RESPOND
Bird Flu
Biosecurity

DEPOPULATION

CONTAINERISED GASSING
WORK INSTRUCTION & CHECKLIST

PIANZ

Egg Producers Federation of New Zealand (Inc)

BIRD FLU BIOSECURITY AOTEAROA

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1.Purpose

This work instruction and checklist outlines the processes for humanely and effectively depopulating birds infected or suspected of having a notifiable disease such as Highly Pathogenic Avian Influenza (HPAI), using containerised gassing.

Why This Matters:

This process protects birds' welfare, and quickly removing affected birds helps stop the disease from spreading.

👉 Please read this document in conjunction with the **Depopulation Guidelines** and the **Response Plan Handbook** to ensure all procedures are followed correctly. Where a site already has an Standard Operating Procedure (SOP) for containerised gassing which meets the requirements in the Guideline, use the SOP.

In this document, "you" can refer to either an MPI person or a farmer/operator, depending on who is leading the response activities.

2.Actions

Before You Start – Know the Workload Challenge

To plan containerized gassing depopulation properly, first figure out:

- **How** many birds need to be depopulated.
- **What** type and size of birds they are (e.g. adults or chicks).
- **Where** they are located and how they'll be accessed.

👉 For farmers / operators, you can use Section B1 of the Response Plan Handbook and Template, or the online Response Plan Builder to help record this information.

Understanding the challenge helps you:

- Select the right number and type of containerized gassing units.
- Ensure there are enough skilled personnel with the training, qualification or experience, to carry out the task humanely and efficiently.
- Plan for safe bird handling and movement.
- Develop a clear health and safety plan, including fatigue management and PPE.

☑ Set up a clean/dirty line and decontamination station for people and equipment.
☑ Ensure all personnel are skilled with the training, qualification or experience in humane handling and use of the containerized gassing depopulation techniques.
☑ Use appropriate restraint methods to minimise stress and injury.
☑ Monitor for signs of ineffective gassing and take immediate corrective action.
☑ Record numbers and outcomes for traceability and reporting.

Work as a Team

Farmers/operators, vets, MPI, and depopulation contractors need to coordinate to:

- Align on timing and logistics.
- Ensure animal welfare standards are met.
- Link depopulation with disposal and site decontamination plans.

📌 **See Appendix A** for the key requirements the contanerized gassing unit plan must meet.
📌 **See Appendix B** for containerized gassing unit options and examples to help to choose the right approach.
📌 **See Appendix C** for step-by-step instructions on how to carry out containerized gassing unit depopulation.

2.1 Required Materials & Personnel

These are the minimum requirements. You may need to scale up depending on the situation.

Category	Item
🧍 **Personal Protective Equipment (PPE)**	• Personal Protective Equipment as outlined in the HealthNZ guidance (incl. hearing protection). • Individual gas monitoring readers. • Antiseptic wipes. • Disinfectant and spray bottle. • First aid kit. • Paper towels.
🧰 **Equipment**	• Crates or baskets: Chicks or birds delivered in crates or baskets with at least one visible side to monitor welfare. • Containerized gassing units (CGUs): CGUs capable of promptly killing chicks or adult birds. Gas cylinders and monitoring equipment. Bird monitoring equipment (if needed). • Skilled personnel with the training, qualification or experience to use the CGU.

2.2 Health & Safety Actions

The on-site **written, Health & Safety plan** for using a containerized gassing unit for depopulation activities at the infected site, needs to cover risks associated with containerized gassing units during a disease incursion. If you're working with **contractors**, make sure you're familiar with and coordinate with their Health & Safety Plans too.

This ensures everyone is working safely, understands the risks, and follows the right procedures to prevent disease spread.

This plan should cover:

- Entry and exit points (watch for contamination), including disinfection steps for vehicles, equipment and personnel before departure and after arrival.
- Risks from handling infected birds.
- Safe use of the containerized gassing unit.

Follow these rules:

- ☑ Conduct a health and safety briefing based on the site-specific plan.
- ☑ Keep accessways clear and safe for vehicles and machinery.
- ☑ Ensure adequate lighting, especially if working at night or in low visibility.
- ☑ Use trained and competent containerized gassing unit operators and ensure personnel can manage the volume. This includes personnel being able to take breaks.
- ☑ Check birds for effective euthanasia and reapply gas (or alternative method such as neck dislocation) if needed.
- ☑ Wear correct PPE at all times, including individual gas monitoring readers.
- ☑ Stick to all biosecurity procedures, including recording and reporting any new risks.

