

Public Action Letter

December 20, 2018

Mike Cassidy, CEO and co-founder
Ben Longmier, CTO and co-founder
Apollo Fusion, Inc.
1049 Linda Vista Ave.
Mountain View, CA USA

Greg Wyler, Founder and Executive Chairman
OneWeb
1785 Greensboro Station Place, Tower 3
McLean VA USA

Will Marshall, CEO
Robbie Schingler, CSO
Planet Labs
645 Harrison St. Floor 4
San Francisco, CA USA

Gwynne Shotwell, President and CEO
Space X
Rocket Road, 1
Hawthorne, CA USA

Dear Ladies and Gentlemen,

We, the undersigned, strongly urge you to publicly pledge to avoid mercury in your satellite propulsion systems, as it poses a severe risk of contributing to a worsening global mercury crisis. According to media reports, Apollo Fusion, Inc. is considering the use of mercury in its satellite propulsion systems and SpaceX, along with OneWeb and Planet Labs were mentioned as potential customers, although the latter two both deny it.¹

Over the past several decades, the U.S. and other governments around the world have spent billions to regulate and reduce mercury emissions from major sources and eliminate the use of mercury in products and processes where viable substitutes exist. That's because mercury circulates in the atmosphere and ultimately making its way into humans by moving up the aquatic food chain. Health agencies worldwide—including the U.S. Food and Drug Administration and all 50 states—warn pregnant women to avoid or limit consumption of certain fish primarily because of mercury exposure risks for the developing fetus.

Recently, the second United Nations Conference of the Parties for the Minamata Convention on Mercury met in Geneva to further the Convention's objective "to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds."² Thus far, over 100 countries (with the U.S. being the first) have ratified the Convention, which entered into force in August 2017. Yet much more mercury reduction work is needed, because according to an upcoming UN report, global mercury emissions rose by 20% between 2010 and 2015.³

Among other provisions, the Convention seeks to reduce, and where feasible, eliminate all uses of mercury where cost-effective, technically-achievable mercury-free alternatives are available. In the case of satellite propulsion systems, as you are aware, mercury-free alternatives have been available and almost universally used for decades.⁴ In the 1970s, NASA recognized the risks related to mercury propulsion systems in satellites and chose other options - even though NASA recognized mercury was cheaper to use.

The mercury-driven propulsion technology developed and marketed by Apollo for satellites will have dire implications if widely applied. According to a recent media report:

"The amount of propellant in each [satellite] would depend on various factors...A case study on Apollo's website⁵ that the company calls a "representative configuration" ideal for a low-orbit satellite would carry 20 kilograms of an unnamed propellant. Multiply that by 1,000, and the constellation of satellites could use 20,000kg, or 20 metric tons of mercury, which would be released over the satellites' estimated five to seven years in orbit. By comparison, the U.S. emits about 50 metric tons of mercury each year..."⁶

It is highly likely that most, if not all, of the mercury emitted at the altitudes planned for your satellite propulsion systems would find its way back and eventually into the earth's surface. This has been demonstrated by many studies, including a UN report on the long-range transport of mercury.⁷

The bottom line is that if mercury is widely used to propel satellites, the resulting releases would significantly increase the global pool of mercury in the atmosphere and hydrosphere. This flies in the face of not only U.S., but global efforts to reduce mercury pollution. Accordingly, as part of the upcoming review of Annex A and B to the Minamata Convention on Mercury, we intend to raise the use of mercury as a propulsion fuel for possible inclusion in Annex A, the list of prohibited mercury-added products under the Convention.

Therefore, we join with others⁸ in strongly urging the above aforementioned companies to pledge to avoid using mercury as a propellant in satellites.

Should you have questions or need additional information, please contact Michael Bender at mercurypolicy@gmail.com. Thank you.

Sincerely,

Michael Bender, Director
Mercury Policy Project
International Co-coordinator
Zero Mercury Working Group
Montpelier, VT
<http://www.zeromercury.org/>

Jane Williams
California Communities Against
Toxics
Rosamond, CA

Caroline Cox
Center for Environmental Health
Oakland, CA

Robert Kennedy, Jr.
Children's Health Defense
Peachtree City, GA

Robin Schneider, Executive Director
Texas Campaign for the
Environment & TCE Fund
Austin TX

Cheryl Nenn
Milwaukee Riverkeeper
Milwaukee, WI, USA

Eric Uram
Headwater LLC
Madison, WI USA

Kathryn Kwiatkowski
Case Western Reserve University-Gelfand
STEM Center
Cleveland, Ohio USA

Bryan Matthias
University of Minnesota Duluth
Duluth, MN, USA

Pam Nixon
People Concerned about Chemical Safety
Charleston, WV 25339

Rachel L. Gibson, JD, MPP
Health Care Without Harm
US and Canada
Reston, VA 20191

William B. Grant, PhD
Sunlight, Nutrition and Health Research
Center
San Francisco, CA

Janet Nudelman
Breast Cancer Prevention Partners (BCPP)
San Francisco, CA

Charles Brown, Esq
World Alliance for Mercury-Free Dentistry
Washington, DC

Steven G. Gilbert, PhD, DABT
INND
(Institute of Neurotoxicology & Neurological
Disorders)
Seattle, WA 98105

