MEMORANDUM

From: SCAPA Lead Task Force

April 20, 2015

RE: EPA LEAD MONITORING AT THE SAN CARLOS AIRPORT (KSQL)

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I. Background

The San Carlos Airport Pilots Association (SCAPA) represents pilots who use San Carlos Airport (KSQL) as their main base of operations. Our members include commercial operators, airport businesses, and private operators. Our members' flying activities include everything from air ambulances, law enforcement and environmental missions, commercial passenger charters, Young Eagles (free educational children's flights), Angel Flights (volunteer medical transport), and business and personal transportation. SCAPA is committed to environmental responsibility—the underpinnings of which require sound science, analysis and action conforming to approved methods.

This memorandum considers the U.S. Environmental Protection Agency's (EPA's) premature release of uncertified and flawed raw data concerning the presence of lead at KSQL. Furthermore, this memorandum describes how EPA deviated from its own study design by placing ambient air monitoring equipment in extremely close proximity to aircraft engine propeller blast, forcing concentrated exhaust emissions into the monitors and thereby producing inaccurate, distorted lead level results. **Notwithstanding, subsequent monitoring on the North side of the Airport found unelevated, background – nominal lead levels, underscoring the EPA's flawed data and undertaking.**

The industry standard for aircraft fuel is 100 octane low-lead (100LL) aviation gasoline. There is no certified or commercially viable alternative today or in the immediate future for 100LL Avgas (the standard aviation gasoline sold at KSQL). While it has been asserted that 70% of the General Aviation fleet can be modified to run a commercializable form of unleaded fuel (94UL), the fact is that the remaining 30% of the fleet cannot, and that 30% is responsible for 70% of fuel sales because it includes all high performance aircraft including most commercial operations.[1]

II. Discussion

In 2009, the EPA required that ambient air monitors be installed at fifteen airports throughout the United States, and that they be monitored for one year in an effort to better understand how lead emissions affect the air near airports. Three of the fifteen airports are located in the San Francisco Bay Area including KSQL, Palo Alto Airport and Reid-Hillview Airport.[2]

In early 2012, SCAPA learned that the EPA had adopted a rule for performing baseline studies of lead from various sources, including airports, and that KSQL was on the list of sites to be tested. At that time, EPA and Bay Area Air Quality Management District (BAAQMD) officials stated that the purpose of the study was exclusively "for modeling" to determine whether their study methodologies were valid and appropriate. No enforcement or other action was intended to be taken based on results of the surveys.

The EPA released a memorandum[3] stating its rationale for selecting the airports and proposed protocols for monitoring air at such airports. In the memo, the EPA discussed the importance of testing "ambient air" at locations that are appropriate from a scientific perspective, and referred to several generations of lead studies at the Santa Monica Airport. The EPA stated its intention to measure ambient air "downwind" from the most frequently used runway because "The location of the predicted maximum lead concentration(s) at airports is *downwind* of the area(s) where pilots conduct the preflight run-up check and takeoff."[4] The Santa Monica studies show that lead from aircraft engines tends to disperse very rapidly as distance from the engine exhaust increases, and that "lead concentrations during the maximum three-month period . . . deceased four-fold from the end of the runway to a site 150 meters downwind."[5]

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[1] The FAA has formed the Unleaded Avgas Transition Advanced Rulemaking Committee (UAT-ARC) (which includes EPA) to address eliminating lead from aviation fuels. Their report is available at http://www.faa.gov/regulations_policies/rulemaking/committees/documents/media/Avgas.ARC.RR.2.17.12.pdf .

[2] Two of the remaining fifteen monitored airports are in Southern California at Palomar/Carlsbad and Gillespie Field in San Diego.

[3] EPA, MEMORANDUM RE: SELECTION OF AIRPORTS FOR THE AIRPORT MONITORING STUDY (Nov. 18, 2010), at page 4, *available at* http://epa.gov/otaq/regs/nonroad/aviation/memo-selc-airport-mon-stdy.pdf (hereinafter "EPA Memo").

