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BATTELLE COLUMBUS LABORATORIES
USNRC
EVENT REPORT

PART I
Initial Discovery/Notification

1. Date/time the event was discovered: August 4, 2004 7:40 AM

2. Date/time the event occurred, if different than the date of discovery: Same as #1

3. Describe the event:

Individuals assigned to perform work activities in the High Energy Cell (HEC) were observed by the Respiratory Protection Program Administrator (RPPA) using the MSA OptimAir MM 2K Mask Mounted Powered Air Purifying Respirator (PAPR) in a configuration that is not approved by the manufacturer. The configuration that was observed to be in use was as follows: the motor- blower housing (P/N 10022695) was threaded into the MSA Ultravue face piece with a MSA P100 Ultrafilter filter (P/N 816255) attached to a coupling nut adapter assembly (P/N 96547) that was threaded into the motor-blower housing. See photograph 1, titled incorrect configuration. The assigned crew, two laborers and one Health Physics Technician, were instructed to exit the HEC by the RPPA. The crew spent approximately fifteen minutes in the HEC. During the initial fact finding assessment, it became evident that the use of the incorrect configuration of the PAPR was not limited to the observed use in the HEC. The incorrect configuration had also been used periodically for work in the High Level Cell/Low Level Cell filter box removal effort and previous work in the HEC dating back to when the PAPR was introduced for use on site on July 6, 2004. On several occasions it was observed that the correct configuration of the PAPR was used in these work locations. It is evident that both the incorrect configuration and correct configurations were used intermittently throughout the work evolutions requiring PAPR protection. In the instances where the incorrect configurations were used it was cited that the correct filters, Optifilter Type HE (P/N 495692), were not available. Individuals were questioned on the performance of prerequisite inspections and checks of the PAPR units. Individuals stated that they had performed the required face-piece negative and positive pressure fit checks prior to use and a flow test of the motor-blower had been performed. The flow test of the incorrect configuration was performed with a MSA flow check meter (P/N 487995) to verify the statements made by the laborers and the health physics technicians. In all cases, the incorrect configuration passed the pre- use tests.

The correct configuration for the mask mounted PAPR is as follows; the motor-blower housing (P/N 10022695) threaded into the MSA Ultravue face-piece with a MSA Optifilter Type HE filter cartridge (see photograph 2), or Type HE particulate filter (P/N 48707). These are the only approved high efficiency particulate air filters for the mask mounted PAPR.

4. Under what regulation is this notification being made: License Condition 10CFR 20.1703 (a)

5. What is the period of time allowed for initial notification?

☐	Immediate	☐	Within 15 days
☐	Within 2 hours	☐	Within 30 days
☐	Within 4 hours	☐	Within 45 days
☐	Within 24 hours	☐	Within 60 days
☒	Within 2 days	☐	Other _____
☐	Within 5 days		

6. Describe the emergency classification of this event.

☐ General
☐ Site/Area
☐ Alert
☐ Unusual Event
☒ None

7. Type of initial notification made.

☒ Telephone ☐ Mailgram ☒ Facsimile ☐ Letter

For other than immediate, 2 hour, 4 hour, and 24 hour notifications: N/A

8. NRC Section notified: US NRC Operations

9. Individual's name to which the notification was made: Chauncey Gould

IE72

PART I
Initial Discovery/Notification

10. Time/date notification was made: 8/5/04 4:41 PM

11. Exact content of notification:

Employees working within an Airborne Radioactivity Area (ARA) entered the work zone wearing PAPRs. The workers entering the posted area unknowingly failed to assemble the PAPRs in the approved and certified NIOSH configuration. Personnel utilized alternate cartridges and couplings that fit securely when assembled, allowing personnel to compliantly perform positive and negative pressure fit tests. The alternate configuration had not been approved and certified by the manufacturer (MSA). Personnel were immediately removed from the posted area. Facility management immediately issued a stand down for all work activities involving use of respiratory protection. On August 5, a stop work order was issued barring use of PAPRs until corrective actions have been implemented.

