Dear Editorial Board Colleagues,

I sincerely appreciate your deep interest in our journal. I believe the mission and scientific content of the journal provides an important contribution to the current landscape of occupational and environmental health literature. It is because of my interest in the mission and scope of the journal that I accepted the assignment as Editor-in-Chief after being approached by Taylor & Francis. I was not involved in the candidate selection or review process so questions about that would need to be directed to Taylor & Francis, who I understand will be writing to you separately.

I recognize there have been questions raised about my background and scientific perspectives and the alignment of those perspectives with IJOEH. Briefly, the bulk of my professional science career has been in developing solutions to chemical risk assessment questions where guidance was not available to risk managers. In particular, this has taken the form of developing exposure and risk assessment tools and guidance for unstudied chemicals or scenarios. Several notable examples include:

- Working with NIOSH to update the methodology and guidance for setting Immediately Dangerous to Life or Health (IDLH) values. These values provide guidance for emergency response and selection of respiratory protection.
- Participating in a volunteer expert group initiated in 2010 and now led by NIOSH to develop approaches for addressing cumulative risks to chemical and non-chemical stressors in the workplace. The effort is ongoing but an upcoming article in the AIHA Synergist will describe some of my thinking in this area and the need to act now to address such considerations.
- Working with a volunteer expert group developing a hierarchy of tools for chemicals that lack authoritative occupational exposure limits (OELs). This effort began in 2011 via a volunteer group and has culminated in work with NIOSH on a proposed occupational exposure banding method (currently out for external review) and numerous continuing education courses offered through professional organizations.
- Serving as a prior Chair and current Publications Coordinator for the Workplace Environmental Exposure Level (WEEL) Committee. The Committee sets OELs for chemicals that do not have values published by other groups (e.g. ACGIH, SCOEL).

Questions were specifically raised about my research portfolio and interactions with industry affiliated groups. Here are some relevant facts regarding the balance of my work.



- I am a full-time Associate Professor in the Department of Environmental Health of the University of Cincinnati and draw a salary as my only source of professional income and do not have a separate LLC or consulting enterprise.
- By far the vast majority of my salary funding is provided by the University for teaching (4 graduate level academic courses) and by federal agencies (NIOSH and Health Canada, etc.).
- A balance of government and industry sources funds my other research contracts. These contracts represent the minority of my overall salary coverage. One of the most notable of these relates to the Hanford Washington DOE site – where I coauthored a report supporting worker perspectives on chemical related exposures.
- I have worked on a total of two legal cases as an expert – one as an expert for the defense (supporting the notion that diverse stakeholder scientists can work together) and one as an expert for the plaintiffs (on behalf of a group of local community citizens claiming health effects from an industrial emission source).
- Overall, more than 80% of my funding comes from University internal resources or government funds.

Concern about my scientific position regarding the butter flavor chemical diacetyl was also noted as a concern. This chemical presents an important and relevant occupational hazard. At the time of my original work on the topic no published OEL existed to guide worker protection, thus I felt it important to take on the task to develop an assessment to help occupational risk managers. The exposure limit I published in 2010 based on the science at the time presented a range from 70 to 200 ppb. The data were carefully considered regarding findings in animal inhalation toxicology, epidemiology, and effects (or their absence) from common background exposures. Because ensuring worker protection is the top priority, I always keep in mind in the hundreds of assessments I have developed whether I would be comfortable for my own family members to work under such a limit value. I invite the board members to read the peer review manuscript that describes the basis for the 2010 recommendation. Since 2010, subsequent analyses published by various organizations include OEL values of 5 ppb from NIOSH, 10 ppb from ACGIH, and 20 ppb from SCOEL. The difference in my 2010 assessment and these later assessments primarily reflects the level of weight placed on the animal toxicology studies (high confidence in the dose but uncertainty in extrapolation to humans) versus the epidemiology data (low confidence on exposure estimates at the time but clear human relevance). The suggestion that my work is viewed as not scientifically credible is not supported by my ongoing relationship with NIOSH over the period 2010 to the present. I continue to work directly with (i.e. being employed as an Interagency Personnel Agreement Fellow) for the very same individuals at NIOSH that authored the NIOSH diacetyl assessment. This Fellowship has been renewed annually. This ongoing close relationship with NIOSH and my funding portfolio does not suggest that government parties find my work lacks scientific credibility.

As for the future I do not suggest any major changes in mission or scope of the journal. The same types of scientific articles should continue to find a home in IJOEH. We are getting a good stream of submissions so it is also possible we can increase the publication rate. I will need an active Editorial Board to maintain the pace of reviews. I do plan to make some changes in sections devoted to perspectives articles. I believe the journal should focus on presenting original science and educating on current issues in science. With regard to the latter goal, we will still plan to publish perspectives, but when we do publish them there will be invitations to individuals

with diverse views on the topic. The publication of alternative perspectives will enhance education and communication on the state of the science and scientific uncertainties that lead to diverse opinions. This balanced approach should allow readers to make their own informed judgments. I will also be seeking to increase special issues or critical reviews that highlight opportunities to harmonize or extend methods in our fields. As an example, I was the co-organizer of a special issue on OEL methods published in December 2015 by the Journal of Occupational and Environmental Hygiene.

I also note that I have no involvement or decision authority on any manuscripts that were accepted or published prior to my tenure with IJOEH. Disposition regarding such older papers can be addressed by Taylor & Francis. I invite current members of the Editorial Board to retain their positions. However, given the changes outlined above I fully understand the need for any member to step away to other pursuits. I will need each member to contact me and copy the publisher's representative documenting their intent regarding maintaining their role on the board. I also am very happy to have a conversation with any of you to discuss these matters further.

I look forward to working with the group, both during this transitional period and beyond, in continuing to make the journal a success.

Sincerely,

Andrew Maier, PhD, CIH, DABT
Associate Professor of Environmental and Industrial Hygiene
University of Cincinnati

8th May 2017

Sent via email

Dear IJOEH Editorial Board

Please allow me to introduce myself as the Managing Director of Taylor & Francis Journals.

I am writing in response to your letters to Andrew Kelly dated 11 February 2017 and to Roger Horton dated 26 April 2017 regarding the transition in the editorship of the *International Journal of Occupational and Environmental Health (IJOEH)* from Dr David Egilman to Dr Andrew Maier.

We note the concerns you have raised. We understand that, in response to your February letter, Dr Maier proposed setting up a meeting with the Board to discuss his plans for the journal. We still believe that this would be a helpful and positive next step. Please let us know if you would like us to arrange this meeting, which I know Dr Maier is keen to attend, as are my team.

In the meantime, I set out below the background to the transition in editorship, which I hope will help to clarify our decision-making with respect to Dr Maier's appointment and the status of submitted manuscripts, and provide you with reassurance regarding the preservation of the integrity of the journal.

As you may be aware, Hamilton Hardy Publishing, of which Dr Egilman was President, sold its ownership of the journal to the Maney publishing company in 2011. Dr Egilman remained as Editor-in-Chief of the journal, under contract to Maney as the journal owner. Subsequently, Taylor & Francis acquired the Maney business in 2015, and with it ownership of *IJOEH*. Dr Egilman's term as Editor-in-Chief was due to expire on 31 December 2016 and, following a review of the journal, we decided not to renew his agreement. It is common practice in scientific journals to rotate journal editorships regularly and *IJOEH* is no exception to this.

The responsibility for selecting and appointing an Editor-in-Chief lies with Taylor & Francis as the owner of the journal.



Taylor & Francis
Taylor & Francis Group

When looking to appoint a new Editor-in-Chief for one of our journals, we may advertise the post. Alternatively, or in addition, we will often seek advice on potential candidates from more senior members of an Editorial Board, as well as advice from other contacts in the field. However, consultation with the whole Editorial Board would be unusual. We would hold at least one interview with any prospective new Editor-in-Chief, before any appointment is made, to discuss the candidate's vision for the journal.

In this particular situation, we reached out to a number of people we know in the field to seek advice, including Dr Jukka Takala from the IJOEH Editorial Board via email and telephone. We were especially keen to solicit his views as a president and past president of two large associations in the area.

On the basis of advice received and our own research, we contacted Dr Maier. We reviewed his CV and held several telephone calls with him to discuss his plans for the journal and how we might position the journal to cover the multiple perspectives of this diverse area with an impartial and evidence-based approach. We felt satisfied that he had the right experience and vision for the role.

Now in post, Dr Maier is working to ensure articles submitted to the journal are peer reviewed as soon as possible and would appreciate help from the Editorial Board in expediting that. As you can see on Taylor & Francis Online, articles that were accepted under the editorship of Dr Egilman continue to be published in the form in which they were accepted.

