



## Built-In-Place Refuge Alternatives – (BIP-RA Petition)

November 17, 2021



**Westmoreland San Juan Mining LLC**

## Overview:

# BIP RA History at San Juan Mine

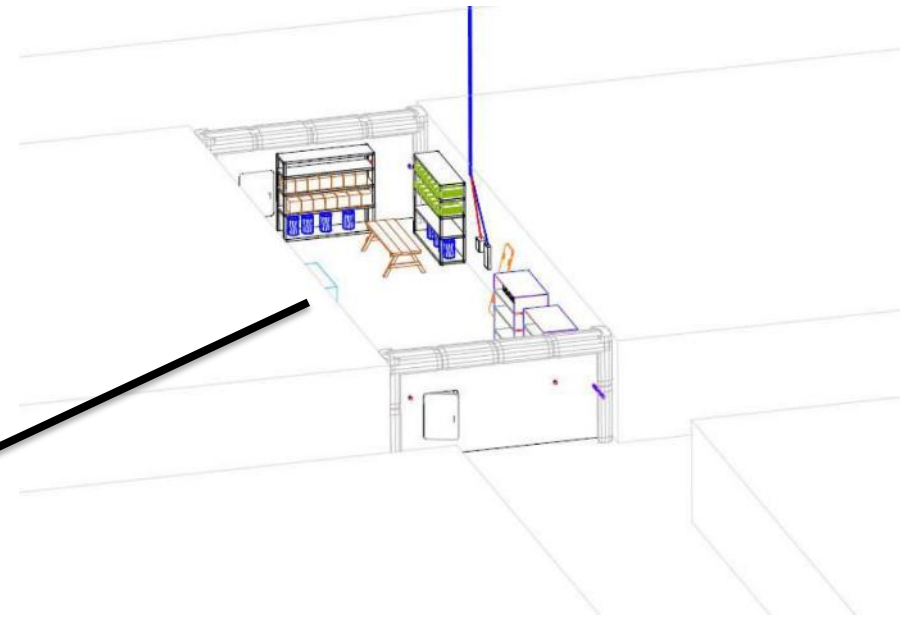
- March 2006 - First installation
- 2007 - Incorporated into the MSHA Approved Emergency Response Plan
- 2009 - Structure certified for 15 psi strength requirements.
- 2010 Structure and Door certified for 15 psi strength requirements.
- 2014 - Part 7 Approvals acquired.
- 2017- Filed Petition for Modification under 75.1506 ( c ) (1).
- 2018 - Petition Granted – allows RA to be up to 5,000 feet from the face.
- Currently being installed at maximum of 5000-foot intervals during development.



*“Therefore, the concept design meets the 15-psi design loading requirements for the assumed load, minimum material properties, and construction methods considered in this report.”*

(Quoted from 2010 Analysis Report)

# Typical BIP-RA Layout



## Maintenance of Atmosphere

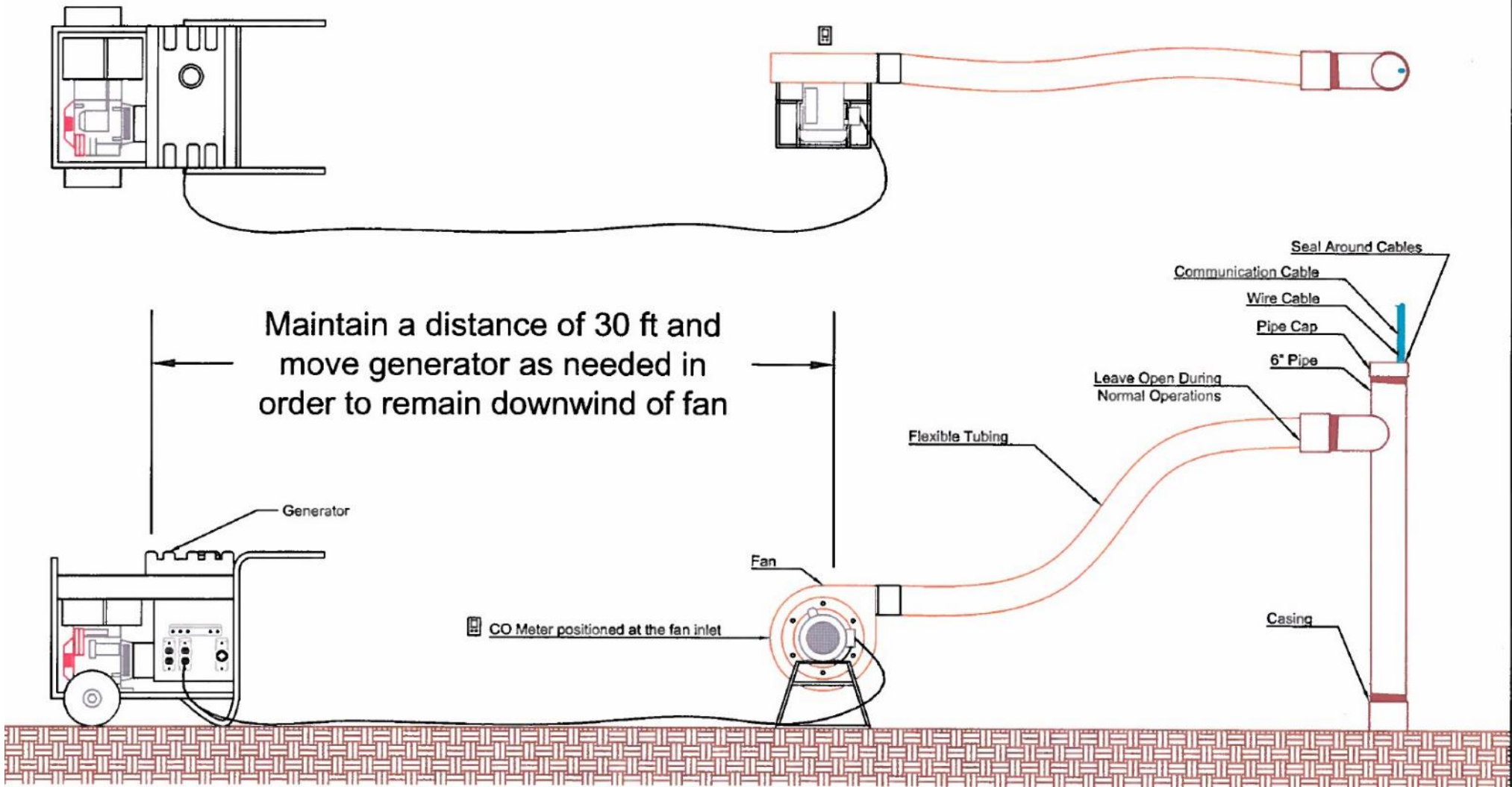
- Main mine fan provides continuous airflow into the BIP-RA during normal operations.
  - Air flows down the borehole and out of the BIP-RA into the mine.
- Portable blower fans are added to each borehole during emergency use.



