WASHINGTON FIRE CHIEFS

Senator Maria Cantwell
511 Hart Senate Office Building
Washington, D.C. 20510

Date: 8/2/2017

Dear Senator Cantwell:

We in the Northwest emergency response community have learned a lot in the last five years about the special and grave public safety disaster risks our communities and our staff at derailment scenes face from the transportation of railcars carrying hazardous chemicals, such as crude oil unit trains. We can never afford to under-estimate these "hazmat" risks. *[Attachment I]*

Over the last 13 years we have observed what we believe to be a quiet but determined campaign to minimize the public perception of toxic gas risks by the chemical and railroad industry. The effort has been enabled by some federal agencies such as US DHS/TSA and the Chemical Security Analysis Center. These taxpayer funded federal agencies provide little to no public transparency or oversight because their focus is domestic security. *[Attachment II]*

Part of this effort includes a critique of existing gas science and a new, "more accurate" gas science. It also sponsored some cleverly designed small-scale gas release field tests, which for several years were misleadingly displayed to selected small audiences as showing that chlorine gas release clouds would not go very far downwind, contrary to real science. In the final, larger-scale field test, recently concluded in September 2016, reality finally asserted itself over wishful thinking: the chlorine cloud was measured at a dangerous concentration many miles downwind which verify what we consider real science.

Although a full-scale 90-ton railcar release would likely provide even more sobering downwind risk results, unsurprisingly no further field tests are planned. With federal agency budget cuts proposed, further analysis of the existing test data is also in some jeopardy. But the industry/agency risk minimization campaign has considerable momentum, and its proponents may yet succeed in further influencing national guidance documents if no dissent is raised.

The national campaign effort includes a special focus on the perception of the potential risks from the standard 90-ton pressurized toxic gas tank cars that move in substantial numbers on the major rail corridors in the Northwest, e.g., corridors originating at the Canexus Corporation chlorine production facility in North Vancouver British Columbia to facilities its website cites as its many chlorine gas-using customers in the US. These "Poison gas" cargoes are transported on nearly all major rail lines, thus through nearly all major US communities, whose at-risk citizens are effectively kept in the dark as to their potential disaster impacts by shippers and carriers and by some local emergency planners who unfortunately are determined not to alarm the public.

605 11th Ave. SE, Suite 211, Olympia, WA 98501 Phone: (360) 352-0161 Fax: (360) 586-5868

WASHINGTON FIRE CHIEFS

The industry-initiated but federal agency-enabled and Congressionally-funded effort cited above has all along explicitly aimed at significantly modifying in a risk-minimizing direction the downwind toxic gas cloud estimates in all of the major national emergency response guidance documents, including specifically the respected "Orange Book", the DOT Emergency Response Guidebook, as well as NOAA's ALOHA computer modeling, the National Fire Protection Association's standards for emergency response operations, and chemical facility submissions to the US EPA's Risk Management Program. The effort already has made some alarming inroads in modifying all these guidance documents and programs. [END NOTE 1]

Citing the newly provided "gas science", moreover, the Chlorine Institute [in its Pamphlet 74 Edition 6 in June 2015, and not seriously amended since] has notably issued recent astonishingly risk-minimizing guidance based on dubious brand-new models and assumptions, and which is intended to reduce the industry's liability in catastrophic releases, given the longstanding dire Protective Action Distance [PAD] estimates of the ERG and other existing national guidance documents. The new Pamphlet 74 Edition 6 estimated the downwind cloud travel distance from a chlorine railcar release [by accident or terrorism] as only "0.2 miles", or 1184 feet, dramatically shorter than its previous historical guidance estimate over many years which is 14.8 miles.

We in the fire service are skeptical of the validity of the new Pamphlet 74 estimates, which we believe are based on dubious, untested new models and assumptions. The Institute will not release the underlying information for independent evaluation, however, asserting that it is based on calculations from gas scientists at US DHS/Chemical Security Analysis Center, almost all of which calculations are still being withheld from public scrutiny.

The chlorine gas industry has also already, in its November 2016 CHLOREP publication [END NOTE 2], touted its success in influencing "almost all" of the chlorine gas PAD calculations in the ERG2016, which means that some of the new ERG2016 gas container calculations estimate that gas releases are not as dangerous downwind as earlier predicted in previous versions of the ERG. Since the arguably most important of the ERG2016 protective action distance, for the standard railcar release, still remains 7+ miles, however, the industry has stated its intention similarly to influence still further the forthcoming ERG2020.

In a significant and surprising new development, however, DHS/CSAC has just released a small portion of actual downwind distance and cloud concentration data from the last of the Jack Rabbit II Dugway field tests *[Attachment 3]*. The new data, unlike results from the previous 2010-2015 smaller scale tests which had been designed mainly to show clouds "held up" at the release point in various ways, show a long chlorine gas cloud plume, dangerously far downwind. This measurement data decisively undermines the chlorine industry's current risk - minimizing efforts and can help protect the safety-conservative estimates in the emergency responders'

WASHINGTON FIRE CHIEFS

"bible", the ERG, from the ongoing campaign's persistent efforts to undermine it. [END NOTE 3]

Federal taxpayers should not continue to fund a complacency-inducing and unreviewed campaign which is dangerous for the emergency responders and the communities at risk for TIH releases. Congress should not allow the risk minimization campaign to stay mainly in the shadows, as currently enabled by the secretive US DHS and US DOD agencies keeping locked away from the at-risk public the most important information underlying the risky changes quietly being infiltrated into industry and federal emergency guidance. We urge elected officials to ensure that the new sobering field test data is publicized vigorously and directly to the whole Congress, the emergency response community and the public.

Sincerely,

Wayne Senter
Executive Director
Washington Fire Chiefs

CC: Senator Claire McCaskill
Senator Tom Carper
Mark Light, IAFC

ATTACHMENT I:

WA FIRE CHIEFS EARLIER LETTER TO CSB/NTSB, WITH 3 APPENDICES

April 6, 2017

Chairperson Vanessa Allen Sutherland
US Chemical Safety and Hazard Investigation Board
1750 Pennsylvania Avenue NW, Suite 910
Washington DC 20006

Chairman Christopher Hart
US National Transportation Safety Board
490 L'Enfant Plaza, SW
Washington, DC 20594

Dear Chairperson Sutherland and Chairman Hart:

We represent fire chiefs in scores of communities which have major hazard chemical facilities and/or are on major hazardous material cargo transportation rail corridors. We are urgently asking for your help in addressing a safety issue of great importance to the fire service and emergency response community, to chemical workers, and to communities at risk from potential chemical releases caused by accident or by terrorism. We feel the issue lies in the jurisdiction of each of your boards.

