Summary

The purpose of this document is to provide information for hospital health personnel (first receivers) on the use of CLD500 unit (Level C1 - Powered Air Purifying Respirator) in a mass casualties situation resulting from a major industrial hazardous materials incident or a deliberate release using chemical, biological or radiological substance.

NOTE: This Policy also applies to Local Health Networks until Local Health Districts commence on 1 July 2011.

Document type Policy Directive

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Policy manual Not applicable

File number

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Status Obsolete

Obsolete note The First Receivers (healthcare workers at a hospital with a decontamination facility) have insufficient experience to be expected to don and doff Powered Air Purifying Respirator - CLD500 in a mass casualty situation. Training is also insufficient to maintain experience. Therefore this PD is no longer required.

Obsolete date 30 October 2017

Functional group Clinical/Patient Services - Incident Management, Medical Treatment

Population Health - Disaster management

Personnel/Workforce - Occupational Health and Safety, Security

Applies to Local Health Networks, Government Medical Officers, Public Health Units, Public Hospitals

Distributed to Public Health System, Government Medical Officers, NSW Ambulance Service, Ministry of Health

Audience All health personnel receiving contaminated patients for decontamination and treatment
CBR POWERED AIR PURIFYING RESPIRATOR – CLD500

PURPOSE
This policy establishes the level of protection available for First Receivers in hospitals designated to receive patients exposed to contamination as a result of a major industrial hazardous materials incident or a deliberate release using a chemical, biological or radiological (CBR) substance. It must be recognised that all risks cannot be excluded as incidents of this nature may result in contact prior to the risk being identified.

Standard procedures are attached for the use of CBR Personal Protective Equipment and the powered air purifying respirator CLD500 at designated health mass decontamination facilities.

MANDATORY REQUIREMENTS
The Local Health Districts are accountable for the equipment maintenance for an emergency situation. An equipment audit is to be conducted annually to ensure the equipment functionality is at its optimal level.

The CBR trained health personnel who are involved in the decontamination procedure at the health decontamination facilities must be trained in the use of the equipment in line with the attached instructions for use.

The equipment must be checked, cleaned and stored appropriately after each use for decontamination.

IMPLEMENTATION
Local Health District Chief Executives are responsible for:

- implementation of this policy regarding the management of the CBR powered air purifying respirator CLD500
- ensuring that this policy is brought to the attention of staff responsible for the maintenance, management and storing of the CLD500 respirator.

NSW Health Counter Disaster Unit is responsible for:

- the development of procedures for use of the CBR powered air purifying respirator CLD500
- the review and update of policy and procedures every 3 years or earlier if required.

REVISION HISTORY

<table>
<thead>
<tr>
<th>Version</th>
<th>Approved by</th>
<th>Amendment notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 2011</td>
<td>Deputy Director-General</td>
<td>New policy</td>
</tr>
<tr>
<td>(PD2011_030)</td>
<td>Population Health</td>
<td></td>
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</tbody>
</table>

ASSOCIATED DOCUMENTS
1. Instructions for use: CBR Powered Air Purifying Respirator – CLD500
CBR POWERED AIR PURIFYING RESPIRATOR – CLD500 - INSTRUCTIONS FOR USE

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1 BACKGROUND

1.1 About this document

The purpose of this document is to provide information for hospital health personnel (first receivers) on the use of the CLD500 unit (Level C1 - Powered Air Purifying Respirator) in a mass casualty situation resulting from a major industrial hazardous materials incident or a deliberate release using a chemical, biological or radiological substance.

There is no intention for the CLD500 unit to replace the existing air purifying respirators that hospitals currently use to care for patients from a hazardous materials incident. The provision of the CLD500 to designated hospitals that currently have mass decontamination facilities is to ensure the safety and welfare of health staff who receive patients from a major industrial hazardous materials incident or a deliberate release of a chemical, biological or radiological substance.

This document will form a supporting document under the Health CBR Management Framework (under development).

1.2 Key definitions

Chemical, Biological and Radiological (CBR)

Australian security and counter terrorism organisations use the acronym CBR in reference to the use of chemical, biological or radiological agents as an act of terrorism. The United States, the United Kingdom and other countries add nuclear and explosive as part of their acronym, as in, CBRNE.