[4] EPA MEMO, Id.

[5] "The Santa Monica airport monitoring study . . . reported a three- to four-fold decrease in ambient lead concentrations over a distance of 80 meters between two monitors sited to evaluate the lead gradient downwind from the runway." EPA Memo, at page 6.

The EPA Memo also included discussion of the proposed study at each airport, including aerial photographs showing the site for the air monitors. For KSQL, the photo[6] (see Figure 1, below) shows two monitors—one located on the north (Bay) side of runway 30, and one outside the security fence on the south side of runway 30.

Figure 1 - Study Design Monitor Placement

The monitor on the north side was to be placed "less than 50 meters" from the runway 30 runup area and threshold. Because there is no public access to the north side of runway 30, SCAPA objected to the placement of a monitor in that location. That monitor location was eliminated from the study. The monitor on the south side was to be placed at the location shown by the pin in Figure 1.

That, however, is ***not*** where EPA put the monitor. Instead of placing the monitor downwind from the runup area (where pilots exercise their engines to a high RPM to ensure proper performance and safety during take-off and thereafter) on the south side of 30, EPA mounted the monitor inside the security fence directly behind the run-up area—25 or fewer feet from the aircraft exhaust, and DIRECTLY in the propeller blast of the engines. See Figures 2 and 3, below. The prop blast easily overwhelms prevailing winds, and blows engine exhaust directly behind the airplanes, into the monitor, before the blast reaches the security fence that separates the runup area from the parking lot.[7] Pedestrians are prohibited inside of the security fence.[8] Even if pedestrians were permitted access, prop blast from aircraft engines at idle is significant, uncomfortable to endure, and during engine runup, highly uncomfortable and dangerous—blowing dust, sand, gravel with force sufficient to cause injury. People

[6] EPA Memo, Figure 28, at page 36.

[7] The EPA agreed that the EPA had moved the monitor from the position designated in the design study (telephonic conversation between Marion Hoyer and Carol Ford, at al., on March 7, 2013), but mistakenly represented it was only six feet. In fact, the actual location of the monitor is approximately *100 meters* closer to the tailpipe source than the design location. In contrast, consider that the monitors at Gillespie Airport are *~400 feet* from the run-up area.

[8] The run-up area is in the "restricted access area" and the monitors are also inside the "Runway Object Free Area (ROFA)".

do not voluntarily stand in or breathe prop blast. In EPA's lexicon, the monitors are not located in or sampling "ambient air". Moreover, the monitor manufacturer's operating manual prohibits sampling in a direct blast of air (such as "prop blast" – the forceful wind from an aircraft's propeller), in non-ambient air conditions. Thus, the conditions under which the EPA's monitor data was taken at KSQL – in prop blast - was patently invalid.[9]

Figure 2 - Actual Monitor Placement (Red Arrow Location)

The force of the prop blast, however, dissipates quickly. The security fence itself, because it has slats in it, substantially arrests and deflects the prop blast. This fact is readily observable by standing behind the fence line, where the air velocity in the parking lot is dramatically less than the velocity on the other side of the security fence immediately behind the aircraft. Indeed, the security fence and environs show how the security fence absorbs tremendous amounts of energy from prop blast during runup. Once deflected, engine exhaust disperses and follows the prevailing winds away from the parking lot and towards the Bay.

Figure 3 - Monitor Proximity to Run-up Area – In the Prop Blast ~25'

[9] See Tisch Environmental, Inc., Sampler Manuals, http://tisch-env.com/manuals/high-volume-air-samplers/ .

Moreover, the force of that prop blast can resurrect contaminants that had build-up over years from prior land uses and (the extensive) prior use of leaded fuel on Route 101,[10] all non-aviation sources.

Predictably, the monitors detected lead levels in excess of EPA's recently-lowered allowable threshold for airborne lead. In an apparent attempt to verify the readings of the single monitor that was originally placed, EPA installed a second monitor a few feet away. The results from the second monitor also exceed EPA's recently-lowered threshold, yet their results differ.