We are troubled to have learned recently of a quiet, joint chemical and railroad industry initiative, planned over some years and now coming to fruition, to minimize on paper the disaster risks of large releases of chlorine gas and other poison gases, from gas containers both in transportation and on fixed chemical facilities. The current federal guidance resources on such releases indicate miles-long downwind distances for worst case gas cloud releases, for example in the widely-used federal "Orange Book", the Emergency Response Guidebook [ERG], in which both the 2012 and the 2016 editions estimate that a nighttime railcar chlorine release could travel "7+ miles".

The chlorine industry trade association, the Chlorine Institute, has recently abruptly modified its Pamphlet 74 guidance document [Edition 6] "Guidance on Estimating the Area Affected by a Chlorine Release", available online, to suggest that instead of a worst case chlorine gas cloud release traveling downwind 15 miles [as in their previous longstanding Pamphlet 74 predictions], it will only go 1184 feet, that is, .2 miles. Many fire chiefs find this new industry information utterly lacking in credibility for use in a real release event, and some emergency managers say they will refuse to use it for pre-planning.

This astonishing effort to reduce the perception of toxic gas risks – on paper – no doubt has real-world liability and political benefits for the risk-imposing industries. But it also has real potential to reduce concern for such disaster risks – as if communities now have too much concern and spend too much money on disaster hazard analysis, prevention and response capabilities. This new guidance is already being cited by some US chlorine facilities as they recently have reported to federal officials, under US EPA Risk Management Program regulations, that contrary to their earlier predictions of 13- to 14-mile long clouds, worst case releases of their onsite chlorine gas containers will be so short [.3-.5 miles] that they will impact nobody in the surrounding Vulnerable Zones. [see Appendix A, below]

605 11th Ave. SE, Suite 211, Olympia, WA 98501 Phone: (360) 352-0161 Fax: (360) 586-5868

605 11th Ave. SE, Suite 211, Olympia, WA 98501 Phone: (360) 352-0161 Fax: (360) 586-5868

WASHINGTON FIRE CHIEFS

WASHINGTON FIRE CHIEFS

We find this industry-initiated and federally-funded risk minimization effort very troubling on several levels. Without any wide consultation with the fire service and emergency response community, much less with the public, this effort explicitly aims to:

- Inject risk-minimization calculations into all current federal guidance documents for emergency responders. It has already made real inroads along these lines, e.g, with NOAA's widely used ALOHA toxic gas release model [now featuring a RAILCAR model along with the traditional one] and with the ERG, and with the EPA Risk Management Program, as noted above.
- Re-calculate and minimize the perceived risks of a list of all 17 major poison gases [Toxic by Inhalation or TIH chemicals] in pressurized railcars and onsite containers.
- Re-educate the entire North American emergency response community that chlorine etc are not so dangerous as previously predicted by the longstanding earlier gas science.

The Chorine Institute published its new Pamphlet 74 guidance in mid-2015 without even waiting for the results of the largest scheduled "Jack Rabbit II" field test at Dugway Proving ground in Utah [in September 2016], which was a 20-ton tank chlorine release. Gas scientists have suggested that a 20-ton release may not be adequate to predict how and how far a release from the standard 90-ton chorine tank car could disperse. The basic industry data is reportedly not available on all the underlying calculations, assumptions, and models of the new mist pool theory, nor on the recently completed field testing in Utah.

Our preliminary information suggests that the industry stakeholders skillfully over several years quietly funded this effort through the US Department of Homeland Security and the Department of Defense. The effort was conducted with hand-picked scientists through US DHS/TSA/Rail Hazmat Office support and Congressional funding for a post-9/11 DHS Chemical Security Analysis Center at Aberdeen MD. In the last stages of testing they relyed on the military [one NAVSEA modeling scientist and some agreeable colleagues] coming up with an industry-friendly new "mist pool" gas release source model that predicts chlorine gas releases will stay as a round "pancake" mist pool, rather than a gas cloud plume that moves downwind and/or downslope into the community. [see Appendix B. below for an overall characterization of the to-be-expected biases in dense gas field testing, from prominent NOAA scientist Bruck Hicks]. Even non-gas scientists, did not find the videos convincing from several of the Jack Rabbit field tests which seem to have been designed to release chlorine gas in a way that it is unlikely to move offsite. There was no apparent published independent peer review of "mist pool" calculations.

We have had many experiences with Chlorine leaks including the leak in a Spokane WA recycling plant in August 2015 where 50 people were treated at the scene. Of those, 13 were transported to four local hospitals including 8 who were in critical condition. Skeptical fire chiefs have said: maybe your hypothetical large chlorine release will form a stationary pancake if it is in the dead center of a tornado whirling around it, but otherwise, the concept is utterly nonsense. The new industry-initiated gas science minimized estimates are being sold to public officials as filling "gaps" in gas science, and as benefitting the community with "more realistic, less conservative estimates" which earlier "over-predicted" gas cloud distances and which could trigger in real emergency events evacuations that would be unnecessarily costly.

We are responsible not only for the safety of our fire service personnel who must know where to establish an incident command post and a staging area for arriving emergency units in the first

605 11th Ave. SE, Suite 211, Olympia, WA 98501 Phone: (360) 352-0161 Fax: (360) 586-5868

605 11th Ave. SE, Suite 211, Olympia, WA 98501 Phone: (360) 352-0161 Fax: (360) 586-5868

WASHINGTON FIRE CHIEFS

WASHINGTON FIRE CHIEFS

few minutes of a release, but also for the safety of the community we serve, in regards to the potential progressive stages of downwind movement of a toxic gas cloud release.