- ☑ Handle birds calmly and gently at all times to ensure both animal welfare and minimise risks to personnel.
- ☑ Move spent birds to disposal vehicles without contaminating the environment. Follow the *Disposal Guideline which includes biosecure transport*.

Refer to: *Avian influenza health and safety guidance for workplaces – Health New Zealand | Te Whatu Ora*

2.3 Containerised Gassing Unit Procedures

Where there is one, use the site's SOP for containerized gassing depopulation. Before starting, check it against the Depopulation Guideline, to ensure it meets required standards. If it doesn't, update it or arrange an alternative method. If no SOP exists, create one using the Depopulation Guideline as the minimum standard.

Auditors will use the **Containerized Gassing Audit Checklist** to confirm all required steps are completed.

See Appendix D for a summary to help you check you have covered all the required steps.

For farmers/operators:

See Appendice C and E for help with writing your containerized gassing SOP.
See Appendix F for case studies that show what to expect in real-world scenarios.

Tip: Plan depopulation and disposal together to meet disposal timelines. Follow the *Disposal Guideline* which includes biosecure transport, when disposing of birds.

3.Appendices

Appendix A: Key Information

Availability
CGUs are commercially available in New Zealand, the UK, and Ireland. Some overseas models can process up to 10,000 kg of birds per hour.

Gas Options & Considerations

Gas Type	Description	Benefits & Risks
Carbon Dioxide (CO_2)	Heavier than air; acts as an anaesthetic at high concentrations.	Causes rapid unconsciousness but is aversive. Avoid concentrations above 25% to reduce distress (e.g., gasping, head shaking). Maintain residual oxygen within the CGU below 5% for poultry or 2% for large birds e.g. ducks and turkeys.
Argon	Inert, heavier than air, colourless, odourless, tasteless.	Kills by anoxia and is less aversive than CO_2. Can be mixed with CO_2.
Nitrogen	Inert, slightly lighter than air.	Also kills by anoxia and is non-aversive. Harder to contain at high concentrations.

General Requirements

- You must keep residual oxygen in any gas mixture below 2% (recommended residual oxygen level <1%).
- Ensure containers are fully sealed before gassing to avoid uneven gas concentrations and bird distress.
- Follow exposure times:
    - ~3 minutes for chickens (chicks and adults) and turkeys
    - ~5 minutes for ducks and geese
- Birds should be unconscious (slumped) within 35 seconds of the correct gas / oxygen level being reached.
- Ensure the effective gas concentrations and/or oxygen concentrations are met. Where these can't be reached, use a secondary depopulation method.
- Removing birds from sheds should ideally happen at night or when birds are on nests or in cages.

Health & Safety

- Large volumes of inert gases pose risks to personnel.
- Minimise bird handling by placing transport crates directly into CGUs.
- Ensure all operators are trained and equipped with PPE.

Minimum Welfare Standard

Under the *New Zealand Code of Welfare: Layer Hens (Minimum Standard 17 - Humane Destruction) & Meat Chickens (Minimum Standard 16 – Humane Destruction)*:

- Birds must collapse within 35 seconds of of the correct gas / oxygen level being reached.
- Birds must remain in the gas for at least 2 minutes after collapse.

Handling & Safety

This method involves handling infected or potentially infected birds, which increases the risk of injury, especially for layers, and poses health risks to handlers.

- Minimise handling by placing transport crates directly into CGUs.
- Ensure operators are trained and wear appropriate PPE.

Appendix B: Options & Examples for CGUs

Option	Description
Basic Requirements	Containers must: • Be easy to load and unload. • Enable fast, effective euthanasia. • Allow easy carcass removal at the disposal site. • Be simple to clean and sanitise inside and out.
Design Features	• Use containers with viewing windows or CCTV for monitoring. • Prefer large top-loading containers with two loading doors and a viewing window at the top/front corners. • Design containers to empty from the front, opposite the lifting machine. • Include a locking mechanism to secure the container during filling and release before emptying. • Measure oxygen levels and/or the gas mixture.
Gas Distribution	• Distribute gas from the centre or use multiple inlets on different sides. • Longer dwell times may be needed for larger containers to ensure uniform gas exposure. • Multiple injection points improve effectiveness. • Choose container dimensions that suit shed access and allow transport between farms using commercial vehicles.

