

UNDERGROUND MINE GAS MONITORING



APPLICATION BACKGROUND

Gas buildup in underground mines is very dangerous as it can cause explosions which can result in injury or loss of life. Such explosions are also costly as mine tunnels, mine shafts and expensive mining equipment can be destroyed.

Mines have ventilation equipment to ensure there is no gas buildup but the control of these ventilation systems is difficult if there is no information on the gas levels within the mine.

This application note details how monitoring in a mine may be achieved.

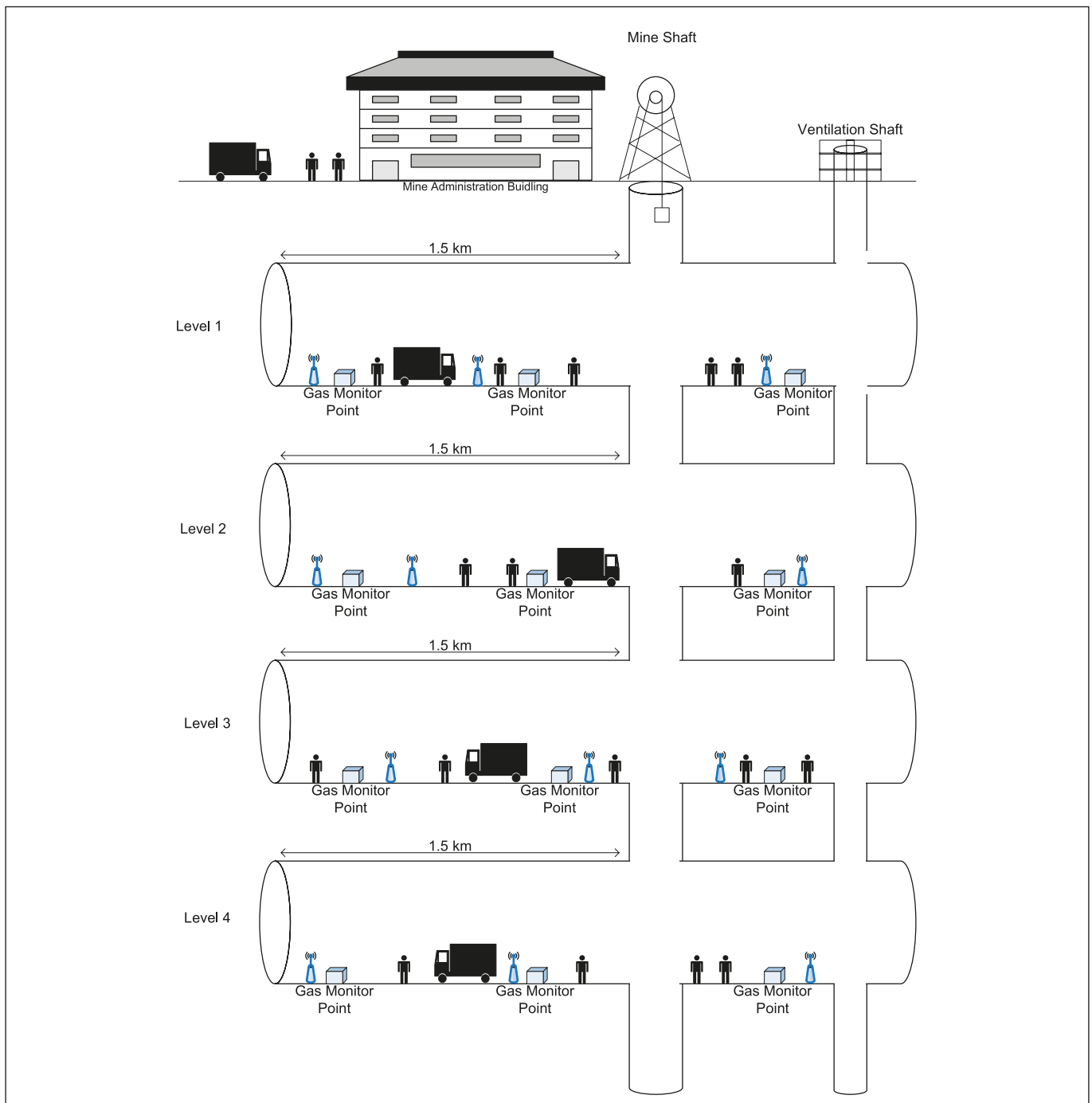
APPLICATION DETAIL

There are many manufacturers of gas monitoring equipment. One such manufacturer is Dräger which provides explosion proof and intrinsically safe gas monitors to measure noxious gases such as CO, CO₂, NO, H₂S, SO₂ as well as O₂ and N.

These instruments typically provide a 4-20mA analog output or a Modbus output which can be read by Neon Remote Terminal routinely, perhaps every 1, 5 or 10 minutes to be logged, alarm limit checked and then transmitted via a communication channels to a Neon Server on a regular schedule, perhaps every 5 minutes.

Underground mines typically have one or more mine shafts, many tunnels leading from those mine shafts and one or more ventilation shafts. Neon Remote Terminal Gas Monitor Stations can be set up at many different locations within the mine to monitor gas and other local conditions, such as temperature, humidity and perhaps dust and sound.

