1.0 Purpose and Scope

This procedure applies to compressed gas cylinders (CGCs) that cannot be returned to the manufacturer/supplier for recycling. Whenever possible, all CGCs that are empty or no longer useful should be returned to the supplier for recycling.

This procedure describes how to identify and de-valve (cut open) compressed gas cylinders that are certified to be non-hazardous. Non-hazardous compressed gas cylinders can be recycled or disposed as non-hazardous waste, which will reduce WHOI’s waste management costs.

2.0 Definitions

2.1) De-valved CGC has had its valve cut off or is otherwise cut open, such that the cylinder is open to the atmosphere and is visually safe for scrap metal recycling or disposal as non-hazardous waste.

2.2) Hazardous CGC is above atmospheric pressure and contains a substance that exhibits any of the following characteristics: unknown contents, toxic/poisonous inhalation hazard, flammable, reactive, and/or substance that cannot be released to the environment. Examples include CGCs with hydrogen, ozone depleting substances (chlorofluorocarbons), hydrogen cyanide, etc.

2.3) Non-Hazardous CGC is not above atmospheric pressure (empty) or does not contain a substance that exhibits any of the following characteristics: unknown contents, toxic/poisonous inhalation hazard, flammable, reactive, or cannot be released to the environment. Examples include CGC with nitrogen, argon, carbon dioxide, helium, krypton, neon, xenon, etc.

3.0 Responsibilities

3.1) Environmental, Health & Safety Office (EH&S) is responsible for identifying CGCs that can be pressure tested and certifying CGCs that can be de-valved by the Facilities Department.

3.2) Facilities Department is responsible for devalving CGCs that have been certified by EH&S as ‘safe for de-valve’ and as appropriate, recycling or disposing of the de-valved CGCs.

4.0 Safety Precautions

4.1) Pressure testing of CGCs shall be performed outside or in a well ventilated location that does not create a hazardous condition, e.g., flammable gas near ignition sources. Prior to testing, ensure cylinder is secured or stabilized to prevent movement.

4.2) High pressure gas releases from non-hazardous CGC shall be aimed away from personnel.

4.3) Appropriate personal protective equipment (PPE) shall be worn during pressure testing, depressurizing, and de-valve procedures, including: eye/face protection, gloves, safety shoes/boots or other PPE as necessary to provide adequate protection.
4.4) If the contents of CGCs need to be evaluated, the Micro 5 PID meter or other appropriate gas detection instrument or method should be used.

5.0 Non-Hazardous CGCs

5.1) Non-hazardous CGCs that are at atmospheric pressure (i.e., not pressurized) can be certified 'safe for de-valve' by EH&S.

5.2) Prior to this certification, EH&S shall perform the following steps:
   a) Verify CGC is not pressurized,
   b) Attach a white tag to each CGC that states ‘safe for de-valve’,
   c) Write ‘safe for de-valve’ on the cylinder with a permanent marker, and
   d) Mark the white tag and the cylinder with the same unique identification number.

5.3) EH&S shall keep an inventory of the cylinders that have been certified as safe to devalve and sent to the Mechanical Shop. This inventory shall be maintained by EH&S until the cylinders have been de-valved.

5.4) Cylinders that are certified by EH&S as safe for devalve can be delivered to the Facilities Mechanical Shop. EH&S shall submit a work order that describes the CGCs to be de-valved.

5.5) The Mechanical Shop shall devalve these CGCs and recycle or dispose of the scrap metal. Whenever possible, recycling of the scrap metals is preferred.

6.0 Hazardous CGCs

6.1) Whenever possible, hazardous CGCs should be completely used (i.e., hazardous substance consumed in process) or returned to the CGC supplier/manufacturer. If this is not possible, hazardous CGCs will need to be managed as hazardous waste.

6.2) Small, hand-held (1 liter) propane cylinders have several disposal options and should not be disposed as hazardous waste.
   a) Small (1 liter) propane cylinders that were purchased from the WHOI stockroom can be returned to the stockroom for disposal.
   b) Small (1 liter) propane cylinders that are EMPTY can be disposed with normal trash by EH&S and do not need to be de-valved.
   c) WHOI Plant Operations has agreed to use the non-empty, small (1 liter) propane cylinders.

6.4) Propane tanks that are used for barbeque grills should be sent to Distribution for recycling and should not be managed as hazardous waste.

6.4) All CGCs that will be managed as hazardous waste must be approved by the EH&S Director. The EH&S Director shall ensure that reasonable efforts have been made to completely use the hazardous product in a process or that the hazardous CGC cannot be returned to the supplier/manufacturer. Generation of hazardous waste must be minimized.