Three articles accepted for publication under Dr Egilman's tenure have been flagged up as raising potential concerns. We are currently investigating these as a matter of urgency and expect to proceed with publication or confirm an alternative course of action with those authors shortly. As you will be aware, we have also recently withdrawn a fourth article that was inadvertently published before the review process was completed, and was subsequently decided to be unsuitable for publication.

Taylor & Francis works in partnership with Editors-in-Chief to ensure the academic success and prosperity of the journals we publish: this includes upholding our guidance on the ethics of journal publishing. Where any sensitive, ethical questions arise, our relationships with our Editors and Editorial Boards are usually sufficiently close that we would work on any such

2&4 Park Square Milton Park Abingdon OX14 4RN UK
Tel: +44 (0) 20 7017 6000 Fax: +44 (0) 20 7017 6336
www.tandf.co.uk

Informa plc Registered in England and Wales Registered Number: 1072954
Registered Office: 5 Howick Place, London, SW1P 1WG

an informa business



Taylor & Francis

Taylor & Francis Group

issues together when they first arise, for example advising on how a paper should best be handled in peer review. The exception would lie in papers where there was a clear conflict of interest for the Editor or their Board such that independent advice might be necessary.

At Taylor & Francis, the Editors we work with have full authority to receive and invite submissions, undertake peer review and make decisions on acceptance and rejection, provided they uphold the highest ethical standards. As such, Dr Maier has the responsibility for making the final decision on an article's acceptance, mindful of publisher guidance where ethical or legal considerations arise.

In common with other journals owned by Taylor & Francis, the appointment of the Editorial Board and the editorial policy for the journal is led by Dr Maier as Editor-in-Chief in conjunction with ourselves, with Taylor & Francis retaining oversight and the right of final approval.

Dr Maier's obligations as Editor-in-Chief are outlined in a formal contract between himself and Taylor & Francis, and as such his role encompasses a higher level of responsibility than that of members of the Editorial Board.

By adopting this approach, we can ensure the highest standards of peer review, free from unethical practice, including outside influence from corporate or other sources, and in line with industry-standard guidance from the Committee of Publication Ethics (COPE).

I hope the above provides additional background for you and my team look forward to addressing any further queries in a forthcoming meeting with the Editorial Board.

Yours sincerely

Ian Bannerman

Managing Director
Taylor & Francis Journals

2&4 Park Square Milton Park Abingdon OX14 4RN UK
Tel: +44 (0) 20 7017 6000 Fax: +44 (0) 20 7017 6336
www.tandf.co.uk

Informa plc Registered in England and Wales Registered Number: 1072954
Registered Office: 5 Howick Place, London, SW1P 1WG

an informa business

Ian Bannerman, Managing Director, Taylor and Francis Journals

May 15th 2017

Dear Mr Bannerman,

We are in receipt of your letter dated May 8, 2017 regarding the International Journal of Occupational and Environmental Health (IJOEH). Your response, we are sad to say, leaves us in a continued quandary. The letter fails to answer the many questions we raised in our letters to both Dr Andrew Kelly of February 11, and Mr Roger Horton of April 26, 2017.

We still do not know the reason for the selection of the new Editor-in-Chief of IJOEH. Moreover, we do not understand why the Editorial Board was not included in the selection process. The method of appointment of a new Editor-in-Chief by Taylor & Francis is unprecedented. None of the members of the Editorial Board were consulted about the selection of a new Editor-in-Chief, including Dr. Jukka Takala. The criteria used in the selection of the new Editor-in-Chief would not likely have been accepted by the Editorial Board in view of the selection made by Taylor & Francis.

Your letter confirms that one published article is being withdrawn and informs us for the first time that Taylor & Francis is reviewing three more (presumably accepted but not yet published) articles 'of concern'. This appears to contradict your statement that "articles accepted under the editorship of Dr. Egilman continue to be published in the form in which they were accepted." We are concerned that the 'concerns' of Taylor & Francis about these three papers reflect a change to the editorial freedom of the journal.

The withdrawal of published and accepted papers by Taylor & Francis is an extreme measure. Suppression of an accepted paper is a direct assault on academic freedom. It should have entailed careful review by the Editor-in-Chief together with the Editorial Board. Moreover, it might require further consideration of peer reviewers, and warrant the journal's issuance of official corrections. The unilateral actions by Taylor & Francis are inconsistent with the Committee on Publication Ethics (COPE) Code of Conduct for Journal Publishers.

The IJOEH Editorial Board would appreciate your consideration of our position. We want to know:

- 1) The reasons for the appointment of the new Editor-in-Chief of IJOEH.
- 2) The process and criteria for the selection of the new Editor-in-Chief of IJOEH.
- 3) The Taylor & Francis intentions regarding repositioning of the journal.
- 4) The targets and process of unprecedented, post hoc actions by Taylor & Francis to withdraw a published paper and interfere with the publication of three other papers apparently accepted for publication after full peer review.
- 5) Please identify those three articles. What are your concerns about each of them, how and by whom were the concerns raised, how are they being evaluated by Taylor & Francis, and do you plan to have the Editorial Board play a role in resolving these concerns?
- 6) What are your concerns about the Bakelite paper published in 2016 that Taylor & Francis recently decided to withdraw, how and by whom were those concerns raised, how were they evaluated by Taylor & Francis, and how do you justify the exclusion of the Editorial Board from the process ending in withdrawal?
- 7) Is Taylor & Francis willing to reconsider the selection of the new Editor-in-Chief, and will it support the continued participation of the IJOEH Editorial Board?

We are concerned that Taylor & Francis will not safeguard the integrity of IJOEH, a journal that has provided a strong historical emphasis countering the widespread corporate influence on research and publication. We find some of the contents of your letter threatening to the light of truth that IJOEH has been throughout its history.

We may be interested in having a video conference after we receive written answers to our questions.

Yours sincerely,

IJOEH current and past board members listed below

Current IJOEH editorial board members

Arthur Frank	arthur.l.frank@drexel.edu
Morris Greenberg	morrisgreenberg1@gmail.com
James Huff	huff1@niehs.nih.gov
Tushar Kant Joshi	kantjoshi@gmail.com
Barry S. Levy	blevy@igc.org
Leslie London	leslie.london@uct.ac.za
David Madigan	david.madigan@columbia.edu
Jock McCulloch	jock.mcculloch@rmit.edu.au
Rene Mendes	rene.mendes@uol.com.br
Iman Nuwayhid	nuwayhid@aub.edu.lb
Domyung Paek	paekdm@snu.ac.kr
Alison Reid	alison.reid@curtin.edu.au
Ellen Rosskam	ellenrosskam@gmail.com
Vilma S Santana	vilma_santana50@hotmail.com
Ken Takahashi	ken.takahashi@sydney.edu.au
Jukka Takala	jukka_takala@wshi.gov.sg
Benedetto Terracini	benedetto.terracini@fastwebnet.it
Andrew Watterson	a.e.watterson@stir.ac.uk
David Wegman	david_wegman@uml.edu

Past IJOEH Editorial Board members

Barry Castleman	barry.castleman@gmail.com
Thomas Gassert	tomgassert@gmail.com
Peter Infante	pinfante@starpower.net
Rob McConnell	rmconne@hsc.usc.edu
Ron Melnick	ron.melnick@gmail.com
Daniel Teitelbaum	toxdoc@ix.netcom.com
Jung-Der Wang	jdwang121@gmail.com
Catharina Wesseling	inekewesseling@gmail.com

Founding Editor-in-Chief

Joseph LaDou	drjoeladou@gmail.com
--------------	----------------------



Taylor & Francis

Taylor & Francis Group

25th May 2017

Sent via email

Dear *JOEH* Current and Past Editorial Board members,

Thank you for your letter dated 15th May 2017.

I appreciate that you still have questions and concerns about the journal. I sincerely hope that you will take up the offer of a meeting or video conference with my team and Dr Maier soon to talk these matters through. As we are beginning a new relationship with you all and a new chapter in the journal's history, we would value being able to discuss any concerns directly with you as a dialogue and in a more immediate way than we can through written correspondence.

In the meantime, in response to your requests, I have provided more information below on the specific questions you raise. I hope this will help us all move on with the important matter at hand – the smooth running and future success of the journal itself. To be clear, we would very much like to continue to work with the current Editorial Board on the journal, so we can make *JOEH* the best it can be.

You ask about the reasons for the appointment of the new Editor-in-Chief, and about our intentions regarding repositioning the journal, which I will answer together. When we acquired the journal from Maney in 2015, we reviewed the journal and felt it was an opportune time to put in place long-term plans and goals for the journal's future development, including improvements to boost citation levels and rapidity of publication. We hoped to work closely with the incoming Editor in order to maximise the online readership over the coming years and confirm the journal as a high-quality outlet that meets the needs of researchers around the world.