CBR, in the Australian context, refers specifically to a deliberate, possibly terrorist, attack against a civilian population using chemical, biological and radiological agents.

The accidental exposure to or isolated and premeditated use of an industrial or agricultural chemical by an individual for self-harm are hazardous materials (HAZMAT) incidents – attended by the combat agency for hazardous materials, the Fire and Rescue NSW.

Mass Casualty

“An incident which generates more patients at one time than locally available resources can manage using routine procedures. It requires exceptional emergency arrangements and additional or extraordinary assistance.”

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The definitions for ‘First Receivers’ and ‘First Responders’ have been adopted from the United States National Institute of Occupational Safety and Health (NIOSH), Occupational Health and Safety Agency (OSHA)\(^2\).

A) **First Receivers**

‘First Receivers’ are healthcare workers at a hospital with the decontamination facility, receiving contaminated victims for treatment. The First Receivers work at a site remote from the location where the primary release occurs. Their exposures are limited to the substance transported to the hospital by the victims’ skin, hair, clothing or personal effects. The location and limited source of contaminant distinguishes First Receivers from other First Responders who normally respond to the incident site (the release zone).

The First Receivers include the following personnel:

- Clinicians and other hospital staff who have a role in receiving and treating contaminated victims (e.g. triage, decontamination, medical treatment and security); and
- Those whose roles support the set-up of decontamination showers and patient tracking.

B) **First Responders**

‘First Responders’ are fire fighters, police officers, HAZMAT and qualified ambulance officers who are typically at the site of an incident (the location at which the primary release occurred). The first responders often face the threat of an ongoing release of material generated at the primary site of release; therefore, they are required to wear a higher level of personal protective equipment until the released hazardous materials are fully characterized and contained.

1.3 **Scope**

This document addresses the use of the Level C1 Powered Air Purifying Respirator (CLD500) in situations where people self-present to hospitals for decontamination and medical treatment. The assumption is made that the hospitals are remote from the location where the primary release occurred. The possible exposure of hospital-based health care workers (first receivers) is limited to the quantity of substance (contaminant) on self-presenters and their clothing or personal effects.

The scope of this guideline does not cover situations where the hospital is the primary site of release. In a situation where a hospital is the primary site of release, the incident will be managed by the combat agency, Fire and Rescue NSW under the Hazardous Materials/Chemical, Biological, Radiological Emergency Sub Plan (HAZMAT/CBR Plan).

2 **LIST OF ATTACHMENTS**

1. Instructions for Use: CBR Powered Air Purifying Respirator – CLD500

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Instructions for the use of CBR
Powered Air Purifying Respirator – CLD500

Acknowledgements:
Professor Alison Jones, Dean of Medicine University of Western Sydney
Professor Wayne Smith, Director Environmental Health DOH
NSWFB HAZMAT RESPONSE UNIT

NSW Health Counter Disaster Unit
Ambulance Service of NSW
Contact Officer: Coral Choi
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Introduction

There are many types of breathing respirators that are used to provide protection to personnel. Australian Standards provide a general level of protection using classification A, B, C and D to describe the levels of protection. The following table provides an overview of the level of protection and various types of breathing respirators.

In the table, the level C designation has been divided into level C1 and C2, under the scope of the Australian Standard and provides further clarification and differentiation of powered air purifying respirators (positive pressure) and non-powered air purifying respirators (negative pressure). This classification has also been used by NSWFB in their Hazardous Materials Standing Operation Guidelines.

In the NSW hospital system, there are many types of breathing respirators that are used to provide protection to health care workers in various situations.

