August 1, 2016

President Kevin J. Worthen
Brigham Young University
c/o Janet_Heier@byu.edu

Dear President Worthen,

I am an environmental epidemiologist and physicist who has had a long academic career at UCLA and I am an expert in the health effects of air pollution in California. I am writing to you because findings on fine particulate matter (PM2.5) and mortality by BYU Professor of Economics C. Arden Pope, III, are being used to justify multi-billion dollar air pollution regulations in Southern California. Since 1995 Dr. Pope has published epidemiologic evidence that PM2.5 is weakly associated with an increase in total mortality in the United States. However, overwhelming evidence from over a dozen sources, including studies by both Dr. Pope and me, shows that there is NO relationship between PM2.5 and total mortality in California (http://scientificintegrityinstitute.org/NoPMDeaths112215.pdf). Furthermore, a very strong case has recently been made by nine accomplished experts, including myself, that "Particulate Matter Does Not *Cause* Premature Deaths" (https://www.nas.org/articles/nas_letter).

Since Dr. Pope refuses to communicate with me in any meaningful way, I respectfully request that you ask him to send me a YES or NO answer to the following question: "Do you support the way that the South Coast Air Quality Management District (SCAQMD) has used three epidemiologic studies co-authored by Pope (Jerrett et al. 2005, Krewski et al. 2009, and Jerrett et al. 2013) to calculate their 'Preliminary Health Impacts – Mortality', knowing that that these preliminary mortality impacts are the primary public health justification for a Draft 2016 Air Quality Management Plan (AQMP) that will impose an estimated $38.2 Billion in compliance costs on the South Coast Air Basin economy?" The July 28, 2016 SCAQMD slides containing the preliminary mortality impacts and preliminary AQMP costs are attached to this letter, with full details at this weblink (http://www.aqmd.gov/home/library/meeting-agendas-minutes/agenda?title=STMPRSocio_072816). A table summarizing all studies of PM2.5 and total mortality in California, with the 2005, 2009, and 2013 studies highlighted in red, is also attached.

If Dr. Pope refuses to answer my question, then I request an answer from you or any BYU academic who you specify. Because the AQMP is being finalized this summer, I request a timely response, hopefully by August 15, 2016. Until I receive a response to the contrary, I will assume that the official BYU answer to my question is YES. Please let me know if you need more details about this request.

Thank you very much for your consideration and assistance.

Sincerely yours,

James E. Enstrom

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Preliminary Health Impacts - Mortality

- Health impacts for mortality are based on the previous data and:
  - Ozone: Pooling of L.A.-specific NMMAPS and meta-analysis estimates from Bell et al. (2005).
  - $PM_{2.5}$: Pooling of Jerrett et al. (2005), Jerrett et al. (2013), and Kriging and LUR estimates from Krewski et al. (2009).

- No threshold effects assumed for either pollutant
  - IEc recommendation based on latest scientific evidence
  - U.S. EPA's practice

> In the absence of substantial information in the scientific literature on alternative forms of C-R functions at low O3 concentrations, the best estimate of the C-R function is a linear, no-threshold function.
>
> U.S. EPA, 2014 Health Risk and Exposure Assessment for Ozone

Note: Confidence intervals provided on supplementary handout.

Preliminary Health Impacts – Mortality (cont'd)

Premature Mortalities Avoided		
	2023	**2031**
Mortality, All Cause	**2193**	**2563**
Short-term Ozone Exposure	**51**	**87**
Los Angeles	22	40
Orange	10	14
Riverside	11	16
San Bernardino	9	15
Long-term $PM_{2.5}$ Exposure	**2111**	**2425**
Los Angeles	1481	1707
Orange	321	356
Riverside	141	166
San Bernardino	169	197

Note: Confidence intervals provided on supplementary handout.

What Costs Are Being Quantified?

- ☑ Measures with quantified emission reductions ready to be committed into State Implementation Plan (SIP)

  (Note: Measures that recognize co-benefit ozone emission reductions from other programs will not have incremental costs.)

- ☐ MOB-14 existing projects, which are in baseline emissions inventory

- ☐ Measures with TBD/NYQ emission reductions – preliminary costs or unit costs, wherever available, will be discussed separately

Preliminary Costs of Draft 2016 AQMP

Measures	Present Value of Compliance Cost (2017) $MM	Column1	Present Value of Incentives (2017) $MM	Column3	Present Worth Value (2017) $MM	Average Annual Amortized Cost (2017-2031) $MM
Stationary Source	**$6,639.3**	+	**$1,366.6**	=	**$8,005.9**	**$402.6**
SCAQMD Mobile Source	**$861.9**	+	**$588.7**	=	**$1,450.6**	**$120.1**
CARB Mobile Source	**$16,945.3**	+	**$11,815.8**	=	**$28,761.2**	**$1,987.6**
Total	**$24,446.6**	+	**$13,771.1**	=	**$38,217.7**	**$2,510.3**

Note: Numbers may not add up due to rounding.