Notwithstanding EPA's previously-stated intent to use the data only for baseline study design purposes, EPA subsequently published the results of its (uncertified and flawed) study. This is further aggravated by the EPA "Fact Sheet" that failed to acknowledge that the monitors are placed improperly despite having been notified of same – thereby potentially misleading the public.[11]

The security fence around the run-up area disperses some of prop blast. Moving the monitors outside the security fence and closer to the Bay (where originally proposed) would provide readings that represent the air in a publicly accessible area.

In March, 2013, an additional monitor was installed to the north of the Airport. The EPA subsequently characterized the results of such monitoring as "*pretty much background* – 0.001 micrograms/m3... The numbers from this monitor should ... be given the same weight as the numbers from the south monitor."[12] These results tend to validate the key assertions in this memo – that the monitoring results from the monitors proximate to the run-up area are flawed.

In March of 2015, another monitor was placed inside and near the fence, approximately ~145 yards downwind from the now-closed runup area. As before, these monitors are sampling air that the public does not breathe—not ambient air—and thus again, in violation of the EPA's own study protocols. Airport Management expects that the results from these monitors will nonetheless be lower than EPA's action threshold because (i) the monitors, while still inside the fence, are farther away from the now-closed runup area, and (ii) the runup area has been moved to a location even farther away than before. The Airport may be correct in its predictions. This does not, however, excuse the multiple errors in EPA's monitoring program, nor does it restore the use of the runup area to the public users of the Airport.

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[10] D.J. Steading, C.E. Dunlap, and A.R. Flegal, "New isotopic evidence for chronic lead contamination in the San Francisco Bay estuary system: Implications for the persistence of past industrial lead emissions in the biosphere," PROC. OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA, v. 97, no. 21, at pp. 11181-11186 (Oct. 10, 2000).

[11] MONITORING THE AIR FOR LEAD NEAR THE SAN CARLOS AIRPORT (draft, Mar. 8, 2013). Defects in the available EPA data/reporting (to date) include but are not limited to uncertain or unstated: qualifications of monitoring personal, adequacy of student training, calibration of instruments, comparison of instruments and personal at the target airports, and identification/descriptions of the physical locations and site locations at the airports studied.

[12] Email from Gwen M. Yoshimura, Air Quality Analysis Office, Environmental Protection Agency, Region 9 (Mar. 29, 2013) (emphasis added).

Alternative Fuels

There is an established National working group of EPA, FAA and aviation industry representatives that is following recognized procedures to resolve unleaded aviation fuel issues. EPA's flawed lead study may also have the unintended effect of precipitating well-intended but premature and misdirected local initiatives to provide substitute fuels – initiatives which may not offer a viable solution. Indeed, as concluded by the General Aviation Avgas Coalition:

> For the general aviation community, any regulation of aircraft emissions is a safety of flight issue. Small changes to aviation fuel can have life and death consequences for pilots, passengers, *and those living underneath flight paths.* . . . The prominence of safety reinforces the need to proceed carefully, and to make a determination only when such action is well supported by data and careful analysis."[13]

III. Analysis

The ambient air monitors were installed at all three Bay Area airports in early 2012. These airports have operations and mixes of air traffic nearly identical to KSQL. Yet, the raw data from the monitors at Palo Alto and Reid Hillview Airports show lead levels significantly lower than at KSQL. The placement of the monitors directly behind the aircraft run-up area and inside of a security fence at KSQL has created false data from which no public health implications can be drawn. ***EPA deviated from its own study design in placing the monitors.*** It neither considered the effect of prop blast, nor that *prop blast inside the security fence is not ambient air*. Indeed, the EPA's *Quality Assurance Handbook for Air Pollution Measurement Systems*[14] states:

> Because obstructions such as trees and fences can significantly alter the air flow, monitors should be placed away from obstructions. *It is important for air flow around the monitor to be representative of the general air flow in the area to prevent sampling bias*.... Network designers should *avoid sampling locations that are unduly influenced by down wash*...in these cases, the sample intake should either be elevated above the level of the maximum ground turbulence effect or placed at a reasonable distance from the source....

