

## SUBMISSION FORM FOR THE ALICE HAMILTON AWARDS

**Title:** Air Quantity Estimator

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Please check the one category in which the contribution should be considered:

Biological Science \_\_, Engineering and Physical Science x, Human Studies \_\_,  
Educational Materials \_\_.

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Briefly describe the **major contribution** to occupational safety and health of the submitted materials:

A critical task for the mine ventilation planner is to determine the air quantity necessary to adequately dilute diesel particulate matter (DPM) from the fleet of engines operating in their mine. The Air Quantity Estimator (AQE) helps in this problem and more; it is a multifaceted mine planning tool. It helps underground mine operators determine a starting point of the air requirements necessary to adequately dilute DPM to statutory levels in the main air stream of their mine. It also pinpoints vehicles that are the highest DPM contributors and even sorts the vehicles based upon their emissions. In addition, it allows the user to make "what if" scenarios by varying the input parameters (e.g., the addition of filters, replacement of engines that are cleaner, etc.) to achieve the most efficient and practical mine ventilation system.

The AQE's purpose aligns perfectly with specific strategic goals set forth in NIOSH's Pittsburgh Research Laboratory Mining Health and Research Plan. These goals are to reduce respiratory diseases in miners by reducing health hazards in the workplace associated with diesel emissions. The report also states that that an intermediate goal should be to reduce workers exposure to diesel emissions in large opening mines and to develop ventilation concepts that can be used practically in these mines.

A recent study by MSHA found that 22% of metal mines, 16% of stone mines and 8% of metal/nonmetal mines had samples that exceeded the interim elemental carbon (EC) limit. Since these overexposures are often a result of insufficient ventilation, the AQE program should help to significantly reduce overexposures to DPM by defining adequate air ventilation in metal/nonmetal mines.

(Optional) If not apparent in the material, briefly describe the salient features of the submitted material that the reviewers should consider:

The AQE is a user-friendly computer (PC) program that comes as a stand-alone package – it will run on any computer and is not dependent upon the installation of spreadsheet programs. This is vital because the program was designed to meet the needs of even the least knowledgeable computer operator. The program also contains engine information in a self contained package rather than the user needing to connect to and browse the websites of the Mine Safety and Health Administration or the Environmental Protection Agency. This was designed for mine operators because many of the operators do not have access to the internet at their place of work.

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