Underground mines generally have an existing communications system within the mine. Old mines had wired systems, like a telephone. Modern mines have wireless communications systems either cell phone based or standard 802. WiFi based, with a leaky feeder / leaky coax antenna throughout the mine, and WiFi access points.





The Neon Remote Terminal / WiFi can be used in this application with data being transferred from the Neon Remote Terminals via the existing WiFi system to a Neon Server within the Mine Administration building on the surface.

The Neon Server can be used to check gas and other ambient parameters at each measuring station / at each Neon Remote Terminal and display information on a standard web browser and on a schematic diagram of the overall mine to highlight any out of limit ambient or gas parameters.

The Neon Remote Terminal can also be programmed to increase or decrease ventilation in the mine based on the current measurements. The Neon Server can be set up to check incoming data for any out of limit conditions and activate an alarm. Alarm actions can be set up to activate visual or audible alarm indicators. Alarm actions can also be set up to email and text mine staff and mine safety officers to alert them of any out of limit / any dangerous conditions.



TYPICAL CONFIGURATION

APPLICATION SPECIFIC INSTRUMENTS / INPUTS

Options	Unidata Part Number	Description
Dräger Gas Detection Instrument	Dräger MiniWarn	CO ₂ / CO Gas Monitor
Dräger Gas Detection Instrument	Dräger PAC 3000 / 5000 / 7000 Monitor	CO ₂ / CO Gas Monitor

NEON TELEMETRY - NRL / RTU / FIELD UNITS

Options	Unidata Part Number	Description
Ethernet	3016A-000 / 3008A-000	Neon Remote Logger-16 or 8 Analog Ch / Touch Screen Display
Ethernet & 3G / 4G	3016A-C00 / 3008A-C00	Neon Remote Logger-16 or 8 Analog Ch / Touch Screen Display
Ethernet & 3G / 4G and LoRa	3016A-CL0 / 3008A-CL0	Neon Remote Logger-16 or 8 Analog Ch / Touch Screen Display
Equatorial Orbit Satellite - Inmarsat	3016A-00I / 3008A-00I	Neon Remote Logger-16 or 8 Analog Ch / Touch Screen Display
Equatorial Orbit Satellite - Inmarsat & 3G / 4G	3016A-C0I / 3008A-C0I	Neon Remote Logger-16 or 8 Analog Ch / Touch Screen Display
Low Earth Orbit Satellite - Globalstar	3016A-00G / 3008A-00G	Neon Remote Logger-16 or 8 Analog Ch / Touch Screen Display
Satellite - Iridium Short Burst Data	3016A-00R / 3008A-00R	Neon Remote Logger-16 or 8 Analog Ch / Touch Screen Display
Standalone RTU / NRL - Industrial	3004A-00 / 3004A-0L	Neon Remote Logger-4 Analog Ch with or without Touch Screen Display
Cellular RTU / NRL 3G / 4G - Industrial	3004AC0 / 3004A-CL	Neon Remote Logger-4 Analog Ch with or without Touch Screen Display
M – Series Standalone RTU / NRL	3004B-M000 / 3004B-M0B0	Neon Remote Logger-4 Analog Ch with or without Li Battery
M – Series Cellular RTU / NRL 3G / 4G	3004B-MC00 / 3004B-MCB0	Neon Remote Logger-4 Analog Ch with or without Li Battery
M – Series LoRa RTU / NRL	3004B-ML00 / 3004B-MLB0	Neon Remote Logger-4 Analog Ch with or without Li Battery
M – Series Ethernet RTU / NRL	3004B-MEBL	Neon Remote Logger-4 Analog Ch, Li Battery & LCD are optional
M – Series Microsatellite RTU / NRL	3004B-MHBL	Neon Remote Logger-4 Analog Ch, Li Battery & LCD are optional
M – Series Iridium Short Burst Data RTU / NRL	3004B-MIBL	Neon Remote Logger-4 Analog Ch, Li Battery & LCD are optional

NEON APPLICATION SOFTWARE - CUSTOMER SERVER

Options	Unidata Part Number	Description
Neon Applications Software	2302A	Neon Server Software Licence Incl 5 NAL
Neon Applications Software	2302A-10	Additional 10 NRT Access Licence
Neon Applications Software	2302A-20	Additional 20 NRT Access Licence
Neon Applications Software	2302A-50	Additional 50 NRT Access Licence

NEON HOSTING SERVICE - UNIDATA SERVER

Options	Unidata Part Number	Description
Neon Hosting Service	2301A	Neon Data Initial Subscription Setup Fee
Neon Hosting Service	2301A-01	Neon Data Service Fee for 1-50 NRT
Neon Hosting Service	2301A-02	Neon Data Service Fee for 51-100 NRT
Neon Hosting Service	2301A-10	Neon Data Service Fee Metering

DATALOGGER MANAGEMENT SOFTWARE

Options	Unidata Part Number	Description
Starlog V4 Management Software	6308A-AUE	STARLOG V4 Full Licence Key