The EPA appears to have failed to model or test the actual, true dispersal of aircraft exhaust at KSQL, which would take into account, among other things: (i) prevailing winds that carry exhaust away from the monitor site, (ii) the placement of monitors on the wrong side of the security fence, and (iii) the lack of public access—let alone significant distance to airport neighbors—where aircraft exhaust is blown by the wind.

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[13] COMMENTS OF THE GENERAL AVIATION AVGAS COALITION ON THE ADVANCE NOTICE OF PROPOSED RULEMAKING ON LEAD EMISSIONS FROM PISTON-ENGINE AIRCRAFT USING LEADED AVIATION GASOLINE, EPA DOCKET NO. EPA–HQ–OAR–2007–0294, *available at* http://www.eaa.org/govt/EPA-Lead-Avgas.pdf (emphasis added).

[14] VOLUME II, AMBIENT AIR QUALITY MONITORING PROGRAM, EPA-454/B-08-003 (Dec. 2008), Section 6.3 at page 11 (emphasis added), *available at* http://www.epa.gov/ttnamti1/files/ambient/pm25/qa/QA-Handbook-Vol-II.pdf .

The results from two monitors located just feet apart appear to confirm what EPA acknowledges in its own design memo: *distance and direction from the source have tremendous impact on the levels of lead detected by air monitors*. The sole valid conclusion that can be drawn from the data collected to date is that there is lead in aviation fuel.

IV. Questions for Consideration

EPA's handling of this matter raises many questions, including the following.

1. Why was the public initially told that the purpose of the study was merely for baseline research, when EPA instead released the raw study data to the public?
2. Why was the monitor location moved from the location in the published study design?
3. Why was the monitor placed directly in the prop blast of aircraft behind the run-up area?
4. Why was the monitor placed on the wrong side of the security fence—on the restricted side which prohibits public access?
5. Why was there no apparent consideration of whether the prop blast directly behind an aircraft meets the definition and purpose of "Ambient Air"?
6. Why has EPA apparently failed to internally validate its results before publication?
7. Why has EPA proceeded without critical stakeholder participation?
8. Why has another monitor again been placed inside the fence where there is no "Ambient Air"?
9. Why were no less drastic alternatives tried per the FAA's recommendations[15] before the runup area was permanently closed?

V. Conclusion

The deviation from EPA's original study design has created a false and alarming picture of lead at KSQL. Rather than having measured ambient air at KSQL, the monitoring has simply measured aircraft exhaust virtually "at the tailpipe" of aircraft. Such results neither serve their intended purpose nor indicate the level of lead to which the public is exposed. Its release without adequate analysis, qualification, or consideration of available information is wrong! It assumes that the public stands close enough to breathe the exhaust of these small airplanes. Finally, the release of such erroneous data will likely irreparably harm KSQL, its many diverse users, and the community at large.

[15] FAA, Memorandum from Ralph Thomson, Mgr., Apt. Planning and Environmental Div. (APP-400) to Reg'l Airports Div. Mgrs., et al (June 19, 2013).

VI. Recommendations

1. Cease monitoring activities until a thorough review of the study design has been completed and remedial actions taken to ensure that the design and implementation conform to relevant standards and science, and that KSQL is not prejudiced as a result of the prior flawed, uncertified data monitoring results.
2. Thereafter, reposition the monitors to ensure that they sample ambient air in a publically accessible area rather than in localized concentrations of engine emission in prop wash.
3. Recognizing that future, properly executed lead monitoring should indicate nominal (conforming) emissions at KSQL, and recognizing that current National initiatives to develop a lead-free aviation gasoline substitute are not anticipated to product a viable result in the foreseeable future, local aviation fuel planning activities should be held in abeyance.
4. Formally recognize that SCAPA is a stakeholder.

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