

2010 National Mine Rescue Contest
Reno, Nevada
Technician Team Competition

General Rules

- The technician team will consist of two members of the 8-person mine rescue team. Persons competing in the competition cannot be members of the first aid team.
- The Technician Team Contest will be held in a simulated mine rescue station.
- At the beginning of the competition, the technician team will be presented with a scenario which requires their mine rescue team's services. The two technicians may work together or separately to complete the required tasks.
- Note: It is critical that the teams designate (at registration) the type of breathing apparatus and multi-gas instrument they will be using throughout the competitions, so the equipment is available for them during the Technician Team Contest.



General Rules

- To prepare their mine rescue team for this task, the technician team may need to bench at least one self-contained breathing apparatus and at least one multi-gas instrument (designated by each team at the time of registration). They will also prepare the first aid supplies and general mine rescue equipment to ensure the field readiness of their team. Only those tools, equipment, and supplies provided will be used by contestants to work the problem.
- At the conclusion of the competition, using this practical approach the technician team's mine rescue team will be prepared to go underground and conduct a successful mine rescue mission.



General Rules

- **Forty (40) minutes will be allowed to complete the competition. A five (5) minute warning will be given by the judge when the time is about to expire. If the technician team has not completed the competition when time expires, the judges will stop their activities and the team will be scored based on their discounts to that point.**
- **If the problem is not completed in the specified time, an additional twenty-five (25) discounts will be assessed.**
- **All defects in testing and preparation will result in the appropriate discounts.**
- **The combined total discounts of the written tests and the individual segments of the competition will determine the winner. In the event of a tie, the written test scores will determine the winner. The total time will be the second tie-breaker.**
- **The judges will conduct a five-minute review of all discounts at a pre-designated time after the competition. After the review, both the judges and the technician team will sign the appropriate judge's scorecard in the spaces provided. All appeals must be in writing and submitted within 30 minutes of the conclusion of the five-minute review. The contest appeals committee ruling will be final.**
- **Six trophies will be awarded for the Technician Team Contest.**

Written Test

- **The written test will be given in conjunction with the written tests for the Mine Rescue Field competition and the First Aid competition. Sixty (60) minutes will be allowed to complete all required testing. At the end of the allotted time, tests will be collected regardless of whether or not the contestants have answered all of the required questions.**
- **The written test will be given while the contestants are in isolation and will consist of thirty (30) multiple choice and true/false questions. The questions will be taken from:**
 - **MSHA Publication 3027 (formerly “IG 6 – Instructor’s Manual for Mine Rescue Training”): Module 2 – Mine Gases and Module 3 – Ventilation.**
 - **MSHA National Mine Rescue Contest Rules**
 - **Respective instrument and apparatus manufacturers’ service or operations manuals and videos.**
- **Contestants will be assessed one (1) discount point for each incorrect or unanswered question. Any alterations to the test questions or answers will be determined to be incorrect by the test judge and discounts assessed.**

Judging

- **All judges will be trained as prescribed by the Contest Director.**
- **Judges must stand clear of team members.**
- **Prior to the competition, judges will ensure that the team's breathing apparatus(es), multi-gas instrument(s), and first aid supplies and mine rescue equipment contains only the deficiencies as per the planned problem.**
- **When unplanned deficiencies are encountered, judges will stop the clock, instruct the technician team to turn their backs to their respective area, at which time the judge will correct the unplanned deficiencies. Judges shall instruct the team technicians that upon turning back to their area, the clock will restart. If the deficiencies are caused by either team member, the clock will not be stopped.**

Team Equipment Checks/Preparation

General Rules

- **The technician team must make necessary checks of multi-gas instruments (see Multi-Gas Instrument Checks/Problem Diagnosis) and self-contained breathing apparatuses (see Apparatus Checks/Problem Diagnosis) for proper working condition. These checks must be within the manufacturer's specified limits. The extra breathing apparatus must also be tested accordingly.**
- **The technician team must check the portable communication system to ensure that it works properly and has insulated wire strong enough to give and receive manual signals in the event of failure.**
- **The technician team must also check the available mine rescue equipment and supplies, such as lifeline, scaling bars, stretchers, hammers, blankets, first aid supplies, fire extinguishers, etc., to ensure that they are adequate to meet the requirements of the problem and that they are in functional condition.**
- **Faulty equipment must be repaired or replaced. If replacements or replacement parts are not available, these items can be requested from the respective judges.**
- **If the information provided indicates that explosive gas(es) is/are or may be present in the mine, the technician team must ensure that non-sparking tools are available for their mine rescue team.**

Suggested First Aid Supplies

- **A list of first aid supplies is provided in the rules as a guide for the technician team. It is not meant to be an all-inclusive list. It does, however, reflect the minimum supplies needed to adequately stock the basket for the mine rescue team preparation. It does not necessarily include what an EMT team or even a competition first aid team need carry.**
- **Based on the scenario provided, additional materials may be needed to adequately treat the missing miners. If these supplies are not found at the simulated mine rescue station, the technician team must ask the judging officials for the materials to be included on the team's stretcher.**

Apparatus

Checks / Problem Diagnosis

Similar to Apparatus Bench Contest in Years Past . . .



