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To: NIOSH Docket Office (CDC)
Cc: Chen, Jihong (Jane) (CDC/NIOSH/EID) (CTR); Doyle, Glenn (CDC/NIOSH/EID)
Subject: 128 - FiringRangesAlert Comments

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Comments
I am writing from the perspective of a project manager and mechanical engineer involved with design, construction, and operations of various federal agency law enforcement training small arms firing ranges and as a private consultant for a variety of firing range design and construction projects spanning the last 20 years.

Your expanded recommendations will be helpful to the industry. The acknowledgement of problems associated with lead contaminated surfaces and improved monitoring guidelines are needed. The promotion of educational awareness and establishment of thresholds and procedures for monitoring lead levels and hearing conservation is needed.

However, in some instances your draft recommendations seem to adopt reference design guide information which is not current, accurate, or considerate of the multitude of circumstances which govern the spectrum of range design, maintenance, operational considerations. Economy is always a factor and some recommendations seem to neglect cost considerations.

The document would be more useful if source information references were included to support and permit verification of many of the recommendations.

Comments follow:

Lead – Supply Ventilation System Recommendations:

Page 13, 2nd paragraph: Reference source of information NIOSH used to determine that use of a perforated wall plenum "ensures optimum airflow distribution across the firing line". Perforated 90-180 degree radial air diffusers mounted at ceiling height prevelant, practical and economical and have been widely tested and demonstrated effective in meeting established industry and regulatory airflow criteria. Request NIOSH reference source of test data on radial plenum or wall plenum construction demonstrating that 15 feet is needed from the plenum to the firing line?
Please cite testing sources including description of the constructed conditions.

Page 14, 1st para: One of the biggest contributors to airflow disruption is shooting booths/dividers. Obstruction such as these can defeat the best engineered laminar airflow system.

Exhaust Ventilation System Recommendations:

Page 14, 1st para: "Exhausting 10% more air than supplied is a general recommendation for maintaining

appropriate negative pressure in the firing range." This figure is high and represents significant energy costs and air handling equipment equipment capacity. The recommendation seems arbitrary and tends to neglect economy, Federal energy policy and LEED goals. What is the source(s) of this recommendation and was energy usage considered as a factor?

Air filtration Recommendations:

Page 14, 2nd para: "If lead-contaminated air..., the exterior walls of the building and surrounding grounds (ADD- and waterways) can become contaminated." Runoff of lead contaminated water is a problem (Clean Water Act).

Lead released outdoors...can be re-aerosolized and result in subsequent contamination of the firing range, (ADD – persons exposed to this lead), or other buildings.....").

Page 15, 1st para: All filters (Add- potentially exposed to lead contaminated air) should be equipped with side and face gaskets....." .
Recognize and differentiate that supply filters are commonly used in these systems but do not necessarily require gasketed filters in a 100% exhaust type design.

Filter System Maintenance Recommendations:

Page 15, 2nd para: "Dirty filters should be (ADD- transported and) disposed of properly .....")

Control system Recommendations:

Page 15, 2nd para: "Exhaust and supply fans should be interlocked so that all fan systems operate at the same time (ADD –during active range use)."
Here again, your sources are imposing recommendations without considering the spectrum of range operating conditions and constraints. Mechanical systems "interlocks" should implemented dependent upon the full range of operating conditions. Operation costs and energy conservation warrants that a HVAC system operate in an economical "unoccupied setback" mode, even on firing ranges. In this economy mode air temperature inside the range is being maintained at a more economical setting. More importantly, to also conserve energy range owners/designers will design dampered air handler systems which recirculate the conditioned air in the unoccupied mode (no shooting) rather than exhaust it. Dependent upon system architecture, a hard supply and exhaust fan system interlock serves to defeat this unoccupied mode of operation.

"Air flow from the fans should be monitored (DELETE – at the firing range operator's station) and interlocked with a critical firing range operating systems to....." Suffice it to say monitor it but refrain from telling people 'where' to monitor it. System monitoring and control locations are dependent on the design and operational protocol of the range operator.
Direct digital control (DDC) systems are used which are able to automatically shut the system down in the event a system operating parameter is violated. And, a DDC system generated signal can notify the range officer by a variety of means.

Page 15, 3rd para: Inclusions of safety recommendations outside the realm of lead and noise issues seem beyond the scope of this document and should be avoided.

Last para: "Exhaust air from the firing range should not be recirculated back into the range." I disagree with your logic. Realize there are folks who really don't concern themselves with the huge potential energy waste attributed to this philosophy. Properly designed range HVAC systems move an inordinately high volume of air. If the exhausted air is cooled or heated is represents substantial energy waste. As a Federal agency, NIOSH should consult the current Federal energy policy and consider the energy use implications of your recommendations. Various engineering controls are available to allow saving energy and recirculating some range air at significant operating cost savings. Folks need to be thinking about recirculation with engineering controls.

The document goes on to say, "It is important to note that the recirculated air systems often require a high amount of maintenance and
expense." This seems a statement of relative opinion. What is the
"expense" (in terms of resources and the environment) of dumping huge quantities of conditioned air to the atmosphere vs. the cost of installing and maintaining a filter system with engineering controls which

permit energy saving recirculation of some air. I have experience with such recirculation ranges which have operated successfully for years without instance of elevated BLL. Yes, they are imperfect and do have to be properly maintained. Please reference any hard data you have demonstrating through life cycle operational cost analyses that 100%
exhaust systems are superior to recirculation systems. Suggest NIOSH
qualify or delete any comments and recommendations not based upon accurate and verifiable information.

Noise:

Page 16, second bullet – The inclusion of a statement that observation rooms should be constructed with bullet resistant glass seems to be a recommendation outside the scope of this document. Ballistic protection recommendations are not the subject of your document. On the other hand, NIOSH should add the pertinent recommendation to use sound rated wall, door, and window assemblies suitable to attain the desired acoustical controls and performance.

Page 16, last paragraph extending onto page 17: The NIOSH comments seem biased towards the promotion of rubber bullet traps and exclude mention of other trap technologies and their respective considerations. Traps have multiple purposes. Acoustical tests and reports are available which say the noise generated by bullet impact on a steel bullet trap is not perceptible to the range users. So, of what hearing conservation advantage is a quiet trap? Rubber traps also become compacted with bullets in the strike zone which creates lead particulate (and a backsplatter hazard). Is NIOSH familiar with other methods employed in conjunction with steel traps to control lead and are you familiar with the equipment costs, service, and maintenance considerations attributed to various traps? Rubber traps burn (Military design guides disallow their use), create a lead contaminated media, and they require frequent maintenance placing workers in contact with lead contaminated material.