

# Reserve Air Supply System

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South Carolina  
Aquarium

# South Carolina Aquarium Dive Operations

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It is the mission of the South Carolina Aquarium (SCA) Dive Team to provide excellence in animal care and husbandry, to actively support both the educational and conservation endeavors of the SCA, and to provide a memorable, positive guest experience to all those who visit our facility.

# Training Schedule

1. Reserve Air Supply System PowerPoint
2. Reserve Air Supply System Quiz
3. GOT: 2 dives minimum
  1. Dive 1: RASS use
  2. Dive 2: RASS use w/ Ascent

J. KING  
SCUBA-DIVING-SMILES.COM



*“You might want to make yourself comfortable. I may be down there for awhile.”*

# Reserve Air Supply System (RASS)

- The purpose of a redundant Reserve Air Supply Systems is to allow the diver a sufficient air supply to safely ascend to the surface in case a diver runs out of air in the primary air source or there is an equipment malfunction.
- By definition of redundant this configuration is independent of your primary gas source and has its own air supply, regulator, and pressure gauge

# Basic Reminders

All Divers must surface with a minimum primary air source of:

- 1000 PSI in the GOT
- 500 PSI in Open Water
- 500 PSI in Surface Supply

# Dive Planning

<b>Depth</b>	<b>Volume</b>	<b>Pressure</b>	<b>Density</b>
0'	1	1 ATM	1
33'	1/2	2 ATM	2
66'	1/3	3 ATM	3
99'	1/4	4 ATM	4
132'	1/5	5 ATM	5

- **A scuba tank that lasts 60 minutes on the surface will last 30 minutes at 33 feet. (1/2 volume)**



# Air Volume of RASS cylinder

The volume of air needed will be determined by depth and calculated based on a normal SAC (breathing) rate

For Example:

13 cu ft tank

3000 PSI

Ascent Rate of 30' /minute from 130'

At surface cylinder should still have 500psi

# RASS Cylinders at the aquarium

- Surface Supplied 1.7 cu ft. cylinder
- GOT 6 cu ft. cylinder
- Open Water 13 cu ft. cylinder



## 2 styles

- “Pony Bottle” (Open Water and GOT)
  - > **Traditional looking cylinder, 1<sup>st</sup> stage, 2<sup>nd</sup> stage, Inline Shut-Off on hose, Over Pressurization Valve, and a Button SPG**
- Spare Air (Surface Supplied)
  - > **Cylinder with Integrated Valve, 1<sup>st</sup> stage, 2<sup>nd</sup> stage, and a Button SPG**
- Max PSI for all RASS’s is 3000psi
- RASS’s will need to be filled when below **2500psi**
  - > ***Divers are not authorized to start a dive with an RASS filled below 2500psi***

# Pony Bottle Assembly

- The SCA Pony Bottle configuration is set in similar fashion like a normal scuba tank.
- Slight difference such as First Stage Orientation & Hose position should be noted.
- Turn cylinder on and check psi
  - *Minimum 2500psi required to use on dive*
- **The GOT RASS is left OFF and only activated when in use.**
  - > **How?**
    - *Cylinder Valve is set ON*
    - *Inline Shut-Off is set to RED/OFF*



# Inline Shut-Off

- We use XS Scuba Deluxe Inline Shut-Off to maintain integrity of our Reserve Air Supply, keeping it in an **OFF** position but still allowing easy activation when needed
- Divers will conduct a dive with:
  - > Cylinder Valve **OPEN**
  - > Shut-Off activated in **Red**; airflow Shut **OFF**
- The Shut-Off is color coded:
- **Red** Closes flow of Air Supply
  - > Push away from 2<sup>nd</sup> Stage
- **Green** Opens flow of Air Supply
  - > Push towards 2<sup>nd</sup> Stage