The technician team may need to bench at least one self-contained breathing apparatus (type designated by each team at the time of registration).

Apparatus Bench Changes

- The technician team must be familiar with the respective self-contained breathing apparatus manufacturer's service manual.
- Bugs used in the competition will be consistent with all models of breathing apparatuses.

Multi-gas Instrument Checks / Problem Diagnosis

Multi-gas Instrument Contest in Years Past . . .



The technician team may need to bench at least one multi-gas instrument (type designated by each team at the time of registration).

Multi-gas Instrument Changes

- The technician team must be familiar with the respective multi-gas instrument manufacturer's operations manual and/or video.
- The technician team will be expected to evaluate each instrument, repair all of the deficiencies, properly calibrate or bump test the each instrument, and check for proper action level alarm set points.
- Based on the scenario provided:
 - The technician team may need to prepare more than one multi-gas instrument.
 - The technician team may be required to reconfigure the instrument(s) to measure additional gases. Proper action level alarm set points and configuration settings for these gases will be provided by the judges.
- The participants will no longer need to subject the test instrument to an unknown air/gas mixture.

Example Scenario and Solution

Example Scenario

- Last night at 11:00 p.m., three 5-person production crews entered the mine to start their shift. One of the crews, a foreman and four other miners traveled to the 5 East Panel. At about 12:45 a.m., an electrical storm knocked the power to the mine. Problems with the diesel-powered back up generators forced the mine superintendent to order an evacuation of all personnel from the mine.
- At 1:00 a.m., two crew members from the 5 East Panel called out to report an incident. An apparent blast caused them to become separated from the rest of their crew. They tried to find the other three crew members, but the smoke became too dense. They also reported that a significant amount of water was coming into the panel from several massive caves that had fallen near the faces. By 1:20 a.m., all crews had been safely evacuated from the mine except for the foreman and two missing crew members on the 5 East Panel.
- At 2:30 a.m., the Company's mine rescue team entered the mine and explored the entire mine to the 5 East Panel. At that time, the team reported light smoke in the return entries along 1 North Mains. Early gas readings from the team showed: 19% oxygen (O_2), 400 ppm carbon monoxide (CO), 0.2% methane (CH_4), and 10 ppm hydrogen sulfide (H_2S). The team traveled nine crosscuts into 5 East Panel and established a Fresh Air Base.
- Your team has elected to continue exploration from the Fresh Air Base to the face areas, a distance of six crosscuts. There is a fully equipped mine rescue team located at the Fresh Air Base and they are ready to serve as your team's backup.

Example Solution

Based on the scenario, the Technician Team would need to:

- Prepare the mine rescue team's apparatuses. This will include benching at least one unit. The technician team must find and repair any bugs while performing monthly checks.
- Prepare the teams multi-gas instruments. This will include benching at least one instrument. The technician team must find and repair any bugs while examining each instrument.
 - Sensors for O₂, CO, CH₄ and H₂S ? If not, reconfigure the instrument(s).
 - Calibrated in the last 30 days? If yes, perform a bump test. If not calibrated in the last 30 days, calibrate the instrument(s).
 - Check/set proper action level alarm set points as provided by the judges.
- Ensure that non-sparking tools are provided for team, since CH₄ present in mine.
- Check the portable communication system to ensure that it works properly and has insulated wire strong enough to give and receive manual signals in the event of failure.
- Check the available mine rescue equipment and supplies, such as lifeline, scaling bars, stretchers, hammers, first aid supplies, blankets, fire extinguishers, etc., to ensure that they are in functional condition. Repair or replace faulty equipment. If replacements or replacement parts are not available, these items must be requested from the respective judges.
- Note: Since there were no special needs identified, adequate first aid supplies would include the minimum items specified in the Technician Team Contest rules.

Technician Team Scoring

Least Cumulative Discounts from All Phases of Competition will be Used to Determine Top Six Teams

Team Equipment Checks / Preparation

Discounts: _____

Multi-gas Instrument Checks / Problem Diagnosis

Discounts: _____

Apparatus Checks / Problem Diagnosis

Discounts: _____

Written Test

Discounts: _____

Total Discounts: _____

*** In the event of a tie, the written test scores will determine the winner.
The total time will be the second tie-breaker.**