<table>
<thead>
<tr>
<th>Relative Level of Protection</th>
<th>Designation</th>
<th>Type of Breathing Respirators</th>
<th>Who and when to use</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Fully encapsulated suit with SCBA</td>
<td>Use by qualified emergency services personnel (first responders).</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>SCBA and chemical protective suit or charcoal suit</td>
<td>Use by qualified emergency services personnel (first responders).</td>
<td></td>
</tr>
<tr>
<td>C1</td>
<td>Powered air purifying respirator and chemical protective suit</td>
<td>Use by first receivers at healthcare facilities for decontamination of patients from mass casualties from a large scale of hazardous material incident such as a major industrial incident or a deliberate release.</td>
<td></td>
</tr>
<tr>
<td>C2</td>
<td>Air purifying respirator and chemical protective suit</td>
<td>Use by first receivers at healthcare facilities for decontamination of patients from hazardous materials incidents.</td>
<td></td>
</tr>
</tbody>
</table>

Level D is described as a work uniform, offering minimal protection. A surgical mask is recommended for healthcare workers if splash or aerosol contact is likely. Additional precautions should also be taken in situations where pathogens could be transmitted by airborne or droplet routes – including donning a P2 or surgical mask respectively in addition to other protective equipment.

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1 NSW Health Infection Control Policy_PD2007_036
Priority Locations

In 2000, mass decontamination facilities were established at the following hospitals.

<table>
<thead>
<tr>
<th>DESIGNATED HOSPITALS WITH MASS DECONTAMINATION FACILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concord Hospital</td>
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<tr>
<td>Gosford Hospital</td>
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<tr>
<td>John Hunter Hospital</td>
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<tr>
<td>Liverpool Hospital</td>
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<tr>
<td>Nepean Hospital</td>
</tr>
<tr>
<td>Prince of Wales Hospital</td>
</tr>
<tr>
<td>Royal North Shore Hospital</td>
</tr>
</tbody>
</table>

Personal Protective Equipment (PPE) for use during decontamination, including powered air purifying respirators, was subsequently provided to these facilities. Following a review of the functionality of old respirators, a decision was made to use the new powered air purifying respirator with fully encapsulated suit (CLD500). A review of the allocation of CLD500 units to the designated hospitals was conducted in consultation with NSWFB HAZMAT Response Unit and Department of Health Toxicology and Environmental Health experts. It was agreed that 10 CLD500 units will be allocated to each of the 13 hospitals with decontamination facilities.

Personal Protective Equipment for CBR Incidents

In the Australian CBR context, PPE refers to the respiratory equipment, garments and barrier materials used to protect first responders and first receivers from exposure to chemical, biological and radioactive hazards.

The aim of wearing PPE is to prevent the transfer of hazardous material from contaminated victims or the environment to health care workers (first receivers).

CLD500 Unit

CLD500 is a fully encapsulated Power Air Purifying Respirator (PAPR) using a single non-rechargeable lithium battery. The CLD500 Unit consists of the following parts:

1. CLD500 fully encapsulated non permeable protection suit with inner nitrile gloves
2. One Micronel C420 PAPR
3. One single use lithium battery
4. 2 Filter Canisters
1. CLD500 fully encapsulated non-permeable protection suit

2. One Micronel C420 (Blower) and Hose

3. One BA – 5800/U Primary Lithium Sulphur Dioxide (Li/SO₂) Single Use Battery - Maximum operational hours is 10 hours and shelf life is 10 years

4. Two CF A2B2E2K2P3/NBC Filter Canisters - Shelf life is 10 years

Additional PPE Accessories

In addition to the CLD500 unit, the other PPE required for decontamination includes Butyl gloves and over boots.
Equipment Specifications & Protection Performance

The following equipment specification and protection performance reports were provided by the CLD500 Manufacturer (Point Trading Company). NSW FB HAZMAT Unit has assisted in reviewing these documents.

1. Protection performance of 3TOX ® material Against industrial chemicals;
2. Protective properties of 3TOX ® material Against Biological Warfare Agents;
3. Protective properties of 3TOX ® material Against Chemical Warfare Agents;
4. Specification – BA-5800/U Primary Lithium Sulphur Dioxide (Li/SO2) Battery
6. Report on Determination of the Weight of Fabrics and Knitting
8. Specification – Inner Nitrile Gloves 732
10. Specification – Outer Butyl Gloves 898

Advantages

Safety factor (protection grade)
The Micronel C420 PAPR provides a constant, filtered airflow of between 115 and 140 l/min to the user’s mask thus providing a higher safety factor due to positive pressure in the mask.

Breathing
The airflow helps prevent the user’s face piece from fogging and also reduces breathing effort as the powered airflow greatly reduces the additional pulmonary stress and fatigue level associated with negative-pressure respirators. This reduction in stress and fatigue level facilitates heavy work performance even under extreme climatic conditions and provides a high degree of comfort. As the unit is fully encapsulated, staff can wear glasses inside the CLD500 unit and there are no face mask fitting issues due to facial hair.