Amy Ziff
Made Safe
Irvington, New York

Barbara Warren, RN, MS
Citizens' Environmental Coalition
New York

Jeannie Economos
Farmworkers Association of Florida
Apopka, Florida

Alan S. Peterson, MD
Physicians for Social Responsibility
Harrisburg, PA

Kirstin Beatty, Director
[Last Tree Laws](#)
Holyoke, Massachusetts

Ed Friedman, Chair
Friends of Merrymeeting Bay
Richmond, ME

Lindsay Baker
Northeast Ohio Regional Sewer District
Cleveland, OH

Catherine Kleiber
Global Union Against Radiation
Deployment from Space (GUARDS)
www.stopglobalwifi.org
Waterloo, Wisconsin

International Signatures

Dominique Bally KPOKRO
African Center for Environmental
Health
Abidjan, Côte d'Ivoire

Zuleica Nycz
APROMAC Environment Protection
Association
TOXISPHERA Environmental
Health Association
AMAR Environment Defense
Association
Brazil

Jeffer Castelo Branco, Director
Associação de Combate aos
Santos - SP - Brazil

Yuyun Ismawati,
BaliFokus/Nexus3 Foundation,
Indonesia

Griffins Ochieng, Programmes
coordinator
Centre for Environment Justice and
Development
Nairobi, Kenya

Ram Charitra Sah, Executive
Director
CEPHED,
Kathmandu, Nepal

Gilbert KUEPOUO
CREPD
Cameroon

Michael Musenga, Coordinator and
Chairman
Children's Environmental Health
Foundation
Livingstone, Zambia

Ann-Marie Lidmark
Tandvårdsskadeförbundet
(Dental Injury Association)
Stockholm, Sweden

Monika Frielinghaus
www.umweltbedingt-erkrankte.de
(Environmental illness group)
Spardorf, Germany

Elorm Kokou AMEGADZE,
Executive Director
Friends of the Earth-Togo
Coordinator of the Togolese Platform
of the Pan-African Alliance for
Climate Justice
Lomé-Togo

Solomon Kusi Ampofo
Friends of the Nation
Ghana

Elena Lymberidi-Settimo
International Co-coordinator
Zero Mercury Working Group
European Environmental Bureau
Brussels, Belgium

Leticia Baselga
Ecologistas en Acción
Spain

Rico Euripidou
groundWork - Friends of the Earth
South Africa
Pietermaritzburg, South Africa

Pham Thi Minh Hang
Vice-Director
Research Centre for Gender, Family
and Environment in Development
(CGFED)
Vietnam

Dr Najoua Bouraoui
Apeddub Bizerte
Tunisia

Atty. Richard Gutierrez and
Reynaldo San Juan, Jr.
BAN Toxics, Inc.
Quezon City, Philippines

Lien To
Center for Creative Initiatives in
Health and Population (CCHIP)
Hanoi, Vietnam

Nga Huy Nguyen,
CCHIP, and former Director of
Vietnam Health Environment
Management Agency
Hanoi, Vietnam

Eri Bizani
ECOCITY
Athens, Greece

Florian Schulze, Executive Director
www.ig-umwelt-zahnmedizin.de
(Eco-dentistry)
Berlin, Germany

Monika Frielinghaus
www.umweltbedingt-erkrankte.de
(Environmental illness group)
Spardorf, Germany

Dr. Naji Kodeih
IndyACT- Lebano
InnoDev - Lebanon
Beirut, Lebanon

Napoleon Frank
Lawyers Environmental Action Team
(LEAT)
Dar es salaam, Tanzania

María Isabel Cárcamo
RAPAL
Uruguay

Napoleon Frank
Lawyers Environmental Action Team
Dar es salaam, Tanzania

Hemsing Hurrinag, Project
Manager.
Pesticide Action Network of
Mauritius
Vacoas, Mauritius

Mailes Zulu Muke
SEPA ZAMBIA
Zambezi North, Western Province,
Zambia

Lars Hylander,
SLU, Swedish University of
Agricultural Sciences
Uppsala, Sweden

Pawel Gluszynski
Society for the Earth
Oświęcim, Poland

Leslie Adogame
SRADev Nigeria
Lagos, Nigeria

Dr. Gopal Krishna, LLB, PhD
Toxics Watch Alliance (TWA)-Ban
Asbestos Network of India (BANI)
India

Nsama Musonda Kearns, Executive
Director
World Wide Care for Nature
Mansa, Zambia

Susana Fonseca, Direção
ZERO – Association for the
Sustainability of the Earth System
Portugal.

Endnotes

¹https://www.bloomberg.com/news/articles/2018-11-19/this-space-startup-could-lace-the-atmosphere-with-toxic-mercury?utm_medium=email&utm_source=newsletter&utm_term=181121&utm_campaign=climatechanged

² <http://www.mercuryconvention.org/>

³ <https://www.unenvironment.org/news-and-stories/press-release/countries-meet-address-mercury-global-emissions-rise-20>

⁴http://aerospace.mtu.edu/_reports/Conference_Proceedings/2005_Kieckhafer_1.pdf

⁵ <http://apollofusion.com/>

⁶https://www.bloomberg.com/news/articles/2018-11-19/this-space-startup-could-lace-the-atmosphere-with-toxic-mercury?utm_medium=email&utm_source=newsletter&utm_term=181121&utm_campaign=climatechanged

⁷<http://web.unep.org/globalmercurypartnership/global-mercury-assessment>

⁸ <https://www.peer.org/news/press-releases/mercury-may-reach-orbit-through-regulatory-blindspot.html>