Health Physics has performed an assessment of all personnel and work activities in which the non-conforming PAPR configuration was used by the work crews. Seventeen workers have been identified as entering posted ARAs wearing PAPRs in the non-conforming configuration. The 17 workers have been designated to two different work restriction categories. Thirteen workers have been placed in the first work group. The first group is under a bioassay submittal restriction, which places the worker on a restriction from working within ARAs, Contamination Areas (CA), or wear respiratory protection for radiological reasons until they have submitted to Dosimetry a urine bioassay sample. This restriction is based upon a relatively low potential for internal exposure as demonstrated by accumulated DAC-hrs to date. The DAC-hrs accumulated are base on a protection factor of one due to the lack of NIOSH certification for the incorrect configuration. Four workers have been placed in the second group which is the extended work restriction group. This group of four is restricted from working in ARAs, CAs, or wearing respiratory protection for radiological reasons until their submitted urine bioassay is analyzed and the results reviewed by Dosimetry in the form of a bioassay investigation including authorization to release the workers from the extended restriction by the Site RSO. This second group's restrictions are based upon having exceeded 40-DAC-hrs in a given week. The DAC-hrs accumulated are based on a protection factor of one due to the lack of NIOSH certification for the incorrect configuration. The highest individual DAC-hrs being tracked based upon this event is 136 DAC-hours.

12. Was any other agency or individual contacted as a result of this event? ☒ Yes ☐ No; If yes, who was contacted?

Pete Greenwalt, Site Project Manager, DOE Columbus Closure Project/ Tom Evans, DOE Headquarters EM 3.2/ Jack Craig, Deputy Manager , DOE Ohio Field Office/ Patty Bubar DOE Headquarters, EM 3.2.

13. Initial notification made by: Keith Anderson, CHP, Esq., Independent Oversight Manager, Alternate RSO Closure Services

Scott [illegible] for KDAnderson
Signature of Individual Making Notification

Joe Jacobsen Joe Jacobsen
Acknowledged (RSO)

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PART II
Event Evaluation

1. Describe what conditions existed at the facility at the time of the event.

The JN-1 Facility is currently under active Decontamination & Decommissioning Operations at the time of this event. The JN-1 Facility and associated site were under what is considered normal day to day operations at the time of this event.

2. Describe any facilities alarms or equipment that indicated the event.

None to report.

3. Radiological conditions involved with the event:

- ☐ Overexposure of licensee personnel
- ☐ Overexposure of a member of the general public, a minor, or a prenatal exposure
- ☐ Release of radioactive materials to the environment
- ☒ License condition
- ☐ Loss or theft of radioactive materials
- ☐ Dose limits in restricted or unrestricted areas exceeded
- ☐ Receipt or transportation of radioactive materials
- ☐ Equipment failure
- ☐ Fires, toxic gasses, etc. that prevent radiological responses
- ☐ Contamination events
- ☐ Unplanned medical treatment of a contaminated individual at an offsite facility
- ☐ Sealed source leak tests
- ☐ Special nuclear material
- ☐ EPA limits

4. Describe, in detail, including the isotopes, quantities, and physical and chemical forms, radiation levels, radioactive material concentrations, causes of elevated levels of exposure rates, dose or concentrations, of the event:

JN-1 Facility is a retired hot cell research facility with a history of work supporting research on irradiated nuclear fuels. Work conditions in the JN-1 Facility during the time of incorrect use of the respiratory protection equipment included work with hand tools, drills, jack hammers, and torches to remove contaminated components. Typical work environments generated dust and fumes while work was being performed. No chemicals were in use at the time of the work evolutions. Typically airborne contamination was at levels ranging from 1-70 DAC with mixed fission products and mixed activation products dominating the analyzed spectrum. The 17 workers being restricted is based upon not being able to assign the normal protection factor of 1000 for a PAPR given the lack of NIOSH certification for the configuration of use. If PAPRs had been used that were correctly configured there would be no issue with internal exposure for the workers.

PART II
Event Evaluation

5. Describe, in detail, immediate and supplemental corrective actions taken to mitigate the event and ensure against recurrence.

On August 4, 2004 a stand down was issued from all respirator wearing on site until further notice by site management. Workers were briefed on the incident and what site management was doing about the situation. The workers pulled out from the HEC work area were verified to have egressed without identification of any personnel contamination.

On August 5, 2004 a formal stop work order was issued on all respirator work by site management. The Respiratory Protection Program Administrator and Health Physics identified 17 workers whom used the PAPR in the incorrect configuration and access restrictions were placed on these workers to allow for an evaluation of potential internal exposure including analysis of additional bioassay samples from the 17 workers.

On August 4, 2004 site management directed that the identified incorrect configuration of use of the PAPR be quantitatively tested using the Portacount System available on site. Test results clearly demonstrated that the PAPR, even though incorrectly configured, passed quantitative fit testing for use as a PAPR with a protection factor of 1000.