Choose a Gassing Unit

Select a unit suitable for the age and number of birds. Options include custom-built or commercial models.

Custom-Built Units

- Must be airtight
- Include a gas flow regulator
- Have a sensor or alarm for low gas levels
- Include exhaust valves to prevent over-pressurisation
- Be easy to clean and sanitise

Commercial Units

- Must follow manufacturer's instructions for gas use
- Include a viewing window or CCTV to confirm birds are unconscious before reducing gas levels
- Seal vents to prevent leaks
- Place on a hard, flat surface to keep crates stable
- Include an air flush system for quick access in case of breakdown
- Monitor gas levels with appropriate equipment
- If using CO_2, increase concentration gradually to reduce bird distress

Figure 4: custom built gas unit

Figures 5: A small commercial unit with viewing window for chicks.

Appendix C: Step-By-Step Instructions

☑ Pre-Start Checklist

Action	Complete (Yes / No)
Health and Safety Plan in place	
Site map prepared	
Depopulation plan (who, how, when) with bird age considered	
Staff skilled with the training, qualification or experience in CGU use	
Equipment checked and gas supply confirmed	
Gas type selected	
Roster includes rest breaks	

Step 1: PPE Requirements

All personnel must wear:

- Gumboots
- Long-sleeved gloves
- Coveralls
- Safety glasses or full-face shield
- N95 mask

Additional PPE:

- If working inside the shed with gas exposure risk, use SCBA or air-line respirator and individual gas monitoring readers.

Step 2: Animal Welfare Standards

- Handle birds gently to avoid injury and distress.
- Minimise stress with calm environments and trained staff.
- Ensure birds are not exposed to heat or cold stress before gassing.

Step 3: Bird Handling

- Depopulate sick/injured birds immediately (use captive bolt or neck dislocation).
- Keep shed calm and dimly lit.
- Minimise carrying distance byplacing crates close to birds.
- Handle one bird at a time, wings down.
- Max: four birds per hand to avoid bone breaks.

Step 4: Crating Birds

- Euthanise sick/injured birds before crating.
- Remove birds carefully and place in crates with visibility.
- Use forklift to move crates to gas unit.
- Maintain transport temperature between 8–26°C for layers.

Figures 1 & 2: Examples of crates that could be used to place the birds in before and during the gassing process.

Step 5: Loading the Gas Unit

- Stack trays without trapping heads/wings.
- Ensure gas can circulate between layers.

Figure 3 unit ready for loading

Figure 4 loading unit

Figure 5 Unit closed

Figure 6 Control box

Step 6: Gas Application

- Seal vents to prevent leaks.
- Place unit on flat, stable surface.
- Introduce gas gradually (especially CO_2) to reduce distress.
- Birds must collapse within 35 seconds and remain in gas for 2 minutes.
- Include air flush system for emergency access.
- Monitor gas levels with proper equipment.

Step 7: Managing Cold from Gas

- Avoid rapid temperature drops.
- Use heater coil in supply line to prevent freezing.
- Gradual CO_2 increase reduces cold shock.

Step 8: Monitoring During Gassing

- Monitor birds via window or CCTV.
- Gasping and convulsions are common in anoxic environments.
- Confirm collapse within 35 seconds and 2-minute exposure post-collapse.

Step 9: Confirming Death

- Check for:
    - No rhythmic breathing
    - No movement; relaxed body
    - Fixed, dilated pupils
    - No eye reflexes

If signs of life remain:

- Reapply gas or use cervical dislocation.