The chemical and railroad industries in the post-9/11 years vigorously and successfully opposed what academic researchers, US DOT staffers and nine major city councils identified as potentially significant real risk terrorism reduction measures, namely protective re-routing of the most dangerous hazmat cargoes around major cities. Even though the 9/11 attacks prompted US DHS and security experts to identify chlorine and other poison gas rail cargoes as perhaps the most significant threat to US target cities [see expert Richard Falkenrath's statement, Appendix C below], Congress gave the rail industry a 2007 law allowing them to make secret their urban hazmat routing decisions with no significant federal oversight. The urban terrorism and accident risks remain unaddressed.

We ask your assistance in publicly challenging the current ill-advised industry push for an astonishing risk minimization on paper, by demanding full transparency in the assumptions and models and field test data and a full discussion with the emergency response community and the public and with the federal agencies being directly targeted for re-calculation of their longstanding toxic gas risk guidance: DOT/PHMSA, NOAA, DOT, and EPA.

Thank you for your consideration of our request.

Sincerely,

Wayne Senter

Wayne Senter
Executive Director
Washington Fire Chiefs

605 11th Ave. SE, Suite 211, Olympia, WA 98501 Phone: (360) 352-0161 Fax: (360) 586-5868

605 11th Ave. SE, Suite 211, Olympia, WA 98501 Phone: (360) 352-0161 Fax: (360) 586-5868

WASHINGTON FIRE CHIEFS

WASHINGTON FIRE CHIEFS

Appendix A: Examples of RMP reporting using Pamphlet 74 model

Chlorine 2 Facilities use P 74 CI science to reduce vulnerabilities on paper – in CA and DE and one counter-example from NV

Under the EPA's Risk Management Planning (RMP) program chemical facilities that use large threshold amounts of certain extremely hazardous substances conduct an off-site consequences analysis of their potential worst-case release scenario. The result is a vulnerability zone analysis of potentially endangered residential populations. EPA allows a facility to select the modelling methodology it uses to perform the analysis from among credible atmospheric dispersion models or methods.

For decades, the Chorine Institute, a chemical industry association, produced consistent vulnerability zone calculation guidance in its Pamphlet 74, Guidance on Estimating the Area Affected by a Chlorine Release. However, the Chlorine Institute's Edition 6 revision of pamphlet 74, published June 2015, dramatically reduced the estimated distances associated with a chlorine gas release. The following are example facilities that used the revised Pamphlet 74 to recalculate their vulnerability zones – on paper.

1] Kuehne Chemical Co., Inc. – Delaware City

1645 River Road

New Castle, Delaware

RMP EPA ID: 1000-0002-5073

Activity: bleach manufacturing

RMP Date: 5/3/16

Chemical: chlorine

Amount: 180,000 lbs. (rail car)

Distance to endpoint: 0.5 miles

Residential population within distance: 0

Model: Chlorine Institute Pamphlet 74 - Guidance on Estimating the Area Affected by a Chlorine Release

RMP Date: 5/4/11

Chemical: chlorine

605 11th Ave. SE, Suite 211, Olympia, WA 98501 Phone: (360) 352-0161 Fax: (360) 586-5868

605 11th Ave. SE, Suite 211, Olympia, WA 98501 Phone: (360) 352-0161 Fax: (360) 586-5868

WASHINGTON FIRE CHIEFS

Amount: 180,000 lbs. (rail car)

Distance to endpoint: 13

Residential population within distance: 480,000

Model: RMP Management Program Guidance for Offsite Consequence Analysis

2] Sierra Chemical Co., Stockton Facility

1010 Industrial Drive

Stockton, Calif.

RMP EPA ID: 1000-0013-3991

Activity: chlorine repackaging and bleach manufacturing

RMP date: 12/10/15

Chemical: chlorine

Amount: 180,000 lbs. (rail car)

Distance to endpoint: 0.33 miles

Residential population within distance: 0

Model: HPAC model scenarios from Chlorine Institute Pamphlet 74, Edition 6

RMP date: 7/20/09

Chemical: chlorine

Amount: 180,000 lbs. (rail car)

Distance to endpoint: 14 miles

Residential population within distance: 364,261

Model: EPA's RMP*Comp(TM)

[3] Sierra Chemical Co., Sparks NV Facility [still using traditional gas model for SO2]

RMP date: 2/9/16

605 11th Ave. SE, Suite 211, Olympia, WA 98501 Phone: (360) 352-0161 Fax: (360) 586-5868

605 11th Ave. SE, Suite 211, Olympia, WA 98501 Phone: (360) 352-0161 Fax: (360) 586-5868

WASHINGTON FIRE CHIEFS

WASHINGTON FIRE CHIEFS

Chemical: sulfur dioxide (anhydrous)

Amount: 180,000 lbs.

Distance: 14.8 miles

Residential population within distance: 400,000

Model: EPA'S RMP GUIDANCE FOR CHEMICAL DISTRIBUTORS REFERENCE TABLES OR EQUATIONS

605 11th Ave. SE, Suite 211, Olympia, WA 98501 Phone: (360) 352-0161 Fax: (360) 586-5868

605 11th Ave. SE, Suite 211, Olympia, WA 98501 Phone: (360) 352-0161 Fax: (360) 586-5868

WASHINGTON FIRE CHIEFS

Appendix B: NOAA's Bruce Hicks on bias in field testing

Safety and Security Engineering 2005 pp 555ff

Urban dispersion for the 21st century

B. B. Hicks Air Resources Laboratory, NOAA, U.S.A.

Abstract

The threat of a terrorist attack using gaseous or biological agents has changed the focus of urban dispersion research programs. No longer are the studies being conducted solely in intensive programs to explore specific aspects identified by slowly evolving numerical simulations. Instead, there is an emerging parallel thrust to optimize the use of existing data and to provide forecasts based heavily on data assimilation. In this context, there is a basic rule that appears to be emerging: to maximize the accuracy of predictions, minimize the reach beyond reliable observations. Within an urban canopy (i.e. in the street canyons) the complexity of transport through the air is such that an accurate prediction of concentrations at any specific place and time is unlikely, regardless of the proximity of accurate meteorological data. Some options are reviewed, as are currently being tested in Washington D.C. and in New York City. Keywords: urban dispersion, emergency response, 1 Introduction

There are many computer models that purport to describe dispersion in urban areas. Many of these yield displays that suggest confidence in the outputs that is not easily reconciled with the realities involved. With few exceptions, data to verify the accuracy of forecasts are not available. In those cases where data are available, the agreement between model predictions and reality can sometimes be poor (see Gryning and Lyck, [2]; Draxler, [1]). Often, confidence is generated on the basis of comparisons against data obtained in experiments usually conducted elsewhere, and often in circumstances selected to satisfy requirements of the models. In other words, the models are often tested in situations such that there is a good chance that there will be success. The chances that the circumstances of field tests mirror the circumstances of an actual event are slim. Hence, there is a credibility gap that needs to be addressed.

