DEPARTMENT OF THE AIR FORCE
711th HUMAN PERFORMANCE WING (AFMC)
WRIGHT-PATTERSON AFB OHIO

4/1/26

MEMORANDUM FOR AFGSC/CC

FROM: 711 HPW/RH
2510 Fifth Street
Wright-Patterson AFB OH 45433-7901

SUBJECT: Missile Community Cancer Study (MCCS) Burn Study Brief Report

1. **BOTTOM LINE UP FRONT**: The study of the emissions from missileers burning controlled items conducted by the 711 HPW/RHB Force Health Protection Section determined the following:

a. Cancer: The risk is below the National Institute of Occupational Safety and Health (NIOSH) designated risk management threshold for occupational exposure.

b. Noncancer: The risk of severe or long-term effects is low.

2. **BACKGROUND**: The Force Health Protection (FHP) section of the Air Force Research Lab (AFRL) Air and Space Biosciences Division (RHB) was contacted by the Office of the Command Surgeon of Air Force Global Strike Command (AFGSC) to evaluate the possibility of adverse health effects related to exposures from the former practice of Missileers disposing of controlled items by burning them in the Launch Control Centers (LCC). The findings of this study will inform the understanding of how these now-discontinued practices may have contributed to past and/or present health effects for Missileers and the potential for future health effects

3. **APPROACH**: To accomplish the study objective, controlled burns of both Crypto Tape and Taper Detection Indicators along with a standard mix provided by AFGSC/A3O were conducted in an ammunition can within a cone calorimeter. Chemical emissions were measured utilizing multiple environmental sampling devices and techniques. Data obtained from burns were used to predict exposure levels relevant to human health inside missile facilities using physics-based modeling. A human health risk assessment (HHRA) was then conducted by comparing the simulated chemical concentrations in the LCC to scientifically derived acceptable exposure levels for health endpoints (cancer and noncancer).

4. **RESULTS**: The burn measurements determined that emissions were comprised of combustion gases, submicron and fine particulate matter, aldehydes, aromatics and polycyclic aromatic hydrocarbons. The physics-based models estimated exposure concentrations at burn observer and other LCC occupant locations for burns positioned both (1) in the “catwalk” and (2) in the T-junction for the F.E. Warren and Minot LCC layouts. Exposure concentrations throughout the LCC were slightly higher when the burns occurred in the “catwalk.” Concentrations were also calculated for a “catwalk” burn location for the Malmstrom LCC layout, but these values were 2-3 times lower than the F.E. Warren and Minot values. Due to

this, the HHRAs focused on the exposure data from the F.E. Warren and Minot “catwalk” burn condition to represent the worst-case scenario.

a. The HHRA demonstrated that the cumulative excess risk ranged from 0.052 to 0.36 cases per 10,000 individuals, which is below the NIOSH designated risk management threshold of 1 in 10,000. A key aspect of this study was the use of Virtual models for property Evaluation of chemicals within a Global Architecture (VEGA) computational modeling to estimate the cancer potency for numerous chemicals that lacked authoritative data, which significantly improved the comprehensiveness and protective nature of the HHRA.

b. The noncancer HHRA concluded that the development of significant, irreversible noncancer health effects in personnel exposed to the byproducts of burning materials within LCC is unlikely. The analysis indicates a potential for minor, transient, and reversible sensory irritation from recurring 15-minute exposures, a risk primarily driven by formaldehyde. However, the assessment shows that the risk of more severe or long-term health consequences is low, with the hazard quotient for "marginal" effects below the level of concern.

5. NEXT STEPS: The report has been drafted and was submitted for review by AFGSC and AFRL public affairs for public release. Results will be documented in the Defense Occupational and Environmental Health Readiness System.

6. Please direct any questions regarding the details of this study to my action officer on the matter, Dr. Christin Duran, via phone at 937-683-2201 or email christin.duran@us.af.mil.

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