Our aims are for the journal to put scientific research at the centre of academic discussion in this important subject area. We believe in taking a rigorous approach to peer review, enabling us to publish the best original international research (alongside balanced constructive discussion pieces where appropriate) in order to move the discipline forward and for the benefit of society at large. We do not see this as 'repositioning' the journal as such, but we do see it as a change of tack - putting in place long-term plans and goals for the journal's future development, enhanced by our expertise in marketing, online publishing, and bibliometric analysis.

You also ask about the process and criteria for selecting the new Editor-in-Chief. As I explained in our previous correspondence, we spoke to a number of contacts in the field to seek advice on the appointment of a new Editor-in-Chief and opportunities for the journal in general. One of those was Dr Jukka Takala, whom we first emailed on 11th March 2016 and whom my colleagues Andrew Kelly and Matthew Cannon subsequently spoke to by telephone on 14th March 2016. They spoke about the recent history of the journal and Dr Takala's views on opportunities for the future. They did not speak specifically about Dr Maier, as his name had not been suggested to us at that stage (and, for the avoidance of doubt, my previous letter did not say that Dr Maier was discussed).

In terms of our criteria for selecting the new Editor-in-Chief, our main criteria were finding someone whose vision for the journal matched the aims outlined above, who was willing to work

2&4 Park Square Milton Park Abingdon OX14 4RN UK

Tel: +44 (0) 20 7017 6000 Fax: +44 (0) 20 7017 6336

www.tandf.co.uk

Informa plc Registered in England and Wales Registered Number: 1072954
Registered Office: 5 Howick Place, London, SW1P 1WG

an informa business



Taylor & Francis

Taylor & Francis Group

collaboratively with us and who would uphold the highest ethical standards on peer review. It was not, nor would ever be, a criterion to find someone who represented a particular corporate perspective, whether pro- or anti-. All our journal editors have editorial independence and are expected to bring a balanced approach, grounded in their expertise within the field. I wish to reiterate that this was not a factor in our selection process.

You ask several questions about the three papers that are currently being reviewed. As I hope you will appreciate, we need to be mindful of the relevant authors on this issue, especially given that our previous correspondence to you has been distributed to the media. We are therefore not able to set out any further details here or to identify the authors of the three articles that have been flagged up as raising potential concerns. As I said previously, these three articles are being investigated as a matter of urgency and we expect to proceed with publication or confirm an alternative course of action directly with those authors shortly.

In terms of the role of the Editorial Board where an article has been flagged up as a potential concern (for example, because of potential libel or other legal issues), it is standard practice for the publisher to review the article in question with the Editor-in-Chief of the journal, unless a conflict of interest makes that impossible. We would also commonly consult with a specific member of the Editorial Board where that Board member has relevant subject area expertise or handled the reviews for that article. Otherwise, we would not ordinarily consult with the Editorial Board regarding such an article.

You also ask questions about the withdrawn paper. Withdrawing published articles is not unprecedented although it is rare. It is not a step we take lightly but we can and do take action in the exceptional circumstances where an article is found to have been unfit for publication at later stage. COPE is an advisory body, and we follow their guidelines, but it is the publisher's responsibility to take the most appropriate action in each particular circumstance, and that is what we have done here.

You ask if we are willing to reconsider the selection of the new Editor-in-Chief and support the continued participation of the Editorial Board. Dr Maier has been appointed, and contracted, to edit the journal and that will not be reconsidered, although the post holder for the Editor role on *IJOEH* may change in future years as part of the natural cycle of the journal. We would welcome the continued participation of the current Editorial Board in the journal, in your role in peer reviewing and assessing the scientific merit of papers submitted for publication, as well as in supporting Dr Maier in the journal's development.

Yours sincerely,

Ian Bannerman

Managing Director

Taylor & Francis Journals

2&4 Park Square Milton Park Abingdon OX14 4RN UK

Tel: +44 (0) 20 7017 6000 Fax: +44 (0) 20 7017 6336

www.tandf.co.uk

Informa plc Registered in England and Wales Registered Number: 1072954
Registered Office: 5 Howick Place, London, SW1P 1WG

an informa business

The production of corporate research to manufacture doubt about the health hazards of products: an overview of the Exponent Bakelite™ simulation study

David S. Egilman 

Department of Family Medicine, Brown University, Providence RI, USA

Although corporate sponsorship of research does not necessarily lead to biased results, in some industries it has resulted in the publication of inaccurate and misleading information. Some companies have hired scientific consulting firms to retrospectively calculate exposures to products that are no longer manufactured or sold. As an example, this paper reviews one such study – a litigation-engendered study of Union Carbide Corporation's asbestos-containing product, Bakelite™. This analysis is based on previously secret documents produced as a result of litigation. The study published asbestos fiber exposure measurements that underestimated actual exposures to create doubt about the hazards associated with the manufacture and manipulation of Bakelite™.

Keywords: Bakelite, Corruption, Asbestos, Dose reconstruction, Fraud

Introduction

Corporate sponsorship of research does not necessarily lead to inaccurate findings. On the other hand, corporate sponsorship may result in the publication of false or misleading evidence that supports corporate economic interests. A body of corporate research has been generated in an effort to reduce liability in toxic tort litigation.¹ Historic dose reconstructions have been used to estimate exposures to occupational and other groups to estimate a range of potential exposures in an effort to determine dose–response relationships. In defending themselves in tort suits due to asbestos exposure, some companies have attempted to apply dose reconstructions to estimate individual plaintiff's historic exposures. Asbestos companies – or their lawyers – have hired experts to reconstruct historic exposures to asbestos-containing products that are no longer manufactured or sold to claim that these exposures were either in compliance with contemporaneous standards and/or too low to cause cancer.

Exponent, an engineering and scientific consulting firm, published a study that purported to reformulate Union Carbide Corporation's Bakelite™, and characterized exposures to this asbestos-containing plastic molding compound.² After manufacturing Bakelite™ powder “based on historical formulation information,” Exponent molded and manipulated small “plaques” of this material (4 inches by 6 inches by .23 inches).³ Exponent claimed

that the exposures produced by these plaques in laboratory simulations were representative of worker exposures to asbestos during manipulation of finished products made from Bakelite™.² The studies were conducted to assist UCC's lawyers in defending against legal cases where workers who had contracted mesothelioma after exposure to dust from Bakelite™-molding compounds or finished Bakelite™ products had sued the company for compensation. In their published paper, Exponent authors Mowat, Bono, Lee, Tamburello, and Paustenbach failed to cite more detailed results that they had provided the lawyer funders.^{2–4}

This paper critically reviews the litigation-generated study of Bakelite™. The arbitrary methodology Exponent used incorrectly minimized asbestos exposures from Bakelite™ and created doubt about the hazards associated with this product. Specifically, this paper reviews measures that Exponent took that gives the false impression that asbestos exposures to Bakelite™ “would not, under any reasonably plausible scenario, be expected to produce airborne concentrations of asbestos above historical or current 8-h TWA occupational exposure limits.” (.1 f/cc) In fact, UCC's actual contemporaneous exposure estimates were much higher than these levels.

Part I: Dose reconstruction studies Legal background

In 1993, the United States Supreme Court provided guidance regarding the admissibility of scientific evidence.⁵

Correspondence to: David S. Egilman, Department of Family Medicine, Brown University, 8 North Main Street Attleboro, MA 02703, USA. Email: degilman@egilman.com

The Court defined “scientific methodology” and provided a framework for trial judge decision-making to determine “validity” of scientific testimony. The Court suggested, and many trial judges have adopted, five factors in evaluating whether or not a jury should decide whether a particular exposure caused or contributed to a particular disease:

- (1) Whether the theory or technique is falsifiable, refutable, and/or testable – a construct taken from Popper.
- (2) Whether it has been peer reviewed and published. The Appellate Court in *Daubert* itself relied heavily on a non-peer-reviewed polemic written by a lawyer who worked for the Manhattan Foundation.⁶
- (3) Whether the method has a known or potential error rate. This is not relevant for epidemiologic or animal studies since there is no way to evaluate the positive predictive value of a single or even many such studies.⁷
- (4) Whether the study had controls.
- (5) Whether, and the degree to which, a theory or technique is generally accepted by a relevant scientific community.

The courts have since determined that trial judges were required to act as gatekeepers to prevent “junk science” from entering the courtroom. As a result, judges have dismissed many cases by determining that juries should not even consider the scientific or other evidence. Prior to the *Daubert* and subsequent decisions, juries would have decided what weight to give this scientific evidence and would have made factual determinations of its reliability.

To capitalize on this decision, companies have funded research designed to undermine adverse scientific evidence and/or create a body of literature that supports their position that their product does not cause whatever disease plaintiffs or public health advocates allege.⁸ Dose reconstruction is a major tool companies use to retrospectively argue that exposures to their product were too low to be considered a cause of the disease or injury for which the plaintiff or her family is seeking compensation.

