

# Chemical Characterization and Optimization of Chemicals used in Respiratory Protective Devices – FY15 (93902JN)



## **Objective**

▪ To chemically investigate and characterize chemicals currently used in respiratory protective devices (RPDs) with an emphasis on self-contained self-rescuers (SCSRs), to determine optimal physical characteristics and forms in order to maximize gas capacity and generation capabilities to extend RPD usage lifetimes.



## **Applicable standards**

- MINER Act 2006
- 42 CFR

## **Key Partners**

- NIOSH/HELD – design, build & maintenance of test system

## **Stakeholders**

- Manufacturers of chemicals contained in CCER units
- CCER Manufacturers
- Workers in mining, transportation & construction jobs who may have need to use a CCER

## **Project Scope**

- Chemical characterization of chemicals most commonly used in RPDs. Soda lime (Calcium hydroxide/sodium hydroxide ( $\text{Ca}(\text{OH})_2 + \text{NaOH}$ )) and lithium hydroxide ( $\text{LiOH}$ )
- Compare different mesh sizes, shapes and forms of commonly used commercial carbon dioxide ( $\text{CO}_2$ ) absorbents to increase residence time without impeding airflow.
- Using information gleaned from specific aims 1 and 2, synthesize soda lime paste and mold/extrude/form into optimal shape and size pellets to more efficiently capture  $\text{CO}_2$ , thereby extending the operational lifetime of the RPD.

## **Milestones**

- Water removal experiments
- Formulation of Soda Lime

## **Outputs**

- Manuscript 1 almost ready for internal review
- Manuscript 2 in draft
- Full proposal approved

## **Outcomes**

- Reformulation of chemicals to increase residence time thereby lengthening functional wear time

Updated: 2017/03/04