Appendix E: Audit Checklist

GENERAL

Farm Contact Name:		Contact Ph:	
Farm and Address			
Movement Control Permit/s Number/s (as required)			

DOCUMENTATION

Document	Comment	Acceptable Y/N
Procedures (SOP).		
Contract related Statement of Work (where appropriate)		
Site Health and Safety Procedures		
Movement control permits, if required		

RECORDS

Records	Comment	Acceptable Y/N
Numbers of birds depopulated (confirm bird numbers per unit match SOP)		
Adequate number of staff		
Training records for CGUs		
Gas type, concentration and time birds left in CGU.		
Monitor and confirm successful euthanasia		
Record of corrective actions if CGU insufficient for euthanasia		
Monitoring of loading of disposal vehicle (as applicable)		

REALITY

BIOECURITY, VERY HIGH AND HIGH RISK MATERIAL

Section	Action	Comment	Acceptable Y/N
Depopulation	Ensure sufficient staff		
	Monitoring of the gas, CGUs and time birds in the CGU.		
	Monitoring of effectiveness of gassing		
	Observation of corrective actions if gassing insufficient for euthanasia		
	Monitoring of loading of disposal vehicle (as applicable)		

Appendix F: Example SOP: Fallowing Procedure (Farmer/operator use only)

Purpose
To ensure the humane, safe, and effective depopulation of birds infected with, or suspected of having, a notifiable disease such as Highly Pathogenic Avian Influenza (HPAI), using a containerized gassing unit. This supports disease containment, protects animal welfare, and minimises risks to human health and the environment.

Scope
This SOP applies to all containerized gassing depopulation activities involving poultry during a biosecurity response on infected premises.

Responsibilities

- **Farm Operator**: Oversees depopulation activities and ensures SOP compliance.
- **Depopulation Team Leader**: Coordinates personnel, equipment, and safety procedures.
- **Trained Operators**: Carry out humane depopulation using containerized gassing unit.
- **Support Staff**: Assist with bird handling, movement, and record-keeping.

Materials and Equipment

- **Containerized gassing unit**.
- **Restraint equipment** (e.g. crates).
- **Personal Protective Equipment (PPE)**:
    - Coveralls
    - Gloves
    - N95 masks
    - Eye protection
    - Hearing protection
- **Disinfectant and cleaning supplies.**
- **First aid kit.**
- **Record sheets and verification checklist.**

Procedure

1. Conduct a pre-operation briefing covering:

- PPE requirements.
- Fatigue management and rest breaks.
- Emergency procedures.
- Biosecurity protocols.
- Animal welfare expectations.

2. Depopulation Process

- Handle birds calmly and gently.
- Restrain birds appropriately to minimise stress and injury e.g. crating.
- Stack appropriately in the containerized gassing unit and apply gas (as per manufacturers instructions).
- Confirm insensibility and death before moving birds.
- Reapply gas or apply secondary method (e.g. cervical dislocation) if required.
- Record each batch of bird's outcome and any corrective actions taken.

3. Post-Depopulation

- Move carcasses to disposal site using biosecure transport.
- Clean and disinfect all equipment and PPE.
- Complete all required records and verification checklists.
- Debrief team and report any incidents or issues.

Records

- Depopulation Verification Checklist.
- Gas concentration logs.
- Daily activity logs.
- PPE and waste disposal records.
- Training records for operators.
- Corrective and preventative action reports.
- Movement control permits (if applicable).

Appendix F: Case Studies (Farmer/operator use only)

Using Our Own CGUs to Depopulate After HPAI Hit[1]

The call came in the middle of winter: HPAI positive. My heart sank. We run a large egg layer farm with approximately 250,000 birds across multiple sheds. The good news? We own our own CO_2 gas units (CGUs) and have a trained team. That made all the difference.

We moved fast. The sheds were cold, but that didn't make it easy. Birds were active during the day, so catching was harder. We started at first light and worked through until dark.

Here's what it looked like:

- Team size: 18 people, including catchers, CGU operators, loaders, and supervisors.
- Process: Catch, crate, move to the CGU station, gas, confirm death, then load for disposal.
- Timeframe: It took three full days to clear all sheds. Even with CGUs, it's not instant, you need rotation time and welfare checks.

The physical side was tough. PPE in freezing weather sounds easier than summer heat, but it wasn't. Gloves made gripping slippery, and everyone needed warm-up breaks every 45 minutes. The emotional side hit harder. These were healthy-looking birds in most sheds. Ending them felt wrong, but we knew it was the only way to stop the virus.

We kept talking, kept checking on each other. Some of the new team members struggled. They'd never seen this scale before. We paired them with experienced hands and made sure no one worked alone.

By the end, we were exhausted, but we did it right: humane, biosecure, and safe.

[1] This is a fictional scenario for illustrative purposes only.