# Pony Attachment

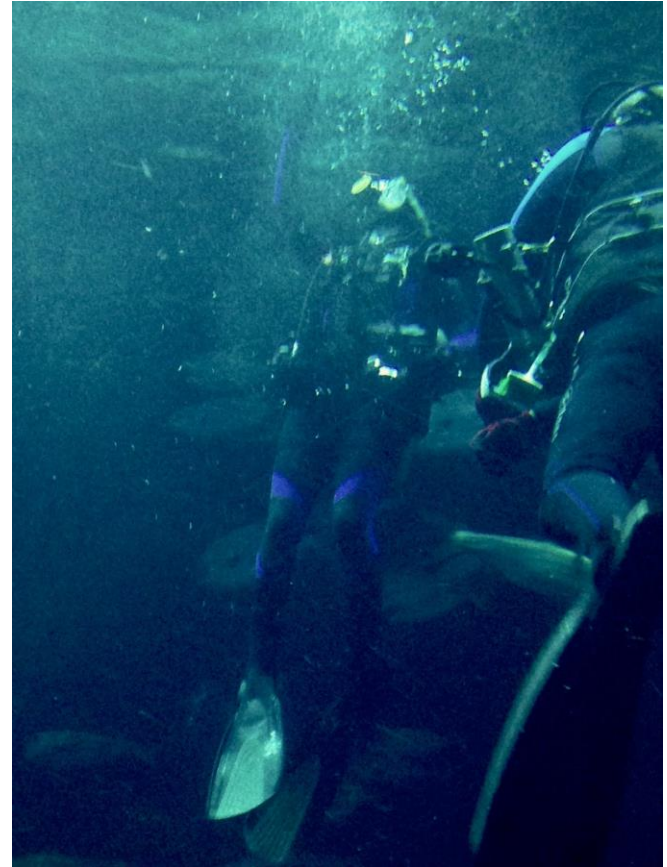
- The pony cylinder will be clipped to your Left Waist using appropriate BC D-rings.
- The exact attachment points may vary depending on our current BC model.



# Pony Bottle Deployment

- Pull 2<sup>nd</sup> Stage free from bungee
- Activate Inline Shut-Off
- Test Purge RASS as you swap regs
- Watch orientation of second stage
- Purge or exhale into second stage to remove any water

\*\*Remember to blow bubbles (do not hold your breath) when swapping regulators



# Pony Bottles add weight

- Pony bottles add ~ 3 lbs negative weight, offset on Diver's left side
- Divers should consider possibly reducing their normal dive weight use
- Divers should also consider rearranging their weights more to the right side to balance the extra 3 lbs from the pony bottle
- \*Spare Air do not add any significant weight to the diver



# Spare Air Assemble

- Spare Airs are only used for Surface Supply Dives
- Spare Airs are **Always ON**; ready for use
  - > Spare Air does not recommend installation of an ON/OFF
- Confirm PSI in cylinder
  - > **3000 PSI is a full cylinder**
- Spare Airs are attached to left side of Diver's Weight Harness



# Spare Air Use

- Cylinder is always **ON**
- Remove cylinder from carrier pouch
- Purge or exhale into second stage to remove any water

\*\*Remember to blow bubbles (do not hold your breath) when swapping regulators



# Bail Out – RASS Ascents

- Emergency use of an RASS (Bail Out)
  - > Diver should do a slow ascent
  - > Follow normal ascent protocols
    - *This is not a CESA*
  - > Skip Safety Stop
- Incidents involving use of RASS **MUST** be reported to Dive Ops
- Incidents involving Significant Unintentional Depletion of RASS must also be reported to Dive Ops

# Disinfect

- To Disassemble:
  1. Rinse Shut-Off under freshwater by sliding back and forth 2x
  2. Turn Cylinder Off
  3. Slide Shut-Off to **Green** & Purge
  4. Undo Reg & Replace Dustcap
- Pony bottles and Spare Air are to be disinfected like normal cylinder and regulator guidelines
  - > Soak Cylinders for 10mins
    - *Regs can be left attached with Cylinder **ON***
  - > If reg was breathed from: Birex, wait 10mins, and rinse



# Filling RASS

- Pony bottles are filled just like traditional cylinders
- Use care lowering the cylinder into the fill station
- Throttle Fill Knobs very slightly as the lower volume Pony Bottles fill very fast.
- Spare Air systems require a special adaptor.
- Only Dive Ops is authorized to fill Spare Air's

**\*Special hands on instruction is required for filling both types of RASS**

**\*Cylinders must have 2500 PSI minimum for a dive**

## **Dive 1**

Pre-dive buddy check

Descend to Shallow Ledge of exhibit

Switch from primary air system to RASS.