The role of scientific consulting firms

Scientific consulting firms have developed dose reconstruction studies and policy arguments as part of a legal defense strategy and not as a scientific endeavor. Exponent once described its business as follows:

Exponent serves clients in automotive, aviation, chemical, construction, energy, government, health, insurance, manufacturing, technology and other sectors of the economy. Many of our engagements are initiated by lawyers or insurance companies, whose clients anticipate, or are engaged in, litigation over an alleged failure of their products, equipment or services.⁷

The current Exponent website is less explicit:

Exponent is a leading engineering and scientific consulting firm providing solutions to complex technical problems. Our multidisciplinary team of scientists, physicians, engineers, and regulatory consultants will perform either in-depth scientific research and analysis, or very rapid-response evaluations, to provide our clients with the critical information that both day-to-day

and strategic decisions can require.ⁱⁱⁱ Our multidisciplinary organization of scientists, physicians, engineers, and regulatory consultants performs in-depth investigations in more than 90 technical disciplines. We analyze failures and accidents to determine their causes and to understand how to prevent them. We evaluate complex human health and environmental issues to find cost-effective solutions. / Our integrated approach offers a multifaceted perspective that leads to insight, revelation, and innovative solutions that produce bottom-line results. By introducing a new way of thinking about an existing situation, we assist clients to overcome seemingly insurmountable obstacles.^{iv}

ChemRisk, a similar type firm, has past advertised that its “scientists and engineers have served as technical advisors to lawyers in all aspects of environmental, occupational, toxic tort, and product liability litigation, including Technical strategy development, providing scientific advice, expert testimony, selection and preparation of expert witnesses, assistance in cross-examining opponent’s expert witnesses.” At the time, they claimed that:

A distinguishing characteristic of our legal support work is our emphasis on conducting original, field research which fills data gaps. This work is usually an essential component in resolving disputes involving chemical, or radiological agents. We have provided support to litigants in some of the most publicized and complex major toxic tort law suits including silicone breast implants, developmental toxicants, beryllium, hexavalent chromium, benzene, asbestos, brake dust, dioxin, various pesticides, and many others.^v

Now known as Cardno ChemRisk (since 2012), the company’s website states:

[...] The Cardno ChemRisk team has a long-standing reputation for thorough scientific analysis and project excellence, and many are sought-after advisors to the public and private sector. They drive new methodologies and stay at the forefront of current and emerging issues, enabling clients to make informed strategic decisions. Cardno ChemRisk professionals are deeply committed to collaboration as well, participating in many industry associations and panels, and publishing hundreds of papers that are frequently cited in both regulatory and litigation decision-making. Many Cardno ChemRisk professionals have participated on some of the most complex projects in the world, and have built international acclaim in specific areas of expertise, including more than 50 chemicals. [...]

Paustenbach, the President of ChemRisk, explained in a 2006 presentation promoting the company’s work why the Bakelite™ and other dose reconstruction studies are performed.^{vi} The presentation took place at a conference held by the Canadian Chrysotile Institute (formerly the Asbestos Institute)^{vii} to combat the European Union ban on asbestos-containing products and to assist companies in defending asbestos law suits filed by injured workers and their family members. Paustenbach used the opportunity to market his company’s “simulation studies” as a

method that companies could employ to defend lawsuits and block regulation:

I'm going to talk today about simulation studies. I believe that they are a very important component of litigation and regulatory affairs, as well as in dealing with epidemiology studies. I happen to believe that epidemiology studies can be done better than categorizing exposure as low, medium, or high. There's not a single product that I can think of in the last hundred years that can't be reproduced in exposures simulated in the past.

Paustenbach went on to describe the likely results:

To the best of my knowledge in litigation that was traditionally lost in the United States, I'm not aware of a single case that has been lost when a high-quality simulation study was done, and of course the exposures were considered de minimis. And in those cases where they're not, then you can expect not to do very well. But when you go into these studies, quite usually you will know roughly what the degree of exposure's going to be; it's intuitive. Sometimes you're surprised, but quite often you're not.

Of course, since the studies are performed for lawyers who represent corporations, unfavorable results do not have to be published or reported if non-testifying consultants performed them for the purpose of defending lawsuits.

He used the Bakelite™ simulation study as an example of how dose reconstruction could be used to cast doubt about the toxicity of an asbestos product. Paustenbach noted that the companies had failed to measure exposures before or during the time the products were actually in the stream of commerce: "If you didn't collect the data contemporaneously, I think it can be done today."

In the same lecture, Paustenbach explained the monetary value of simulation studies in defending lawsuits:

This is intuitive. It's says – it would – it's a shame to have to have spent, let's say, \$250,000 to do this study when it's really intuitive that there wouldn't be much exposure. But when there's – when it costs \$4 million in the United States to work up and take a case to trial, that's just the expenses. That's not the outcome. A 250,000 or 500,000 study is – is a drop in the bucket. So when you heard the term yesterday – remember, we turned down a settlement of a \$150 billion – that's with a B – \$150 billion to settle the – the litigation crisis yesterday that was mentioned in the United States – these kinds of \$250,000, \$500,000 investments go a long way. If you've got a hundred cases and it takes \$4 million for the lawyers and consultants to get ready for the case and to take it to trial, you can see this is a drop in the bucket. So when I hear people say, "we can't afford it," I don't understand.

He later went on, specifically in relation to Bakelite™:

It is not easily done. The study cost over a million dollars, to find the product, to remanufacture it, to press it, and then cut it and drill and take all the samples. It – it was a massive project. But, again, I – the – the – in spite of the fact it cost upwards – I don't know if it was over a million, but it was very expensive, and it may well

have approached a million. It – in potential benefit, it probably is going to save tens of millions of dollars in litigation costs, not settlements. So we reformulated it. We collected 150 personal and area samples by sawing, sanding, drilling, and cleaning up. Those are the three things that were alleged. That's the only three things, I think – or four things you can do with Bakelite™, and these are the results.

You'll see even when you band-saw it, which is the highest possible concentration, it's still much below the .1 value. We look at one hour of work, two hours of work, half an hour of work, and then we can – we can scale up to eight hours if we want to. So I usually like to do it over a span of time; and, of course, you hope that those relationships are nearly linear, and they often are. So you see quite clearly the difference between cleanup, sanding, drilling, et cetera. So the studies on Bakelite™ clearly show that the concentrations were very, very low. This does not even qualify – this doesn't even discuss the fact that the asbestos may not even pose a hazard when it's been soaked with a – with a resin and made into really a – a little piece of plastic fiber, rather, it may not have its asbestos characteristics anymore biologically. But that's another matter. We're just talking just about exposure...

... In short, then, I believe that you can reproduce any of these exposure scenarios of the past 50 years. It is expensive, but I think it's well worth it, and I think they should be published for the scientific community to understand your views. We've looked at these five – or four that I've talked about today – or seven, depending on how you count them. We found that the exposures are very low. You need to consider the frequency, of course, and duration. And they're a wonderful add-on to the FE studies.

Paustenbach presents himself as part of the company defense team. He took credit for "victories," explaining in his lecture how "we" took the results of a dose reconstruction to trial and explains how "we won": "We took the first two results, I think, to trial, and we won hands down, again, based on this study." [Emphasis added]

While Paustenbach unequivocally states that the sole purpose of these studies is the defense of lawsuits, none of his papers explicitly explain this aim. And yet: "... we publish all of our work in peer-reviewed journals. That's kind of the – the – a distinguishing characteristic of our firm."⁸ Many of Exponent's studies are published in *Regulatory Toxicology and Pharmacology*, a journal edited by Gio Batta Gori, a former tobacco company consultant,⁹⁻³⁵ and published by The International Society of Regulatory Toxicology and Pharmacology. Jacobson has noted the problems with that journal:

Its sponsors include Dow Agro-Sciences, Eastman Kodak, Gillette, Merck, Procter and Gamble, R. J. Reynolds Tobacco, and other corporations that have an interest in weakening government regulations of toxic chemicals. The Journal's editorial board is dominated by industry lawyers and scientists who consult for industry. In one egregious episode, the journal's editor was paid \$30,000 by the tobacco industry to

write a paper – which was published in the journal – downplaying the risks of second-hand smoke.³⁶

Several journals have established ethical rules that bar publication of papers funded by tobacco companies, and many (e.g. European Journal of Respiratory Disease, British Medical Journal (BMJ), BMJ Open, PLoS Medicine, PLoS One, PLoS Biology, Tobacco Control, Thorax, Heart, journals published by the American Thoracic Society, and the Journal of Health Psychology) refuse to publish papers authored by researchers who received tobacco industry funding. Some ban authors who previously accepted tobacco funding, even if the researcher's work is unrelated to tobacco.³⁷

In his 2006 presentation to the Chrysotile Institute, Paustenbach noted that institutional review boards (IRBs) should review this type of research:

The second [expectation] that is new [when conducting simulation studies today] is the use of an Institutional Review Board. Even though the exposures are often incredibly low and sometimes you're wearing respiratory protection, in the United States, at least, the bar has been raised that you may need to use institutional review board approval. [...] I think the courts are going to be very sensitive to, at least, the institutional review board.