605 11th Ave. SE, Suite 211, Olympia, WA 98501 Phone: (360) 352-0161 Fax: (360) 586-5868

WASHINGTON FIRE CHIEFS

WASHINGTON FIRE CHIEFS

Appendix C: Richard Falkenrath op ed Washington Post washingtonpost.com op-ed "We Could Breathe Easier : The government must increase the security of toxic chemicals in transit"

By Richard A. Falkenrath Tuesday, March 29, 2005; Page A15 Washington Post

The basic strategy al Qaeda used on Sept. 11, 2001, was to strike a common, poorly secured commercial system in a way that would cause catastrophic secondary effects. The terrorists did a better job of identifying the vulnerability associated with fully fueled commercial airliners than the government did -- and they exploited this vulnerability to terrible effect. Now, because of the work of the Transportation Security Administration, commercial aircraft in the United States are all but impossible to hijack. But the terrorist is an adaptive enemy. One central question in homeland security is whether terrorists will again locate a catastrophic civilian vulnerability before the government gets around to addressing it.

There are an infinite number of potential targets in America that, if attacked, could result in hundreds of civilian casualties. The number of potential targets that could result in thousands of civilian casualties is, however, finite and knowable. In the federal government, the Department of Homeland Security is responsible for identifying these potentially catastrophic targets, analyzing their security schemes and taking action if the security arrangements are deficient. It is in general a bad idea to call attention to America's most serious civilian vulnerabilities. Government officials should never do so and should not be asked to. Private citizens should do so with care, and only when the government fails to act.

Of the all the various remaining civilian vulnerabilities, one stands alone as uniquely deadly, pervasive and susceptible to terrorist attack: industrial chemicals that are toxic when inhaled, such as chlorine, ammonia, phosgene, methyl bromide, and hydrochloric and various other acids. These chemicals, several of which are identical to those used as weapons on the Western Front during World War I, are routinely shipped through and stored near population centers in vast quantities, in many cases with no security whatsoever.

A cleverly designed terrorist attack against such a chemical target would be no more difficult to perpetrate than were the Sept. 11 attacks. The loss of life could easily equal that which occurred on Sept. 11 -- and might even exceed it. I am aware of no other category of potential terrorist targets that presents as great a danger as toxic industrial chemicals. The federal government has the authority to regulate the security of chemicals as they are being transported on roads, railways and waterways. With only one minor exception, the administration has not exercised this authority in any substantial way since Sept. 11. There has been no meaningful improvement in the security of these chemicals moving through our population centers.

In a desperate step, the D.C. council recently voted to ban hazardous material shipments through downtown Washington. This ordinance is clearly good for Washington, but it is bad for the other parts of the country that will absorb the diverted chemical loads. Furthermore, its economic burden falls principally on CSX Corp., the company that owns the two rail lines through downtown Washington. CSX is suing to block implementation of the ordinance. The federal government is supporting CSX's effort, an awkward position for a security-conscious administration that has so far failed to mandate a systematic, nationwide reduction in the vulnerability of this sector.

605 11th Ave. SE, Suite 211, Olympia, WA 98501 Phone: (360) 352-0161 Fax: (360) 586-5868

605 11th Ave. SE, Suite 211, Olympia, WA 98501 Phone: (360) 352-0161 Fax: (360) 586-5868

WASHINGTON FIRE CHIEFS

WASHINGTON FIRE CHIEFS

The administration can and should act immediately to enhance the security of toxic chemicals in transit nationwide; no new legislation is required. Specifically, the departments of Homeland Security and Transportation should promulgate regulations that will, over time, require chemical shippers to track the movement of all hazardous chemicals electronically; to report this data to DHS in real time; to use fingerprint-based access controls for all chemical conveyances; to adopt container signs that do not reveal the contents to most observers; to perform rigorous background checks on all employees; to strengthen the physical resilience of chemical containers; to reduce chemical loads; to ship decoy containers alongside filled containers; and to install perimeter security at loading and switching stations. Violators should suffer harsh civil and criminal penalties.

But the federal government does not have authority to regulate the security measures inside chemical plants and storage facilities. President Bush has twice called on Congress to pass legislation granting the Department of Homeland Security this authority. The 108th Congress declined to do so. It is often alleged -- incorrectly -- that lobbying by the chemical industry was behind Congress's inaction. The real reasons had to do with the full agendas of the committees involved; the administration's competing legislative priorities; and the obscure, esoteric and theoretical nature of the issue.

The voluntary security enhancements many of the larger chemical firms have implemented -- in some cases with assistance from the Department of Homeland Security -- are a step in the right direction but are insufficient. Congress should promptly grant powerful authority to regulate chemical-plant security to that department as the president has requested.

There is no silver bullet to improving the security of chemicals that are toxic when inhaled. A layered, nationwide approach is required. It is right and proper for the government to require industries to take on the security costs of their activities. The immediate cost of these regulations would be borne by the chemical industry. Over time, costs would be passed on to consumers, and the market would adjust to a new, more socially responsible equilibrium. The real losers would be al Qaeda and its successors.

The writer was deputy homeland security adviser to President Bush until May 2004. He is now a visiting fellow at the Brookings Institution and senior director of the Civitas Group, an advisory and investment services firm serving the homeland and national security markets.