Summary Table. Epidemiologic cohort studies of PM2.5 and total mortality in California, 2000-2016

Relative risk of death from all causes (RR and 95% CI) associated with increase of 10 µg/m³ in PM2.5

(http://scientificintegrityinstitute.org/NoPMDeaths112215.pdf)

Krewski 2000 & 2010 CA CPS II Cohort N=40,408 RR = 0.872 (0.805-0.944) 1982-1989
(N=[18,000 M + 22,408 F]; 4 MSAs; 1979-1983 PM2.5; 44 covariates)

McDonnell 2000 CA AHSMOG Cohort N~3,800 RR ~ 1.00 (0.95 – 1.05) 1977-1992
(N~[1,347 M + 2,422 F]; SC&SD&SF AB; M RR=1.09(0.98-1.21) & F RR~0.98(0.92-1.03))

Jerrett 2005 CPS II Cohort in LA Basin N=22,905 RR = 1.11 (0.99 - 1.25) 1982-2000
(N=22,905 M & F; 267 zip code areas; 1999-2000 PM2.5; 44 cov + max confounders)

Enstrom 2005 CA CPS I Cohort N=35,783 RR = 1.039 (1.010-1.069) 1973-1982
(N=[15,573 M + 20,210 F]; 11 counties; 1979-1983 PM2.5) RR = 0.997 (0.978-1.016) 1983-2002

Enstrom 2006 CA CPS I Cohort N=35,783 RR = 1.061 (1.017-1.106) 1973-1982
(11 counties; 1979-1983 & 1999-2001 PM2.5) RR = 0.995 (0.968-1.024) 1983-2002

Zeger 2008 MCAPS Cohort "West" N=3,100,000 RR = 0.989 (0.970-1.008) 2000-2005
(N=[1.5 M M + 1.6 M F]; Medicare enrollees in CA+OR+WA (CA=73%); 2000-2005 PM2.5)

Jerrett 2010 CA CPS II Cohort N=77,767 RR ~ 0.994 (0.965-1.025) 1982-2000
(N=[34,367 M + 43,400 F]; 54 counties; 2000 PM2.5; KRG ZIP; 20 ind cov+7 eco var; Slide 12)

Krewski 2010 (2009) CA CPS II Cohort
(4 MSAs; 1979-1983 PM2.5; 44 cov) N=40,408 RR = 0.960 (0.920-1.002) 1982-2000
(7 MSAs; 1999-2000 PM2.5; 44 cov) N=50,930 RR = 0.968 (0.916-1.022) 1982-2000

Jerrett 2011 CA CPS II Cohort N=73,609 RR = 0.994 (0.965-1.024) 1982-2000
(N=[32,509 M + 41,100 F]; 54 counties; 2000 PM2.5; KRG ZIP Model; 20 ind cov+7 eco var; Table 28)

Jerrett 2011 CA CPS II Cohort N=73,609 RR = 1.002 (0.992-1.012) 1982-2000
(N=[32,509 M + 41,100 F]; 54 counties; 2000 PM2.5; Nine Model Ave; 20 ic+7 ev; Fig 22 & Tab 27-32)

Lipsett 2011 CA Teachers Cohort N=73,489 RR = 1.01 (0.95 – 1.09) 2000-2005
(N=[73,489 F]; 2000-2005 PM2.5)

Ostro 2011 CA Teachers Cohort N=43,220 RR = 1.06 (0.96 – 1.16) 2002-2007
(N=[43,220 F]; 2002-2007 PM2.5)

Jerrett 2013 CA CPS II Cohort N=73,711 RR = 1.060 (1.003–1.120) 1982-2000
(N=[~32,550 M + ~41,161 F]; 54 counties; 2000 PM2.5; LUR Conurb Model; 42 ind cov+7 eco var+5 metro; Table 6)

Jerrett 2013 CA CPS II Cohort N=73,711 RR = 1.028 (0.957-1.104) 1982-2000
(same parameters and model as above, except including co-pollutants NO2 and Ozone; Table 5)

Thurston 2016 CA NIH-AARP Cohort N=160,209 RR = 1.02 (0.99 -1.04) 2000-2009
(N=[~95,965 M + ~64,245 F]; full baseline model: PM2.5 by zip code; Table 3)

Enstrom 2016 unpub CA NIH-AARP Cohort N=160,368 RR = 1.001 (0.949-1.055) 2000-2009
(N=[~96,059 M + ~64,309 F]; full baseline model: 2000 PM2.5 by county)