Despite this acknowledgment, Paustenbach did not seek IRB approval for the Bakelite study.

The protocol for Exponent's study called for the workers to wear Tyvek™ suits and use respirators. However, Exponent did not implement these worker protections in the Bakelite™ study.⁴

Part II: The Bakelite™ simulation study

In the following section, I deconstruct various components of the Bakelite™ simulation study that are of scientific and ethical concern.

Ignoring contemporaneous exposures

Mowat et al. claimed they performed this dose reconstruction to determine the historical exposures to asbestos from working with finished Bakelite™. Mowat et al. state that:

The test results from this study are useful in providing a sense of the possible exposures that historical workers may have experienced when they were engaged in sawing, sanding, or drilling of BMMA-5353 and other materials in this class of phenolic resins.

However, Mowat et al. completely ignored published and unpublished historical exposure data that UCC collected in their factories. In 1975, UCC's marketing manager, John Myers, published a paper and reported that users of Bakelite™ compounds had asbestos exposures that exceeded the 1972 OSHA asbestos TLV.³⁹ Peak exposures were 14 fibers/cc. Myers noted that the TWA exposure levels to various UCC products were "... in most cases ...

well below OSHA standards." (The 1972 OSHA asbestos standard was a TWA of 5 f/cc and a peak of 10 f/cc.)³⁹

Myers recommended that UCC place the OSHA warning on the bags of Bakelite™-molding material:

Caution labels are required on products containing asbestos except where the fibers have been modified by a bonding agent or other material to prevent dusting during any normal subsequent use or handling. [...] Products containing asbestos and not requiring a label could include: reinforced plastics (phenolic, nylon, polypropylene, polyester, etc.), roofing compounds, floor tile, reinforced rubber, ready-mix joint cements, flooring, coating and adhesives (polyester, epoxy, urethane, casein, etc.), paint (PVC, alkyd, acrylic latex), mineral board, lubricants and greases. 92% of total US asbestos is "locked" in.

At the same time, UCC told their sales men that:

[...] Measurements made at Bound Brook on molding compound have indicated that it is unlikely any free fibers in excess of the OSHA limit will be released during reasonable handling which might occur in a molding plant.^{xiii} However we cannot assume that this will always be so. Accordingly it has been decided to place the required caution label or marking on all packages used for compounds containing asbestos. The label will read:

CAUTION

CONTAINS ASBESTOS FIBERS

AVOID CREATING DUST

BREATHING ASBESTOS DUST MAY

CAUSE SERIOUS BODILY HARM⁴⁰

Furthermore, UCC had conducted studies of asbestos exposures in their Bound Brook, New Jersey plant where Bakelite™ was manufactured from 1968 to 1974.^{ix} All measurements were under 5 f/cc except for 14.1 f/cc when an operator was dumping five bags of phenolic-molding compound.⁴¹⁻⁴⁵ In 1969, UCC discovered that the band sawing of Bakelite™ resulted in asbestos exposures that exceeded the TLV and "contaminated the room."³⁸ UCC's physician instructed local managers to require that workers who cut Bakelite™ with a band saw use respirators.³⁸ UCC found that emptying bags of asbestos phenolic molding produced exposures of 14.1 f/cc, which exceeded the former permissible exposure limit of 12 f/cc and the "newly adopted federal standard" of 5 f/cc.^{45,46} (Given these contemporaneous data, there was little reason to produce a dose reconstruction of Bakelite™.

Although UCC never published these data, Paustenbach, a co-author of the Mowat et al. paper who oversaw the Exponent study, testified that he was given access to and reviewed the historical UCC documents related to phenolic-molding compound in the repository at the offices of Mayer Brown (UCC's legal counsel) in Chicago.⁴⁶ He referenced, relative to that visit, UCC documents related to the company's 1969 air sampling as well as exposures while emptying bags of asbestos phenolic molding.⁴⁶

Inaccurate description of the product

In describing Bakelite™, Mowat et al. went to great lengths to attempt to show that the product contained “encapsulated asbestos” [Quotation marks in original]:

The term “encapsulated asbestos” applies to fibers that are coated with a material or wetted with a binder, resin, or other medium, thereby containing the asbestos fibers within a solid matrix and limiting their potential to become airborne (e.g. asbestos in automotive brake pads, vinyl composite floor tiles, floor mastics, roofing tars). These fibers are considered to pose a negligible health hazard because of the inability of appreciable concentrations to become airborne and because the presence of the encapsulating medium inside and outside of the fiber may significantly reduce (or eliminate) its adverse effects.

Although the authors repeatedly placed the words, “encapsulated asbestos” within quotations suggesting that OSHA gave these words a particular meaning that excluded such products from asbestos rulings, neither of the regulations that Exponent cites includes the word “encapsulated,” nor do they make reference to any of the products that the authors mention. In fact, all references to “encapsulation” in the two cited regulations refer to products that can be used to reduce exposures to asbestos products when they are removed. For example, the 1994 OSHA standard’s reference to encapsulation describes the use of an “encapsulant” during removal – not a product that is comprised of “encapsulated asbestos.”⁴⁷

Further, the cited OSHA regulations fail to support the authors’ assertion that the listed products “pose a negligible health hazard.” The cited regulations specifically name and regulate these products, and include detailed mandatory workplace controls to avoid asbestos exposures while these products are used or removed:

Class II asbestos work is defined as activities involving the removal of ACM or PACM which is not TSI or surfacing ACM. According to the definition, this includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, gaskets, joint compounds, roofing felts, roofing and siding shingles, and construction mastics.⁴⁸

Two examples, asbestos-flooring and asbestos-roofing materials, of mandated workplace controls in the regulations are detailed in Appendix 1. In addition, OSHA specifically included automotive repair workers (brake mechanics) as a subject of the asbestos regulation:

“Automotive repair.” The general automotive repair and service sector includes establishments involved in brake and clutch repair work and maintenance. The major source of asbestos exposure in this sector occurs when compressed air is used for blowing the residual dust from the brake lining assembly. In addition, minor exposures in brake repair can occur during spray applications and when handling cloths and other supplies contaminated with asbestos fibers. Replacement of clutch assemblies can also lead to fiber release. CONRAD estimates that approximately

329,000 automobile repair shops and garages, brake and clutch repair establishments, and motor vehicle dealers, employing 676,000 workers, will be affected by the revision to the asbestos standard. OSHA is mandating specific engineering controls and work practices that will affect this sector.⁴⁸

The authors’ description of this merchandise as products that “pose a negligible hazard” cannot be explained as “bias” or “error” when the cited basis for the characterization affirms the converse. While Exponent repeatedly represented Bakelite™ as an “encapsulated product” they knew – or should have known – that this was inaccurate: their corporate sponsors, (UCC’s and lawyers) who approved of their publication, certainly should have known it. These failures raise the specter of corrupt science.

Misstatement of the law

Mowat et al. cited part of a sentence from the OSHA 1972 Asbestos Standard in support of their proposition that the Bakelite™ products are safe:

The low potential for release of fibers from these kinds of products is acknowledged in the federal regulations, wherein OSHA, in 1972, did not require asbestos caution labeling requirements for fibers that have been “modified by a bonding agent, coating, binder or other material.”⁴⁹

The authors misstated the 1972 OSHA Standard by writing that the quotation ended with the word “material” and omitting an ellipsis, which would have indicated to the reader that the sentence was incomplete. In this case, the author’s premature termination of the sentence completely misstated OSHA’s intent:

Caution labels shall be affixed to all raw materials, mixtures, scrap, waste, debris, and other products containing asbestos fibers, or to their containers, except that no label is required where asbestos fibers have been modified by a bonding agent, coating, binder, or other material **so that during any reasonably foreseeable use, handling, storage, disposal, processing, or transportation, no airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section will be released.** [Mowat et al. omitted part of sentence in bold].

The omission of the latter part of OSHA’s language (which limits the definition of asbestos-containing “modified” products to products that do not release asbestos fibers during foreseeable use) in an effort to characterize Bakelite™ as “safe” merchandise is particularly egregious given prior UCC research. As noted in the introduction, John Myers’ 1975 published paper indicated that users of Bakelite™ were exposed to asbestos at levels that exceed the TLV.