605 11th Ave. SE, Suite 211, Olympia, WA 98501 Phone: (360) 352-0161 Fax: (360) 586-5868

605 11th Ave. SE, Suite 211, Olympia, WA 98501 Phone: (360) 352-0161 Fax: (360) 586-5868

WASHINGTON FIRE CHIEFS

ATTACHMENT II:

BACKGROUND: THE NATIONAL CAMPAIGN TO MINIMIZE THE PERCEPTION OF TOXIC GAS RISK

While not technically secret, the risk minimization campaign was effectively kept quiet, the details known fully only to a few insider participants in an informal steering committee, and its data and operations hidden. When early on an outside observer inquired about it, one key insider described it generally in a private meeting held at his request off the grounds of his office, saying "We have to make sure you are playing fair with us, we don't want this to end up in the pages of the New York Times."

Regarding concerns about lack of transparency, proponents asserted that the key project data, including the Jack Rabbit field testing downwind gas cloud concentration distances, were shared in the Homeland Security Information Network. This was for authorized insiders only, however, and only on a "For Official Use Only" ["FOUO"] basis that requires strict measures to protect the information from the general public. [The author of this report was belatedly invited to join that group in June 2017.] No independent review has ever emerged by a gas scientist of the overall project's publications [the most important were by Steve Hanna], including the shaky "new gas science" they aimed for and presented, and the related field testing.

Homeland Security Information Network (HSIN): https://hsin.dhs.gov/Pages/Home.aspx

♣ Contact: Jack.Rabbit@st.dhs.gov

♣ Jack Rabbit II HSIN Site: https://hsin.dhs.gov/ci/chm/jrwg/Pages/default.aspx

♣ DHS S&T/CSAC Points of Contact:

Shannon Fox: Shannon.Fox@st.dhs.gov

Mark Whitmire: Mark.Whitmire@st.dhs.gov

Skillfully deploying to hand-picked allies what one prominent gas scientist termed "the largest single pot of gas science research funding in the world", reportedly an estimated one million dollars from Congress, funneled mainly through US DHS/S&T/CSAC, the well-coordinated under-the -radar risk minimization campaign, whose periodic meetings and conference calls also included as insiders a few hand-picked national fire service officials, pursued ambitiously a set of interlocking goals:

- to recruit hand-picked gas scientists to **repeal**, or at least to "cast doubt," on the existing, broad and relatively consistent dense gas dispersion science consensus shared

in recent decades by practitioners of several well-known dispersion models in use nationwide. A few key publications built the case for this.

- to quickly **replace** it with an allegedly more accurate gas model, including several new and dubious assumptions, that predict chlorine gas to be much less dangerous than earlier estimated. Military gas scientists were key in this effort.
- to **validate** the new gas model with DHS/CSAC's 2010-2016 series of DHS/CSAC "Jack Rabbit" field tests at Dugway of mainly small-scale releases, carefully designed -- and biased [NOTE on Bruce Hicks and downward direction of jets] – to minimize the downwind dispersion of the chlorine releases. Only the single 20-ton release, the final test in September 2016, was anyway near large enough to approximate a 90-ton railcar-quantity release. The gas scientists repeatedly expressed doubts about the "scalability" issues in their testing.
- **to re-write** all the national guidance documents, especially those with community evacuation guidance for gas emergencies
- and then, most concerning, **to re-educate** the whole US emergency responder community on the minimized new risks estimates

To this final end, the risk minimization campaign proponents brought together selected stakeholders for two national "Training Value Implications" meetings, in 2013 and 2015, to develop coordinated strategies to re-train the whole emergency response service on the new perspectives. Two of the participants authored the campaign's first national outreach effort to the fire service which can be seen in the extensive November 2016 article on the Jack Rabbit tests in Fire Engineering magazine. The article:

- parrots the talking points of the industry/enabling agencies' campaign
- omits the inconvenient, dramatic September 2016 field test's downwind cloud travel data
- and ends, bottom-line, with an illuminating, explicit exhortation that the fire service should be "establishing a relationship with their peers in the chemical and the railroad industries."

All along the campaign's self-selected stakeholders [no elected officials involved], including centrally the DHS/CSAC officials and Jack Aherne of DHS/TSA, have been giving invited presentations to and extensively lobbying with some evident success the consultant organization authors of the national guidance documents, including NFPA, US EPA, NOAA, and especially Argonne National Labs with its very broad existing research grant contracts. The

lobbying urged insertion of the new risk minimization models and assumptions into the guidance authors' own calculations and methodologies.

The campaign agencies even arranged to fund the guidance consultants/authors to do brand-new [again, hardly well-tested] research on selected factors which they reckoned could be portrayed as significantly lowering the estimation of downwind concentrations of chlorine gas cloud travel and thus support the new "improved" gas models being developed. They also funded military research to develop a new standard for estimating chlorine gas risks to human health. They in effect moved the goal posts of previous gas research from bare estimates of downwind gas concentration to a new standard of estimating concentration over time, as seen most saliently in the Chlorine Institute's 2015 Pamphlet 74, Edition 6.

These factors which the campaign put forward for new focus, which had previously been assessed by prominent gas science researchers such as Steve Hanna as very unlikely to be significant, included the possible "deposition" of chlorine from a gas cloud release onto "urban surfaces" and reaction with "organic matter in various kinds of soils and vegetation, reducing the danger from the cloud. Indeed, the hired authors of the obviously hastily crafted new lab and field experiments unsurprisingly asserted findings of "potentially significant" cloud-diminishing impact, and the Chlorine Institute in 2015 cited this "new deposition research" as "the main factor" allegedly justifying its dramatic new risk minimizing estimates in Pamphlet 74 Edition 6, and the Institute also chose to substitute the new health effects standard, albeit with no clear explanation of the change.

No one could seriously maintain that the main "new gas science" resulting from this whole risk minimization effort by hand-picked insiders has been adequately subjected to open independent peer review or oversight, which is by definition impossible when the basic data has all along been kept hidden from public view and when public funding has been channeled through secretive federal agencies.

The risk minimization campaign has touted the Utah Valley University website as its main mechanism for providing Jack Rabbit information to the fire service. The site, however, provides no actual data on downwind gas cloud concentrations of the larger tests, only photogenic photos and videos. And is accessible only on a restricted basis.

