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|---|---|---|---|
| **Project Name:** | Airzone - LOSS Solving Combustion Issues to Develop Artificial Smouldering | **Start Date:** | 2022-03-01 |
| **Project Number:** | 2212 | **Completion Date:** | 2022-11-30 |

## Project Details:

## Scientific or Technological Objectives:

| Measurement | Current Performance | Objective | Has results? |
|---|---|---|---|
| measure emissions (% expected) | (not set) | (not set) | No |

72] During summer months, coal piles that were stored at a shipping terminal were prone to spontaneous smouldering. Airzone was engaged to identify and measure the compounds emitted from the smouldering coal piles.

## Field of Science/Technology:

Environmental sciences (1.05.06)

## Project Details:

| | |
|---|---|
| Intended Results: | Improve existing processes |
| Work locations: | Lab |
| Key Employees: | Mr Fellin (Airzone) (Chemistry - BSc. (1972) / Airzone One President) |
| Evidence types: | |

## Scientific or Technological Advancement:

### *Uncertainty #1: Technological uncertainty*

72] The evidence shows that because of the risks associated with spontaneous combustion, neither Airzone nor its partner in this project could undertake direct sampling at the coal face using traditional monitoring to do so.

The most significant underlying key variables are:

identify compounds

## Technology or Knowledge Base Level:

### Activity #1-1: Activity 1 (Fiscal Year 2022)

**Methods of experimentation:**

| Method | Experimentation Performed |
|---|---|
| | |
| | |
| Trials: | 25 runs / samples |
| Physical prototypes: | 1 samples |

73] Faced with this difficulty, Airzone decided that the identification and quantification of the compounds had to be measured in a testing device. Airzone designed a testing chamber and used that chamber to collect representative emissions from various types of stored coal.

The testing chamber that was designed for this purpose allowed oxygen delivered into the chamber to be controlled so that the smouldering process could occur over a two-hour period without full ignition of the coal. Oxygen levels were controlled to prevent full combustion of the coal.

Mr. Fellin explained that burning coal releases fewer emissions than smouldering coal because the fire itself consumes the contaminants typically released by smouldering coal.

75] a large part of the work undertaken in this project concerned the design of the testing chamber and the use of the chamber to mimic smouldering coal.

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76] The smouldering process generated substantial water, which interfered with the measurement of other emissions by the continuous monitors. However, Airzone was nonetheless able to measure these emissions using different monitors, called integrated samplers.

Once the emission compounds were measured, Airzone used an existing computer model developed by the United States Environmental Protection Agency to estimate the level of exposure at various locations around the terminal.

**Results:**

JUDGE COMMENTS:

75] In my opinion, the testing chamber, although a little more sophisticated, was not that different from a home use barbecue.

**Conclusion:**

76] Secondly, unlike the three projects undertaken in 2014, there is no evidence in the record that shows that Airzone had difficulty establishing the identification and quantification of the emissions generated from different types of coal once the smouldering process was started.

I am of the opinion that Airzone has not demonstrated that the work undertaken in connection with this project was undertaken to achieve a technological advancement. Rather, I believe that Airzone knew what methods or processes could be used to mimic emissions from a smouldering coal pile and knew how to measure the emissions once the smouldering process was undertaken.

What Airzone did was measure emissions using standard methods and techniques typically employed when contaminants are released in a testing chamber.

Significant variables addressed: identify compounds