Inaccurate presentation of the “Bakelite™ formula”

Mowat et al. claimed they were reproducing BMMA-5353; however, the actual product formula code on which

they focused was BMMA-5353 25 DC.³ The code “DC” designated “dust controlled” – “Products which are specially processed to remove extremely fine particles or ‘smoke.’”⁴⁹ UCC had begun to develop low dust formulations after the ACGIH proposed that the asbestos TLV be lowered in 1968. Earlier versions would not have been “dust controlled.”

Exponent’s report to the Bakelite™ study funders (UCC’s legal counsel) provided a more complete description of the reconstruction methodology than those described in the methods section in the published paper, and included two different BMMA-5353 formulas.³ One of these used a two-step resin; Exponent employed a one-step resin, which was used in another BMMA-5353 formulation. In the published paper, Mowat et al. did not disclose that there were many iterations of the formula for Bakelite™.

Failure to disclose the use of different raw materials than those called for in the original formula

Exponent substituted two key components in their Bakelite™ formulation. UCC produced the original resin; however, Exponent never reviewed the recipe for this resin, and they did not use it. Instead, they purchased a one-part DURITE® FD-2170 Friction – phenolic powder resin (a Borden Corporation product) which “was specifically developed as a general-purpose bond for **friction** elements.” [Emphasis added]. UCC’s corporate representative testified that UCC never sold phenolic resins for friction products.⁵⁰ More importantly, Exponent used Johns-Manville chrysotile fiber from the Jeffery Mine in Asbestos, Quebec. Exponent thus used the third longest fiber size – 7RF-3 – while the original formulation called for RF-9 asbestos, from the Carey Mine in East Broughton, which was the shortest fiber type ever sold, and was tremolite-free.^{51,52}

Use of a different manufacturing process

The original process involved three sets of two rollers each. The Exponent process involved a single set of rollers followed by manual manipulation of the material. After the dry mix was charged on the two-roll mill, it was worked manually with hot gloves and spatulas. Additionally, Exponent set the rollers to temperatures that did not match the original specifications. UCC’s specifications called for temperatures of 60 °F (front roller) and 100 °F (second roller). Exponent kept the temperature of the front roller at approximately 200 °F, and the second varied from approximately 60–100 °F.

Additionally, Exponent discarded fibers smaller than 60 mesh. The original process did not discard any fiber size. This added process would have reduced the percentage of asbestos in the final Bakelite™ product. Exponent also used a different mesh cut-off which reduced the number of small fibers.

Exponent’s reformulated Bakelite™ product specified the following mesh tests:

The sieve set consisted of No. 6 (0.132 in.), No. 10 (0.0787 in.), No. 12 (0.0661 in.), and No. 60 (0.0098 in.) sieves. Granules that did not pass through the No. 6 sieve (over-sized) were either re-ground or discarded.

Exponent discarded undersized particles.³ This removal of small particles, which would have included small fibers, was not in the original UCC protocol.

Manipulation of the time of the work simulation in order to reduce the time-weighted average (TWA) exposure

The TWA is a simple formula, which divides the total exposure by the amount of time that a work process takes to perform. In a video taken as part of the Bakelite™ study, Exponent increased the time denominator by starting the clock minutes before any activity commenced, and by performing the work process at a farcically slow pace.⁵³ For example, in the band sawing test, Paustenbach stood next to the band saw for 2 min and 45 s before he picked up the reformulated Bakelite™ plaque to begin cutting, and stopped cutting 2 min and 35 s prior to the end of the taping. Thus, Paustenbach did not work for 5 min and 20 s of the 14 min 29 s “work simulation.” To further reduce exposures and increase the denominator time, Paustenbach worked at an unrealistically slow pace while cutting; he took 14 min and 29 s to make five 4”-long cuts in the reformulated Bakelite™ pieces that were 6” wide. No worker could work this slowly and not get fired. Paustenbach also only cut seven pieces; however, the protocol called for seven cuts resulting in 8 pieces.⁵³

Discussion: The etiology of the problem of corporate corruption of science

In the case of Paustenbach’s research, “filling data gaps” can mean producing science to specification. Instead of beginning with a question and seeking the most accurate possible answer, this research starts with the desired conclusions. For example, in 1990 Paustenbach developed a proposal for the American Petroleum Institute (API) and described it as follows:

McLaren/ChemRisk is pleased to provide this proposal to develop an alternative cancer potency estimate for benzene. It is our understanding that API would like us to develop a succinct, yet scientifically compelling, integrated position statement to be used in comments to the state of North Carolina and as a possible springboard for future analyses that could be presented to US EPA and the State of California.⁷

Paustenbach explains some of their methods, and assures the API that he will incorporate their comments into final published papers.⁷

... EPA and OSHA considered benzene to cause all types of leukemia in their development of cancer

potency estimates for benzene. ... The objective of this task is to develop a succinct, compelling position that presents evidence that AML is the only type of leukemia induced by benzene exposure (task 4.1). A meeting with Dr. Richard Irons will be needed in order to discuss the molecular basis for benzene-induced AML (task 4.2).

Deliverable to the API benzene task force: Draft manuscript, suitable for publication in *Fundamental and Applied Toxicology*. Comments from the Task Force and Dr. Irons will be incorporated into a final document.

Paustenbach published this work but failed to disclose that the research findings had been pre-determined with a foregone conclusion and had been subject to editing by industry representatives.⁷

Exponent's production and simulation study of Bakelite™ is typical of the type of service they provide industry in the form of fabricated historical reconstruction of product characteristics (i.e. "encapsulated") and exposure (i.e. "none," or "not enough to cause harm.") The breadth of similar results which Paustenbach has produced in his work is far reaching.⁵⁴⁻⁵⁹

Exponent's and ChemRisk's work for corporations involved in litigation is legal consulting and not science.^{xii} A 2002 letter from Exponent's Patrick Sheehan to Ford, GM, and Chrysler lawyers sheds light on the nature of the relationship that existed between Exponent and ChemRisk and their staff and the company's corporate clients. (Appendix I attached) This letter was designated as confidential attorney work product as follows:

Document type: Confidential draft memoranda from expert consultant to legal staff attorneys memorializing scope of litigation strategy tasks, ongoing work and budgets related to defending ongoing, pending and potential litigation matters.

Purpose: To set forth litigation strategy tasks to assist in ongoing, pending and prospective litigation.

Sheehan sent the letter to the legal representatives of the three automakers, and he stamped them "Attorney Work Product; Privileged & Confidential by Joint Defense Agreement."⁶⁰ Sheehan confirms that the company lawyers, rather than the companies, hired Exponent, and later ChemRisk, under a "Joint Defense Agreement" for litigation research. In his deposition, Sheehan stated that he labeled the documents that he prepared as "attorney work product" per instructions from the company lawyers. The letter confirms that he was part of the legal defense team and that Exponent's work was part of the legal defense – not independent research. Sheehan confirms Exponent's strategy understanding that the lawyers determined the nature of the research:

... for litigation support work performed by Exponent **at the request of you and/or your designated representatives** from 1 February 2002 forward to the completion of this project or the severing of this agreement

by these parties, each company will assume responsibility for payment of a one-third share of the cost of all tasks performed.^{xiii} [Emphasis added]

When research is conducted pursuant to litigation the company lawyers can block publication even though the disclosure would prevent disease and death. In fact, in most states the work of (or even the existence of) non-testifying consulting experts is not disclosed to the opposing party or to the court.⁶¹

Readers of corporate funded studies must determine whether they are legitimate studies or camouflaged data manipulation masquerading as science.

Notes

- i Exponent called the samples "plaques" in its reports to UCC's lawyers. They referred to the plaques as "test panels" in the published paper, apparently in an effort to imply that they reflected commercial sizes.
- ii For several reasons plaintiff lawyers almost never make Daubert motions to exclude defense evidence. Plaintiffs have the burden of proof, and must have pre-existing evidence of some sort to bring a case in the first place. In addition, while plaintiff lawyers usually represent a single – or a few – clients, companies are often sued by many alleged victims (in the case of asbestos, tens of thousands) and thus can distribute research costs over many cases.
- iii <http://www.exponent.com/history/>
- iv <http://www.exponent.com/capabilities/>
- v http://www.cardnochemrisk.com/index.php?option=com_content&view=article&id=569&Itemid=10
- vi Paustenbach's presentation can be viewed here: http://www.chrysotile.com/en/conferences/speakers/Dennis_Paustenbach.aspx
- vii The name change was part of the strategy to convince juries and regulatory agencies that chrysotile asbestos was less harmful (or even nontoxic) compared to other asbestos forms. <http://www.chrysotile.com/en/conferences/default.aspx>
- viii UCC misrepresented the fiber test results to its own sales force. The testing showed that the exposures exceeded the OSHA level and UCC conclude and even published that this was the case.³⁹
- ix UCC has failed to produce any bag that actually had this caution on it
- x Additionally, in the Army Corps of Engineers' study, three mechanical Certified Asbestos Consultants asbestos removal methods and a manual method were evaluated by monitoring during removal of the siding. The three methods were: (1) super wet: the siding was thoroughly wetted with water on the outfacing and back side; (2) mist: a measured amount of water was applied to the outfacing side of the siding only; and, (3) encapsulation: an EPA-approved commercially available encapsulant was applied at or above the recommended application rate. These removals took place inside enclosures and the hand method was also evaluated.
- xi The authors cite the 1994 OSHA standard, however, in the text they correctly reference the 1972 OSHA standard, which is where this language appears
- xii This section relies on materials that relate to Exponent and ChemRisk work for companies involved in asbestos friction product litigation – not to that involving UCC
- xiii In fact, GM's outside counsel issued the checks on behalf of GM. Deposition testimony of Patrick James Sheehan in *Allen vs. 3M et al.*, third Judicial Circuit Court, Madison County Illinois Case No. 14 L 131, 28 August 2014.