ATTACHMENT III:

CSAC's SUMMARY of the PROJECT JACK RABBIT FIELD TESTING CAMPAIGN, 2010-2016

The risk minimization campaign effort was fronted and coordinated within the government originally by Jack Aherne at DHS/TSA but later largely by a new **DHS agency, CSAC.** Located at Aberdeen MD Army Research institution, CSAC was established in 2010, and touted its work, especially the photogenic but deceptively misleading early field testing, as if it were a major risk-reduction effort:

*"*Project Jack Rabbit—Helping DHS and its Partners Reduce the Risk of Large-Scale Toxic Inhalation Hazard Chemical Releases

Each year, hundreds of millions of tons of chemicals like chlorine and ammonia are transported through U.S. population centers. Although these chemicals are essential, they are toxic and pose a risk to the public through accidental release or an act of terrorism. To better understand and address this risk, CSAC conducted Project Jack Rabbit in 2010 and initiated the Jack Rabbit II program *in 2014.*

Jack Rabbit I involved a series of 1- to 2-ton outdoor chlorine and ammonia release trials involving a team of stakeholders from government, industry and academia.

Jack Rabbit II will continue that effort with release trials of up to 20 tons. These experiments are unprecedented and will fill crucial knowledge and data gaps. Prior to Jack Rabbit I and II, large-scale chlorine releases have never been tested at volumes representative of rail cars, tanker trucks, barges or bulk storage tanks. This work will improve hazard prediction modeling, emergency planning and response and mitigation strategies, as well as improve the United States' resilience against chemical release incidents."

The main industry "partners" always cited in CSAC presentations, unsurprisingly, were the ammonia gas and chlorine gas industries and the railroads, who throughout participated in conference calls and meetings, but effectively kept a low public profile.

WASHINGTON FIRE CHIEFS

ATTACHMENT IV:

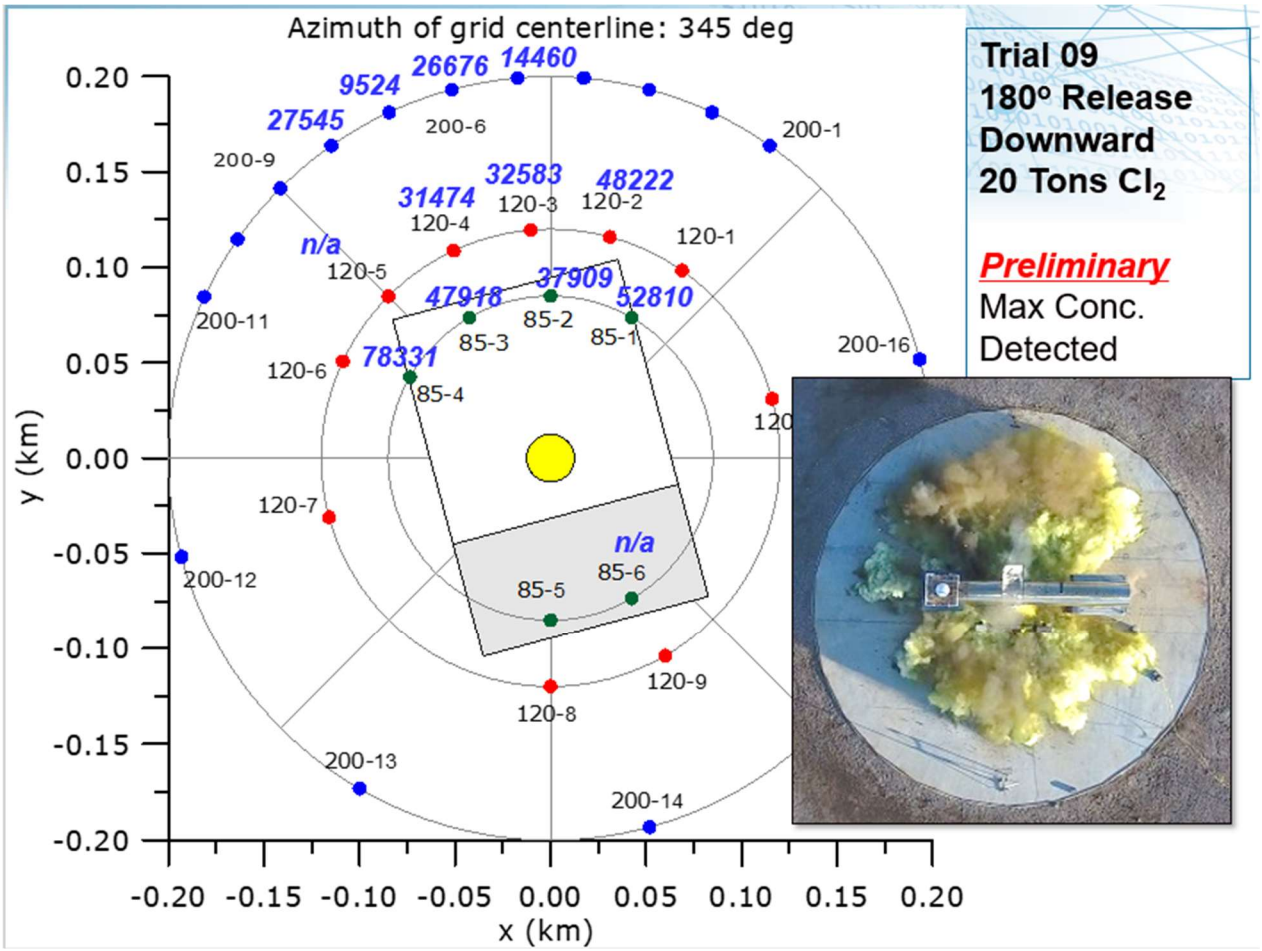
Slides from the final 20-ton Jack Rabbit II [Phase 2] field test release shows the gas cloud measured at dangerous concentrations far downwind:

The first trial 9 slide shows the mainly round cloud [since directed straight downward 180 degrees] measured at concentrations as high as 27545 ppm at the 200m arc.