## Typical Surface Borehole Site During Normal Operations



# Surface Components Typical Layout During Emergency Use



## Borehole Support Trailers



Trailer Materials	Quantity	
	Gateroad	East Mains
Generator	1/borehole	1/borehole
Carbon Monoxide Detector set to alarm at 10 PPM	1/borehole	1/borehole
Fans	1/borehole	1/borehole
Ventilation hose/tubing	1/borehole	1/borehole
Lighting	1/borehole	1/borehole

## Borehole Support Equipment





## Key Learnings from our Experience

- *Borehole fans enhance the ventilation volume and assure positive pressure inside the RA.*
- *Major ventilation changes must consider impact on RA ventilation.*
  - They can impact RA ventilation and its performance.
- *Regular inspections of ventilation, supplies and RA conditions are necessary.*
  - Including verification of airflows provided by blowers.
- *Site selection is critical, surface and underground.*
  - Surface waterflows, especially during storm events.
  - All-weather access to surface sites.
  - Underground water or gas make can have a negative impact on performance.

## Challenges Met for the Petition

- *Method of maintaining equipment at the borehole site.*
- *Must be operational in less than 60 minutes.*
- *Regular inspections of ventilation, supplies and RA conditions. (Weekly)*
- *A trained person located on the Surface with responsibilities for each BIP-RA under the Petition. Available anytime miners are underground.*
- *Air velocity at the borehole bottom checked each shift, during the preshift.*



## Steel Structure Currently in Use



## Challenges To Meet for the Petition

### ***Do Not Exceed Capacity of System (numbers of personnel)***

- *Limits on numbers of miners allowed inby the BIP-RA at any time. (BIP-RA has 25-person capacity)*
  - *Tracking system displays this total for Control Room Operator.*
  - *Has been a challenge during LW moves, especially if using a Hot Seat Change*
  - *Delivered air volume can potentially drive differences in maximum occupancy for each BIP-RA.*

### ***Deal with delays in having system components online.***

- *Additional Post-Accident Breathable Air supplies stored between the face and the BIP-RA.*
  - *UG - Install an additional cache of breathable air, just inby the BIP-RA location.*
  - *Surface - Maintain spare equipment at the borehole site.*

### ***Assuring air quality inside the BIP-RA prior to removing SCSR/SCBA equipment***

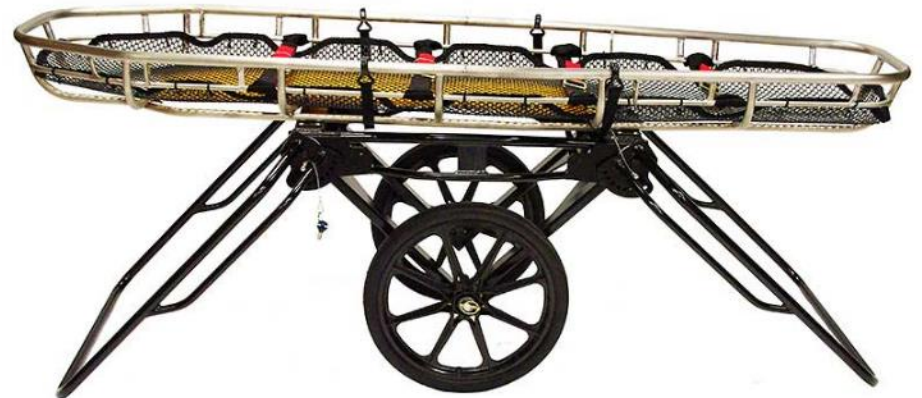
- *Miners trained to refill their SCBA or grab an additional SCSR as they evacuate.*
- *Miners trained to keep their SCSR/SCBA unit on after entering the BIP-RA, until the atmosphere inside has been confirmed to be safe.*

## Transport of Injured Miners

*How we addressed transport of injured persons to ensure they can reach the RA.*



*Various Commercial units are available*



## Challenges To Meet for the Petition

- *Maximum grade of 5%.*
  - *(Exception Process for seeking exemptions thru the District Manager)*
- *Spare equipment stored at the BIP-RA site.*
- *Quarterly Drills for Surface BIP personnel to verify having it online in less than 1-hr.*
- *85 cu ft of space per occupant.*
- *Space must be large enough to accommodate the miners assigned to the area, at all times, including hot seat changes.*
- *Maintenance of floor conditions to facilitate egress.*
- *New training requirements incorporated into ERP, Mine Emergency Evacuation and Training Plans.*
- *Documented Task Training for BIP-RA activation.*



*Questions?*