



## Respiratory Protection Incidents

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**Special Operations Reports** are issued to initiate management actions in response to events whose subject matter represents significant departmental safety concerns.

**Environment, Safety and Health Alerts** are issued to initiate immediate action on potentially significant safety issues.

**Environment, Safety and Health Bulletins** are issued to share information and recommend actions on potential safety issues.

**Operating Experience Summaries** are issued to share lessons learned information, operating experience information, and best practices from significant events or important individual DOE activities.

### PURPOSE

The purpose of this Bulletin is to highlight recent respirator failures in the DOE complex. These incidents underscore the importance of maintaining a comprehensive and effective respiratory protection program. Respiratory protection is a vital tool for safe work in hazardous and contaminated atmospheres, and respirators are widely employed in accomplishing the DOE mission.

### BACKGROUND

Several serious respirator failures have occurred during this calendar year at DOE sites. Multiple events occurred where respirators actually fell apart in service:

- At Idaho, filter cartridges broke off the respirators of two employees while they were exiting contaminated work areas.
- The speaking diaphragm on a respirator mask fell off while an employee was working in a contaminated area.
- A follow-up inspection performed on 36 similar dual-filter respirators identified four cracked filter assembly connector fittings with 31 fittings showing severe wear.



Figure 1 MSA Ultra Twin Respirator

### RESPIRATORY PROTECTION PROGRAM ELEMENTS

According to program details in OSHA's respiratory protection standard (29 CFR 1910.134), the seven key elements that every respiratory protection program should contain are:

1	A written plan detailing how the program will be administered
2	A complete assessment and knowledge of respiratory hazards that will be encountered in the workplace
3	Procedures and equipment to control respiratory hazards, including the use of engineering controls and work practices designed to limit or reduce employee exposures to such hazards
4	Guidelines for the proper selection of appropriate respiratory protection equipment
5	An employee training program covering hazard recognition, the dangers associated with respiratory hazards, and proper care and use of respiratory equipment
6	Inspection, maintenance, and repair of respiratory protective equipment
7	Medical surveillance of employees

- Oak Ridge reported an incident where a powered air-purifying respirator (PAPR) separated while being used by an asbestos subcontractor. Follow-up inspections of the subcontractor's equipment identified three additional questionable PAPRs.
- Idaho reported a similar incident where the PAPR separated because of a loose body clamp.

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Events have also been reported where defective or missing hose clamps were a factor.



- Hanford reported defective clamps that cut into hose linings, forming a flap that restricted air flow.
- At Idaho, a heavy equipment operator's airline separated, forcing him to remove his respirator while exiting a contaminated area. The retaining pin for his hose connection was found to be missing.
- In another case at Idaho, the supply hose to an airline hood disconnected, forcing an operator to exit the area. The fitting at the hood was found to be missing after the incident, indicating a fitting failure.
- Hanford reported four incidents of loose hose clamps on airline respirator hoods, including two cases where the hoods were in use at the 105KW Basin. Discussions with the manufacturer identified that some clamps had not been properly tightened at the factory. No personnel contamination was detected in either instance.

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#### IMPLICATIONS

Failure of respiratory protection could result in personnel being exposed to the hazardous atmosphere in which they are working. For many DOE applications, this could result in a chemical exposure or radiological uptake.

Respiratory equipment failures can stem from a number of causes including manufacturing defects, equipment misuse, inadequate training, and simply wearing out due to age and repeated cleaning cycles.

Currently, the Office of Quality Assurance Programs (EH-31) is looking at possible quality assurance implications at both DOE and its contractor organizations stemming from the recent increase in the number and frequency of respirator failure-related events.

#### ACTIONS

Site managers are requested to review their respiratory protection program to ensure that it complies with DOE O 440.1A.

Site respiratory protection programs should include procedures to inspect all mechanical clamps, fixtures, and fittings to verify the mechanical integrity of a respirator prior to its issuance. Respirators should also be periodically inspected for signs of actual or impending mechanical failure or excessive wear due to the effects of repeated use and decontamination cycles.

In-service failures of respiratory protection equipment are generally reportable in the Occurrence Reporting and Processing System (ORPS). The Lessons Learned database (URL <http://www.eh.doe.gov/DOEII/index.asp>) is also available for sharing relevant experience with the DOE complex.

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