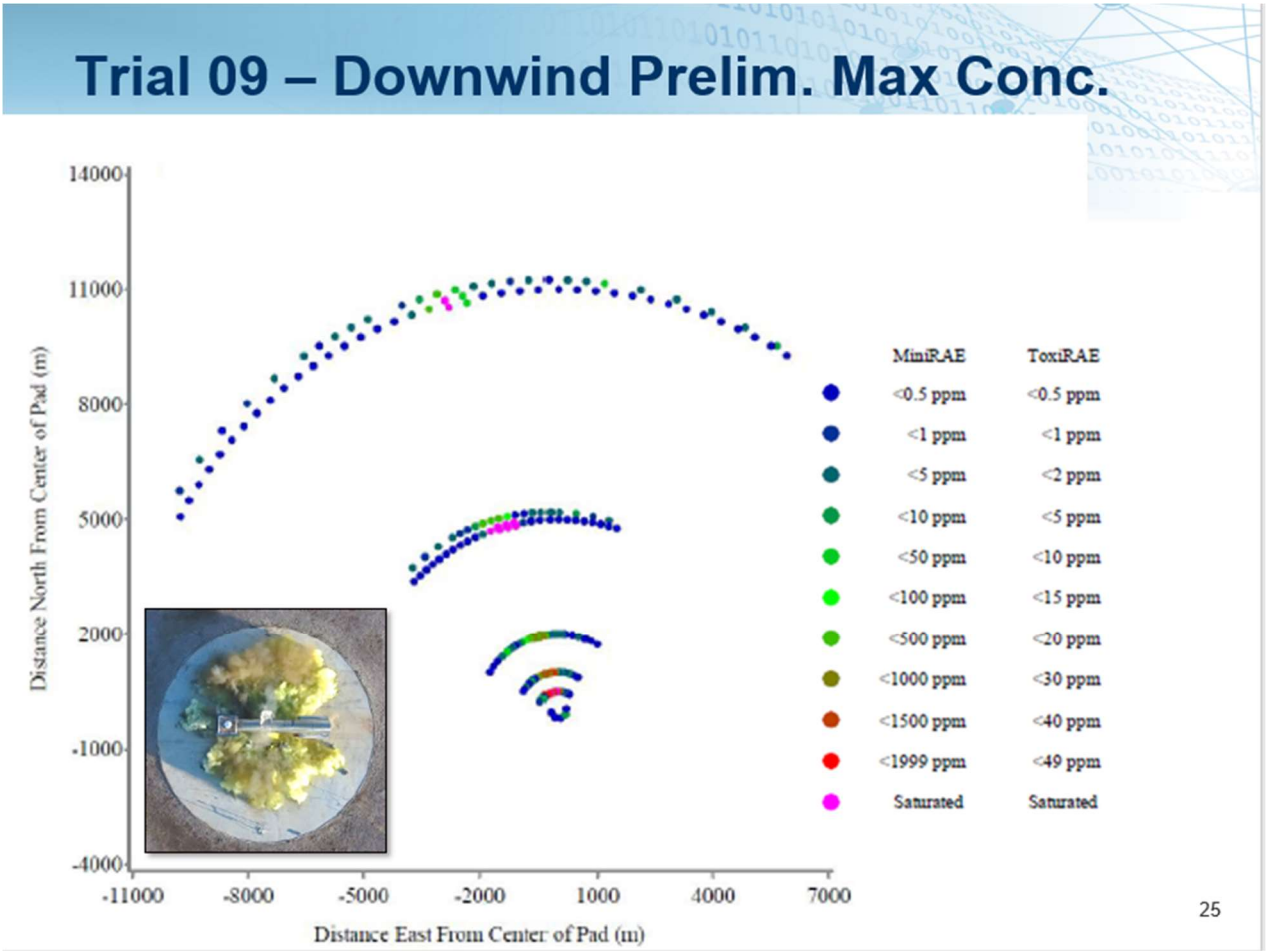
Then the second trial 9 slide shows the downwind plume at the 11 km arc reaching concentrations in the range of approximately 40-1500 ppm.

The earlier Chlorine Institute standard for a dangerous concentration was 20 ppm.

Source: Shannon Fox CSAC presentation at GMU 2017 summer conference.



605 11th Ave. SE, Suite 211, Olympia, WA 98501 Phone: (360) 352-0161 Fax: (360) 586-5868



END NOTES

END NOTE 1. For decades, the several standard national emergency response guidance documents in North America – most important, the indispensable "Orange Book" -- have, in their "safety-conservative" suggestions to emergency responders for needed evacuations and Protection Action Distances, estimated sobering, miles-downwind toxic dense gas plumes. They thus implied extensive potential fatalities and injuries from releases of pressurized gas containers widely used in production, storage and transportation of chlorine gas and other Toxic By Inhalation gases [TIHs]. These estimates were cited in personal injury and other court cases and rail safety legislative hearings in ways that the gas shippers and railroads found very inconvenient.

Prudent emergency responder Incident Commanders following Orange Book guidance might order substantial community precautionary evacuations in hazmat derailments, and the industry responsible for the incident ultimately would bear the costs. The new perception of risk-minimization campaign suggested that a "more accurate" gas science was needed to prevent such "excessive" potential evacuations.
In fact, there have been no public reports to our knowledge compiling any list of "excessive" chemical disaster evacuations. Even in quite serious actual derailment incidents, however, the evacuations ordered have been much smaller than the safety-conservative Orange Book would have suggested: for example, only one mile [5000 residents] in the 2005 chlorine gas tank car release in Graniteville SC, and ¼ mile in the 2016 crude oil derailment and fires in Mosier OR. If anything, local emergency response teams have often badly under-estimated the risks of chlorine gas and other hazardous chemical releases [e.g., in the 2015 West,TX explosion of ammonium nitrate].

Information on evacuation costs is likewise scarce, in part because final court settlements are often kept secret. But media reports from the Knoxville News-Sentinel on December 4, 2015 and July 25, 2016 of the Maryville TN acrylonitrile railcar release on July 2, 2015 provided some information on initial costs paid by the railroad and tank car manufacturer:

"*A broken axle on a single rail car hauling 24,000 gallons of a toxic chemical derailed the 57-car train, causing a fire that burned for 19 hours, authorities said.*

About 5,000 people in a 2-mile radius in Blount County were forced to evacuate their homes. At least 87 people had to be treated, with 36 admitted to the hospital, and 10 first-responders also required treatment for the effects of exposure to the noxious smoke. A fish kill was later reported, and area wells tested.

The rail car was carrying a chemical, acrylonitrile, used in the manufacture of plastics. The substance is considered carcinogenic, and exposure can burn the skin, inflame the lining of the lungs, throat and nose, and cause headaches, nausea and dizziness. Cyanide is a byproduct of burning acrylonitrile.