On August 6-8, 2004 site management conducted an intensive programmatic assessment of the existing documented respiratory protection program using site management, quality assurance, and subject matter experts. The assessment identified eleven programmatic deficiencies which were reported to site management and formally entered into a resolution tracking system. The eleven deficiencies identified inadequacies in the areas of procedure compliance, worker training, and management oversight. NOTE: On August 17, 2004 NRC Region III inspectors were briefed on site during a routine inspection on this programmatic assessment and the identified deficiencies.

On August 8-12, 2004 additional formal documented training on the PAPR in question and respiratory protection procedural training was presented to site workers by site subject matter experts and responsible management. Additionally, site management identified a staff member from Health Physics to serve as the Respiratory Protection Supervisor for on site work activities.

On August 13-16, 2004 site workers were briefed on the results of the evaluation of the respiratory protection evaluation by site management and answered any questions.

Health Physics has received the results of urine bioassay samples submitted for workers and have verified that results are in line with workers original submitted baseline urine bioassay sample results and within the bioassay program thresholds for no assignment of internal dose to workers. Results of the evaluation of the urine bioassay results were communicated by Health Physics to workers individually by Health Physics Staff and work restrictions were lifted. Final assignment of any dose actually assigned to workers due to this event will be communicated to Region III NRC site inspector's office.

6. Describe any release that has, is or will occur as a result of this event.

No release to report

7. If overexposures of facility personnel or members of the general public are involved, including prenatal over exposure, complete Part III of this form.

PART II
Event Evaluation

NOT APPLICABLE TO THIS EVENT- NO OVER-EXPOSURES TO REPORT.

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PART III
Exposure Data

SECTION 1.

Name	DOB	Social Security #	Type Exposure*	Dose	Other**
NONE					

* TEDE, Hd_{eye}, $Hd_{shallow}$

** M = male; F = female; P = pregnat female, Mr = minor; G = General Public

PART III
Exposure Data

SECTION 2.

Summary of supplemental actions taken associated with exposures

N/A

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PART IV
Final Event Summary

1. Determined cause of the event

- ☐ Design
- ☐ Procurement
- ☐ Component Failure
- ☐ Failure to Comply
- ☒ Personnel Performance Failure
- ☐ Installation/Construction Errors
- ☐ Unusual Service Condition
- ☐ Procedure Deficiency
- ☐ Administrative Deficiency

NOTE: Use Exhibit 1 as guidance in determining the cause of the event

2. Summarize, in detail, the cause, and sequence of events and effects of the event.

The cause of this event was personnel performance failure particularly in the areas of: inadequate awareness tied to procedural compliance, inadequate supervision, and inadequate training. The sequence of events included procuring the new style of PAPR and bringing it into the site operations in early July 2004. This style was selected to address a concern related to the existing MSA PAPRs in use on site regarding ease of use and comfort of the equipment for its intended use in JN-1 Facility. The new style of PAPR selected was a different model of MSA PAPR respirator. Site workers were provided with a large single group briefing by a site trainer on the new type of PAPR prior to actual use on site. A field change was made to an existing operating procedure in the respiratory protection program and the new type of MSA PAPR was deployed in the field. When the HEPA cartridge model originally provided with the new style of PAPR was not immediately available at the work location, the workers identified that another style of HEPA cartridge with coupler nut adapter assembly, which was available at the work location, would fit onto the respirator and would pass the negative and positive pressure fit tests and flow checks. Additionally, the parts needed to attach the incorrect HEPA filter cartridges were all parts from the available on site MSA PAPR supplies.

The effects of the event were in several areas. Site work using respiratory protection for radiological purposes was shut down for nine days. Site management initiated a large effort to formally assess the respiratory protection program and determine corrective actions. Site workers were formally re-trained in several aspects of the respiratory protection program as well as the new style of PAPR. Health Physics conducted a detailed review of potential internal exposure to the 17 identified site workers. Site management made a commitment to commit a dedicated resource to handle the respiratory protection program in the field work locations- the Respiratory Protection Supervisor.