Easy and safe decontamination
Unlike many unsealed commercial PAPRs, the C420 can be effectively decontaminated of NBC agents and other toxic industrial chemicals. The C420 Blower is air-tight and waterproof (with the three protective port caps properly installed) and may be fully submerged for decontamination. In addition the batteries can be changed during the decontamination process as the battery compartment is also air-tight, waterproof and decontaminable.
Limitations

The CLD500 unit provides Level C protection for first receivers at the hospital but it is not suitable for use if the hospital is the primary site of release.

Air must have sufficient available oxygen, 20% or greater.

The CLD500 unit does not have a built-in warning system of battery level during operation.

Filter canisters have a variable life span with no warning system of breakthrough conditions. The life span will depend on the individual contaminants and concentrations. Higher temperatures and humidity can also reduce filter life span.

Instructions for Use

All first receivers must be trained and certified on the use of the Powered Air Purifying Respirator - CLD500. Without this qualification, personnel must not use the equipment for decontamination.

Dressing with the CBRN protective coverall is to be conducted in a binomial mode (2 people), each person being responsible for the safety of the other one.

Despite the battery operating for a maximum of 10 hours, it is recommended that trained first receivers wear the suit for no longer than one hour. Upon the notification of a CBR incident, NSWFB will attend the affected hospital site to take control of the decontamination process.

Staff preparation

1. It is preferable that a scrub suit to be worn in lieu of regular street cloths. Clothing should be suitable for preserving a comfortable body temperature
2. Remove all jewellery and leather material and place in plastic bag with your name on it – place in a secure location for Security to maintain
3. People who need to wear glasses should be certain they will not fall off inside the CLD500 fully encapsulated suit by using retaining band
4. People with long hair should apply a hairnet or place hair in a braid
5. Hydrate with a minimum of 500ml of fluid
6. If time allows have blood pressure, pulse, respiration rate and temperature taken and recorded
7. Obtain appropriate sized PPE including CLD500 suit, over boots and outer gloves
8. Layout PPE parts and confirm they are the right size and in working order.
**Assemble the equipment**

1. Open the individual storage bag and unfold the coverall. Lay the coverall flat on a clean and soft surface.
2. Assemble blower with filters and belt as follows:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Attach Belt to Blower:</td>
<td><img src="image1.jpg" alt="Attach Belt to Blower" /></td>
</tr>
<tr>
<td>b. Unplug Filter Ports on Blower and Filter Canisters:</td>
<td><img src="image2.jpg" alt="Unplug Filter Ports" /></td>
</tr>
<tr>
<td>c. Attach Filters to Blower and Remove Plug from the Air Intake on the Bottom of the Filter</td>
<td><img src="image3.jpg" alt="Attach Filters" /></td>
</tr>
<tr>
<td>d. Unseal Pipe Intake on Blower and Attach Pipe:</td>
<td><img src="image4.jpg" alt="Unseal Pipe" /></td>
</tr>
<tr>
<td>e. Unscrew Battery Compartment, Insert Battery and Replace Battery Cap.</td>
<td><img src="image5.jpg" alt="Unscrew Battery" /></td>
</tr>
</tbody>
</table>
Dressing (Donning)

1. Pass the hose of the blower through the tunnel in the back of the coverall and screw the hose onto the hood’s connector. Switch on the blower and control so that the blower is blowing air into the hood. Rest the blower on the ground.

2. Put on the legs of the coverall first, then put the over boots on.

3. Ask your colleague to hold the blower for you.

4. Put on the arms of the coverall, and adjust the inner gloves (already pre-fixed on the coverall) on your hands.

5. Put your head into the hood and breathe. If you feel that air is missing, take your head immediately out of the hood and control the blower.

6. Close the zipper up to the chest area, and then adjust the Velcro flap.

7. Secure the blower around your waist by using the blower’s belt.

8. Close the upper part of the zipper and adjust the Velcro flap. Ask the second person to help you to ensure perfect closure of the front opening.