Union Tank Car Co. manufactured the rail car at issue. CSX is accused, among other things, of dragging the rail car nearly 10 miles after the axle broke, which, in turn, caused it to rupture and the derailment to occur. Both companies face class-action lawsuits in U.S. District Court from emergency responders in one action, and property owners in another…

[Judge] Varlan has dismissed some claims alleged in both lawsuits but is refusing to toss out either in its entirety. He concluded both emergency responders and property owners have, so far, made a case both firms were negligent and that negligence resulted in actual damages.

CSX has complained in prior court filings that it paid more than $3.5 million in damages to evacuated citizens and business owners whose firms were shut down for economic losses and medical bills and to the governments of Maryville and Blount County for its expenses."

… [Judge] Varlan has dismissed some claims alleged in both lawsuits but is refusing to toss out either in its entirety. He concluded both emergency responders and property owners have, so far, made a case both firms were negligent and that negligence resulted in actual damages.

CSX has complained in prior court filings that it paid more than $3.5 million in damages to evacuated citizens and business owners whose firms were shut down for economic losses and medical bills and to the governments of Maryville and Blount County for its expenses."

Useful photos of actual releases are also scarce. The dramatic February 1988 Fire Engineering photo from the 1987 Morristown TN release shows that the successful evacuation of the valley's population of 4000 people over a 3-hour period from a very slow release of only 2 tons of chlorine gas was entirely prudent. The cloud was estimated to reach one mile wide, 5 miles long and 10 feet deep.

The most objective information on potential toxic gas downwind plume risks to the public could be provided by performing full-scale field railcar test releases. A few such tests, with chemical industry and federal funding, were performed for a few hazmat cargoes in the special federal research facility at the Nevada Test Site. One field test series there in 1986 revealed stunningly that large releases of the hydrogen fluoride catalyst used for alkylation in 50 US oil refineries could travel at a dangerous concentration more than 5 miles downwind.

The disaster risk-imposing chlorine industry, however, has since 1986 steadfastly refused to perform such a full-scale field test, despite recommendations to do so from its own prominent consultants, Technica International and the majority of the board.

Washington Fire Chiefs can provide scanned copies of these 1986 Technica International reports. The testing at the Nevada Test Site was the subject of a program on the History Channel, with visuals of substantial gas releases and comments from Dr. Ron Koopman, the Lawrence Livermore National Labs' former director of the testing.

Instead, what the new risk minimization campaign provided from 2020 to 2016 was a drawn-out and photogenic series of small scale gas release field tests carefully designed to produce "stationary", pancake-shaped gas clouds instead of long downwind distance chlorine gas plumes which the previous consensus gas science models had predicted. These photos and videos were placed on the UVU website…

A key method in the field testing design for reducing the downwind cloud distance, utilized in all the early Jack Rabbit I and Jack Rabbit II [Phase 1] tests *[Attachment III]*, was to direct the jet of released chlorine straight down into a hole in the ground or onto a concrete pad. Only in the final Jack Rabbit II [Phase 2] tests did the researchers try releases at several different angles, and they unsurprisingly scratched the scheduled test that would have admittedly produced the farthest downwind plume, at 90 degrees with the wind. Notably the final 20-ton test was of a chlorine release jet directed straight downward at 180 degrees.

END NOTE 2. Source for CHLOREP Bulletin of November 18, 2016: www.chlorineinstitute.org The Bulletin cites an internal document for Institute members listing all the related changes in the ERG2016, but the document is not publicly available. The citation for members only: file:///P:/_Transportation%20Issue%20team%20-TRIT/Regulatory/DOT/ERG/Summary_changes_ERG2016.pdf

END NOTE 3. Only a small glimpse of the September 2016 new and decisive downwind chlorine gas cloud travel data has been finally revealed, to a small audience of gas scientists in the mid-July 2017 gas research conference at George Mason University. The presentation [attached, since it is still not available to the public], was shown in the conference's Jack Rabbit session on June 14, 2007 by US DHS/CSAC's Dr. Shannon Fox [http://camp.cos.gmu.edu<http://camp.cos.gmu.edu/] It included a few slides at the end with some of the most important concentration/distance data as measured in the final and largest field test release at US DOD's Dugway Proving Ground.

The never-before-publicly-seen field test data show that the downwind gas cloud from the 20-ton chlorine release, although far short of a worst-case release scenario from a 90-ton rail car, nonetheless travelled out past the most distant arc of gas sensors, measuring worrisome gas concentrations at fully 11 km [7 miles] downwind. [*ATTACHMENT IV*] This finding is very similar to the afore-mentioned current Table 3 estimate of "7+ miles" for a chlorine railcar release at night, in both the 2012 [p. 353] and 2016 Emergency Response Guidebook [p. 355], which Protective Action Distance estimates in previous ERGs have traditionally been based on accident history and probabilistic statistical modeling by Argonne National Labs.

END NOTE 4. The Pacific Northwest has recently experienced some chlorine gas storage-related and hazardous train incidents that highlight the importance of accurate risk information, adequate planning and proper siting of facilities that handle dangerous chemicals. In 2007 a dangerous chlorine gas leak on the Tacoma Tideflats sent two dozen people to hospitals, including a dozen firefighters, and subsequent investigations revealed serious and

dangerous errors in the emergency response that stemmed from significant under-estimation of the chlorine gas risks. https://www.firerescue1.com/hazards-hazmat/articles/390631-Review-of-Wash-chlorine-incident-faults-firefighters/

In 2015, the release of chlorine gas from a recycling facility in Spokane, Washington sent 13 people to local hospitals, eight in critical condition. http://www.cnn.com/2015/08/12/us/washington-state-chlorine-sickness/index.html

In 2016, a unit train carrying crude oil derailed in Mosier, Oregon, just a few hundred feet from a grade school. The derailment prompted the evacuation of the school and nearby residences, and it resulted in groundwater pollution and millions of dollars in damages. [END NOTE 5] These experiences teach us that our communities deserve to know about the risks we face with dangerous chemical storage and transport. http://www.opb.org/news/series/oil-trains/mosier-derailment-cost-9-million/