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PART IV
Final Event Summary

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3. Report sent to: 1) US NRC, Document Control Desk, Washington, D.C. 20555

2) Administrator, USNRC, Region III, 2443 Warrenville Road, Suite 210, Lisle, IL. 60532-4352

4. Copies of this report sent to:
   1. Mike McCann- Region III NRC-Senior Health Physicist
   2. BCLDP RSO File
   3. Pete Greenwalt- DOE Site Manager- Columbus Closure Project
   4. Scott Zoller- Closure Services- Site RSO
   5. Pat Weaver- Battelle BCLDP Project Manager
   6. BSTI RSO File

Report Preparer: _____ Date: 9/3/04

Joe Jacobsen- BCLDP RSO

Report Approval: _____ Date: 9/3/04

Pat Weaver- BCLDP Project Manager

PHOTO 1

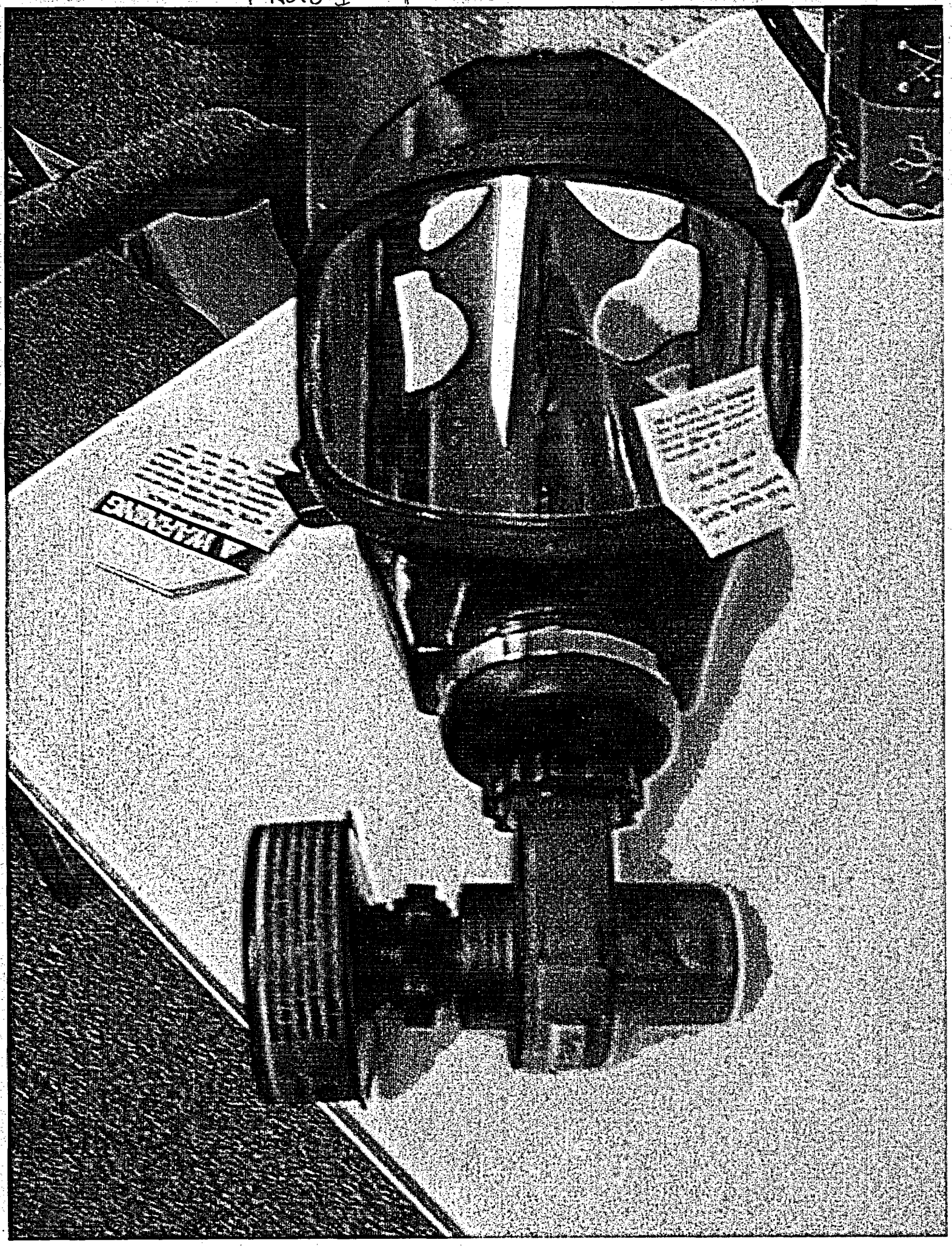

PHOTO 2