Disclosure statement

David Egilman serves as an expert witness at the request of persons injured by asbestos and asbestos product manufacturing companies who have been sued in asbestos personal injury tort litigation. He also served as a consultant to UCC in the Bhopal MIC chemical explosion of 1984.

ORCID

Egilman David S.  <http://orcid.org/0000-0003-0280-163X>

References

- Egilman D, Ardolino E, Howe S, Bird T. Deconstructing a state-of-the-art review of the asbestos brake industry. *New Solutions*. 2011;21(4):545–71.
- Mowat F, Bono M, Lee RJ, Tamburello S, Paustenbach D. Occupational exposure to airborne asbestos from phenolic molding material (bakelite) during sanding, drilling, and related activities. *J Occup Environ Hyg*. 2005;2(10):497–507. PubMed PMID: 16147471.
- Scott C. Preparation of union carbide bakelite product BMMA-5353 using historical information prepared for Mayer, Brown, Rowe & Maw Chicago, Illinois. Exponent; 2003 May.
- Exponent. BMMA-5353 Product testing prepared for Mayer, Brown, Rowe & Maw. 2003.
- Daubert v. Merrell Dow Pharmaceuticals, Inc. 509 U.S. 579, 593. 1993.
- Chesbro K. Galileo's retort: Peter Huber's junk scholarship. *Am Univ Law Rev*. 1993;42:1637–1726.
- Egilman D, Kim J, Biklen M. Proving causation: the use and abuse of medical and scientific evidence inside the courtroom – an epidemiologist's critique of the judicial interpretation of the Daubert ruling. *Food Drug Law J*. 2003;58(2):223–50. PubMed PMID: 12866555.
- Paustenbach D. The roles of dose reconstruction and simulation studies in understanding historical exposure to asbestos. 2006.
- Carrington S. Testimony of Susan Carrington In Re: asbestos products consolidated under liability litigation (No. Vi) Mdl Docket No. 875 EDPA Civil Action 2:11-Cv-64227-Er, Ream Vs Cameron International et al. Civil Action No. 4:11-Cv-00076, October 4, 2011.
- Blake CL, Dotson GS, Harbison RD. Assessment of airborne asbestos exposure during the servicing and handling of automobile asbestos-containing gaskets. *Regul Toxicol Pharmacol*. 2006;45(2):214–22. PubMed PMID: 16730109.
- Calabrese EJ, Stanek EJ, Barnes R, Burmaster DE, Callahan BG, Heath JS, et al. Methodology to estimate the amount and particle size of soil ingested by children: implications for exposure assessment at waste sites. *Regul Toxicol Pharmacol*. 1996;24(3):264–8. PubMed PMID: 8975756.
- Copeland TL, Paustenbach DJ, Harris MA, Otani J. Comparing the results of a Monte Carlo analysis with EPA's reasonable maximum exposed individual (RMEI): a case study of a former wood treatment site. *Regul Toxicol Pharmacol*. 1993;18(2):275–312. PubMed PMID: 8278647.
- Cowan DM, Dopart P, Ferracini T, Sahmel J, Merryman K, Gaffney S, et al. A cross-sectional analysis of reported corporate environmental sustainability practices. *Regul Toxicol Pharmacol*. 2010;58(3):524–38. PubMed PMID: 20850490.
- Cowan DM, Kingsbury T, Perez AL, Woods TA, Kovochich M, Hill DS, et al. Evaluation of the California safer consumer products regulation and the impact on consumers and product manufacturers. *Regul Toxicol Pharmacol*. 2014;68(1):23–40. PubMed PMID: 24231524.
- Finley BL, Monnot AD, Paustenbach DJ, Gaffney SH. Derivation of a chronic oral reference dose for cobalt. *Regul Toxicol Pharmacol*. 2012;64(3):491–503. PubMed PMID: 22982439.
- Finley BL, Pierce JS, Paustenbach DJ, Galbraith DA. Response to a letter to the editor by Dr. Murray M. Finkelstein regarding the article by Finley et al. (2012). *Regul Toxicol Pharmacol*. 2013;65(1):180–1. PubMed PMID: 22974770.
- Finley BL, Pierce JS, Paustenbach DJ, Scott LL, Lievens L, Scott PK, et al. Malignant pleural mesothelioma in US automotive mechanics: reported vs expected number of cases from 1975 to 2007. *Regul Toxicol Pharmacol*. 2012;64(1):104–16. PubMed PMID: 22668748.
- Finley BL, Proctor DM, Paustenbach DJ. An alternative to the USEPA's proposed inhalation reference concentrations for hexavalent and trivalent chromium. *Regul Toxicol Pharmacol*. 1992;16(2):161–76. PubMed PMID: 1438996.
- Finley BL, Scott P, Paustenbach DJ. Evaluating the adequacy of maximum contaminant levels as health-protective cleanup goals: an analysis based on Monte Carlo techniques. *Regul Toxicol Pharmacol*. 1993;18(3):438–55. PubMed PMID: 8128005.
- Jiang GC, Madl AK, Ingmundson KJ, Murbach DM, Fehling KA, Paustenbach DJ, et al. A study of airborne chrysotile concentrations associated with handling, unpacking, and repacking boxes of automobile clutch discs. *Regul Toxicol Pharmacol*. 2008;51(1):87–97. PubMed PMID: 18440685.
- Kopelovich LM, Thuett KA, Chapman PS, Paustenbach DJ. History and evolution of warning labels for automotive friction products. *Regul Toxicol Pharmacol*. 2014;68(3):402–11. PubMed PMID: 24518387.
- Liukonen LR, Weir FW. Asbestos exposure from gaskets during disassembly of a medium duty diesel engine. *Regul Toxicol Pharmacol*. 2005;41(2):113–21. PubMed PMID: 15698534.
- Madl AK, Clark K, Paustenbach DJ. Exposure to airborne asbestos during removal and installation of gaskets and packings: a review of published and unpublished studies. *J Toxicol Environ Health Part B*. 2007;10(4):259–86. PubMed PMID: 17620202.
- Madl AK, Hollins DM, Devlin KD, Donovan EP, Dopart PJ, Scott PK, et al. Airborne asbestos exposures associated with gasket and packing replacement: a simulation study and meta-analysis. *Regul Toxicol Pharmacol*. 2014;69(3):304–19. PubMed PMID: 24768989.
- Paustenbach D, Galbraith D. Biomonitoring: is body burden relevant to public health? *Regul Toxicol Pharmacol*. 2006;44(3):249–61. PubMed PMID: 16473444.
- Paustenbach DJ. Important recent advances in the practice of health risk assessment: implications for the 1990s. *Regul Toxicol Pharmacol*. 1989;10(3):204–43. PubMed PMID: 2690195.
- Paustenbach DJ, Board EPASA. The U.S. EPA science advisory board evaluation (2001) of the EPA dioxin reassessment. *Regul Toxicol Pharmacol*. 2002;36(2):211–9. PubMed PMID: 12460755.
- Paustenbach DJ, Jernigan JD, Bass R, Kalmes R, Scott P. A proposed approach to regulating contaminated soil: identify safe concentrations for seven of the most frequently encountered exposure scenarios. *Regul Toxicol Pharmacol*. 1992;16(1):21–56. PubMed PMID: 1410655.
- Paustenbach DJ, Panko JM, Fredrick MM, Finley BL, Proctor DM. Urinary chromium as a biological marker of environmental exposure: what are the limitations? *Regul Toxicol Pharmacol*. 1997;26(1):S23–S34. PubMed PMID: 9380834.
- Paustenbach DJ, Rinehart WE, Sheehan PJ. The health hazards posed by chromium-contaminated soils in residential and industrial areas: Conclusions of an expert panel. *Regul Toxicol Pharmacol*. 1991;13(2):195–222. PubMed PMID: 1852930.
- Paustenbach DJ, Shu HP, Murray FJ. A critical examination of assumptions used in risk assessments of dioxin contaminated soil. *Regul Toxicol Pharmacol*. 1986;6(3):284–307. PubMed PMID: 3775086.
- Proctor DM, Fredrick MM, Scott PK, Paustenbach DJ, Finley BL. The prevalence of chromium allergy in the United States and its implications for setting soil cleanup: a cost-effectiveness case study. *Regul Toxicol Pharmacol*. 1998;28(1):27–37. PubMed PMID: 9784430.
- Shu HP, Paustenbach DJ, Murray FJ. A critical evaluation of the use of mutagenesis, carcinogenesis, and tumor promotion data in a cancer risk assessment of 2,3,7,8-tetrachlorodibenzo-p-dioxin. *Regul Toxicol Pharmacol*. 1987;7(1):57–88. PubMed PMID: 3575798.
- Teuschler L, Klauing J, Carney E, Chambers J, Conolly R, Gennings C, et al. Support of science-based decisions concerning the evaluation of the toxicology of mixtures: a new beginning. *Regul Toxicol Pharmacol*. 2002;36(1):34–9. PubMed PMID: 12383716.
- Yarborough CM. Chrysotile as a cause of mesothelioma: an assessment based on epidemiology. *Crit Rev Toxicol*. 2006;36(2):165–87. PubMed PMID: 16736942.
- Jacobson MF. Lifting the veil of secrecy from industry funding of nonprofit health organizations. *Int J Occup Environ Health*. 2005;11(4):349–55. PubMed PMID: 16350468.
- McKee M, Allebeck P. Why the European Journal of Public Health will no longer publish tobacco industry-supported research. *Eur J Public Health*. 2014;24(2):182.
- McKinley C. Dust from band saw, Bldg. 95. 1969.
- Myers J. Handling asbestos chrysotile asbestos in plastics. *J Paint Technol*. 1975;47(611):63–67.
- Potter PB. Letter to "all salesmen and customer service representatives". 16 April 1973.
- LaFrance L. Industrial hygiene survey. Union Carbide Memo: September 10, 1968. Bates No.: UCASB00913419-UCASB00913434.
- Neal WD. Industrial hygiene survey of phenolics division bound Brook, New Jersey. 1974. UCASB00945581.
- Kleber E. Airborne fiber counts for UCC Bound Brook NJ. February 21, 1973. Bates No.: UCASB00913405-UCASB00913416.
- Cope R. Bound brook plant industrial hygiene program-air analysis. September 22, 1972. Bates No.: UCASB00913419-UCASB00913434.
- Bradley W. Environmental health consultation. 1972. Bates No.: UCASB00913256-7.