9. Put on your outer gloves.

10. Have someone place a piece of tape across shoulders with the staff member’s last name and function (eg. Smith RN) written with a marker.

11. Have second person perform safety check before proceeding to assigned work area.

12. Record the time of the personnel left the dress out area.

Undressing (Doffing) the suit following the decontamination process

1. After completion of the technical decontamination process, proceed to edge of the dirty/clean zone and prepare to remove protective ensemble.

2. Undressing must be done in binomial mode (2 people).

3. While sitting or assisted by a second person, remove over boots. Place the boots in biohazard bag or leave boots out for re-cleaning and use by additional personnel.

4. Remove outer gloves and place in biohazard bag. The inner gloves must remain in place (attached to the overall).

5. Unclip the blower’s belt and ask the second person to help you hold the blower and turn the blower off.

6. Unzip the chest area and put your head out of the hood.

7. Remove protective suit using an inside out roll down manner.

8. Place the suit with the blower in a clean designated area for after use inspection later.
9. Proceed to clean area and rehydrate and undergo medical monitoring

10. The suit is to be rewashed with soap and water and towel dried before next use. The canisters filter should be replaced. The single use battery should be replaced if necessary.

**Equipment Maintenance**

**Maintenance and Cleaning Instruction**

1. Suits to be placed in clean area following decontamination, consult with NSWFB HAZMAT team if suits is safe to be cleaned and dried

2. Suits should be clean and dry before storage

3. Suits should be washed with hand towel and water (never use any oxidative, corrosive, reactive or solvent-containing solutions)

4. Do not dry-clean, use any hot-air or tumbling air dryer to dry the suits

5. Do not bleach

6. To avoid ‘normal’ bacterial cross-infection, the inside of the visor and internal area of suit may be wiped with antibacterial gel. (Always avoid solvents during cleaning)

7. After each use, follow the inspection instructions. The coverall is not supposed to be repaired if it fails a visual inspection, with exception of inner and outer gloves, which can be replaced.

**After-use inspection instructions**

Each inspection must include the following steps:

1. Lay the suit flat on a clean and soft surface

2. Examine material to find any damages in the protective material (punctures, holes, cuts or tears)

3. Examine the suit seams to see if there is any separation between the protective material and the seal tape

4. Examine the suit zipper. Make sure that the zipper cover is in good working conditions

5. Examine the inner and outer gloves and the hood’s visor to find any potential damages

6. After examination, carefully fold the coverall and follow storage instructions.

If any damage is found upon inspection, the suit should not be used. Store the suit separately and report the damage to the Disaster Coordinator. The Disaster Coordinator is to liaise with NSW Health for advice on appropriate actions.
Storage Requirements

Before use, suits must preferably be stored in a dry, cool and dark location. Sunlight, ozone and high temperature might degrade the materials of this garment. Before use, the coverall is preferably stored in its original individual package.

After use and successful inspection, the coverall can be stored until its next use.

1. Place suit face down on a soft surface
2. Fold suit in half (ensuring that the visor does not fold)
3. Bring both suit arms back to lay on suit
4. Fold from bottom so that the suit will fit back into the storage bag being careful not to damage visor.

Storage conditions must be the same as those applied to new coveralls.

In case of any damage or tear on the overall, it must be changed.

Equipment Servicing

NSW Health Counter Disaster Unit has established a five year equipment servicing contract with the CLD500 equipment manufacturer, Point Trading Company. Under the contract agreement, a Point Trading authorised service technician will conduct an annual test of the blowers using the company’s testing equipment according to the manufacturer’s instructions. The testing involves physical inspection of fan blades, flow rate meter testing, and overall physical inspection. The company will provide a certificate noting the date of test, equipment serial number and checklist for the various items for each unit. The company will also provide an overall equipment servicing report to NSW Health Counter Disaster Unit.

The annual equipment servicing schedule will be developed in conjunction with the participating health services on an annual basis.

Training

Training in storage and use of CLD 500 will be provided by the local Disaster Coordinators, once they have undertaken the CLD Train the Trainer program. Each trainer will be provided with a training package to deliver to staff at the nominated facilities.

All healthcare personnel must complete the training on the CLD500 together with other relevant CBR training courses prior to the use of equipment in a decontamination procedure.