- 46 Testimony of Dennis Paustenbach. In Re: Baltimore city in the Asbestos litigation circuit court for Baltimore city, Beeman Et Al. Consolidated Case No. 24x04001106 V Ac&S Et Al. May 9, 2006. Trial Cluster, May 2, 2006.
- 47 Occupational Safety And Health Administration (OSHA). Occupational exposures to asbestos: final rule. Federal Register. 59:153, pp. 40964–41158. August 10, 1994
- 48 “Asbestos-containing materials in schools”. Code of federal regulations title 40 P, Subpart E. As cited in FR 52:41825–905. October 30, 1987.
- 49 Union Carbide Corporation. Bakelite phenolic molding materials guide. 1973.
- 50 Testimony of Susan Carrington. In Re: asbestos products consolidated under liability litigation (No. Vi). Mdl Docket No. 875 EDPA Civil Action 2:11-Cv-64227-Er RV
- 51 Virta R. Asbestos geology, Mineralogy, mining, and uses; October 2, 2002.
- 52 Gunter ME, Sanchez MS, Williams TJ. Characterization of chrysotile samples for the presence of amphiboles: the Carey Canadian deposit, Southeastern Quebec. *Can Minerol.* 2007;45(2):263–280.
- 53 Egilman D. [Bakelite video]. 2014 [cited 2014 Oct 14]. Available from: http://www.youtube.com/user/nacvids?feature=em-share_playlist_user
- 54 Madl AK, Paustenbach DJ. Airborne concentrations of benzene and mineral spirits (stoddard solvent) during cleaning of a locomotive generator and traction motor. *J Toxicol Environ Health Part A.* 2002;65(23):1965–79. PubMed PMID: 12490042. Epub 2002 12 20. eng
- 55 Paustenbach DJ, Madl AK, Donovan E, Clark K, Fehling K, Lee TC. Chrysotile asbestos exposure associated with removal of automobile exhaust systems (ca. 1945–1975) by mechanics: results of a simulation study. *J Exposure Sci Environ Epidemiol* 2006;16(2):156–71. PubMed PMID: 16265462. Epub 2005 11 03. eng
- 56 Gaffney S, Moody E, McKinley M, Knutsen J, Madl A, Paustenbach D. Worker exposure to methanol vapors during cleaning of semiconductor wafers in a manufacturing setting. *J Occup Environ Hyg* 2008;5(5):313–24. PubMed PMID: 18330801. Epub 2008 03 12. eng
- 57 Paustenbach DJ, Knutsen JS, Hollins DM, Sahmel JE, Madl AK. Comparison of modeled and measured concentrations of airborne benzene from the use of petroleum-based solvents spiked with low levels of benzene. *Chem Biol Interact.* 2010;184(1–2):296–8. PubMed PMID: 20096674. Epub 2010/01 26. eng.
- 58 Kerger BD, Suder DR, Schmidt CE, Paustenbach DJ. Airborne exposure to trihalomethanes from tap water in homes with refrigeration-type and evaporative cooling systems. *J Toxicol Environ Health Part A.* 2005;68(6):401–29. PubMed PMID: 15799243. Epub 2005 04/01. eng.
- 59 Mad AK, Scott LL, Murbach DM, Fehling KA, Finley BL, Paustenbach DJ. Exposure to chrysotile asbestos associated with unpacking and repacking boxes of automobile brake pads and shoes. *Ann Occup Hyg.* 2008;52(6):463–79. PubMed PMID: 18515846. Epub 2008 06 03. eng.
- 60 Deposition testimony of Patrick James Sheehan in Allen vs. 3M et al. tJCC, Madison County Illinois Case No. 14 L. 131. August 28, 2014.
- 61 Pielemeier JR. Discovery of non-testifying “in-house” experts under Federal Rule of Civil Procedure 26. *Indiana Law J* 1983;58(4):597–626.

Appendix 1. Asbestos flooring:

- (i) For removing vinyl- and asphalt-flooring materials which contain ACM or for which in buildings constructed no later than 1980, the employer has not verified the absence of ACM pursuant to paragraph (g) (8) (i) (I) of this section. The employer shall ensure that employees comply with the following

work practices and that employees are trained in these practices pursuant to paragraph (k) (8):

- (A) Flooring or its backing shall not be sanded.
 - (B) Vacuums equipped with HEPA filter, disposable dust bag, and metal floor tool (no brush) shall be used to clean floors.
 - (C) Resilient sheeting shall be removed by cutting with wetting of the snip point and wetting during delamination. Rip-up of resilient sheet floor material is prohibited.
 - (D) All scraping of residual adhesive and/or backing shall be performed using wet methods.
 - (E) Dry sweeping is prohibited.
 - (F) Mechanical chipping is prohibited unless performed in a negative pressure enclosure which meets the requirements of paragraph (g) (5) (iv) of this section.
 - (G) Tiles shall be removed intact, unless the employer demonstrates that intact removal is not possible.
 - (H) When tiles are heated and can be removed intact, wetting may be omitted.
 - (I) Resilient flooring material including associated mastic and backing shall be assumed to be asbestos-containing unless an industrial hygienist determines that it is asbestos-free using recognized analytical techniques.
- Asbestos-containing roofing materials:
- (ii) For removing roofing material which contains ACM the employer shall ensure that the following work practices are followed:
 - (A) Roofing material shall be removed in an intact state to the extent feasible.
 - (B) Wet methods shall be used where feasible.
 - (C) Cutting machines shall be continuously misted during use, unless a competent person determines that misting substantially decreases worker safety.
 - (D) All loose dust left by the sawing operation must be HEPA vacuumed immediately.
 - (E) Unwrapped or unbagged roofing material shall be immediately lowered to the ground via covered, dust-tight chute, crane or hoist, or placed in an impermeable waste bag or wrapped in plastic sheeting and lowered to ground no later than the end of the work shift.
 - (F) Upon being lowered, unwrapped material shall be transferred to a closed receptacle in such manner so as to preclude the dispersion of dust.
 - (G) Roof-level heating and ventilation air intake sources shall be isolated or the ventilation system shall be shut down.