Switch from RASS back to primary air system

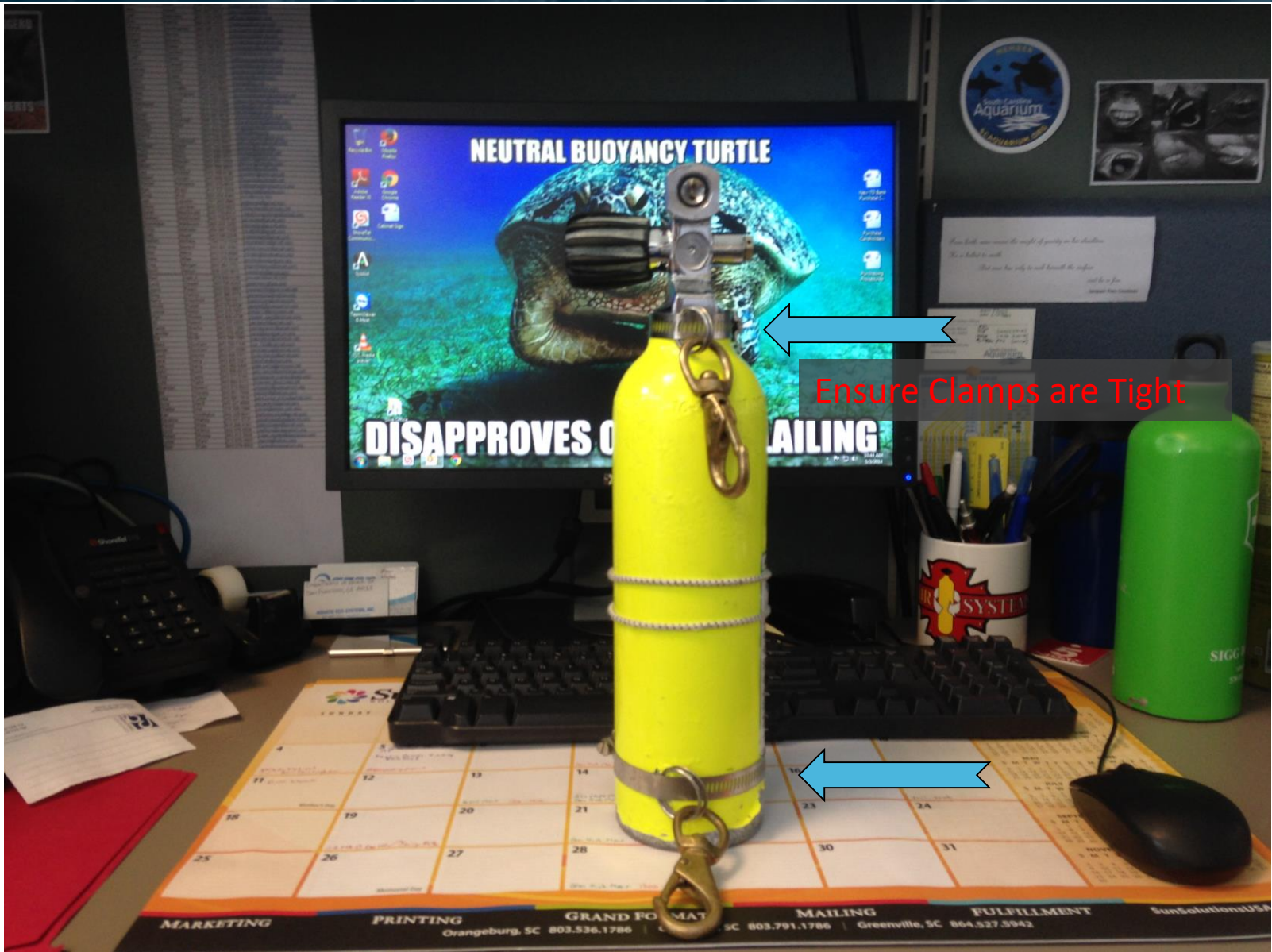
## **Dive 2**

Pre-dive buddy check

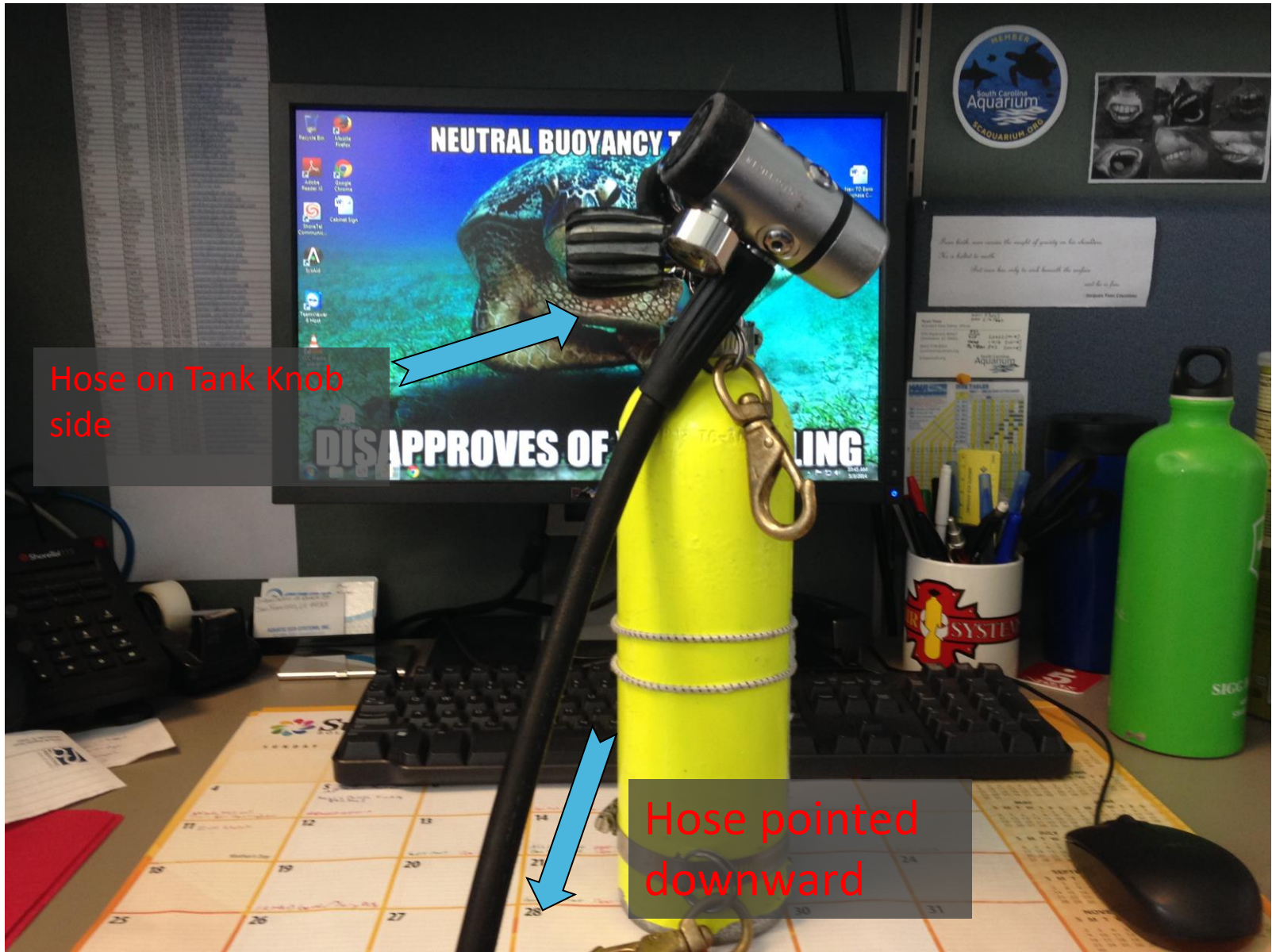
Descend to bottom of the exhibit

Switch from primary air system to RASS.

Complete a slow ascent on the RASS



Ensure Clamps are Tight



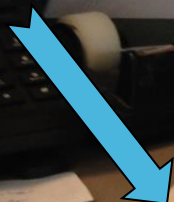
Hose on Tank Knob side

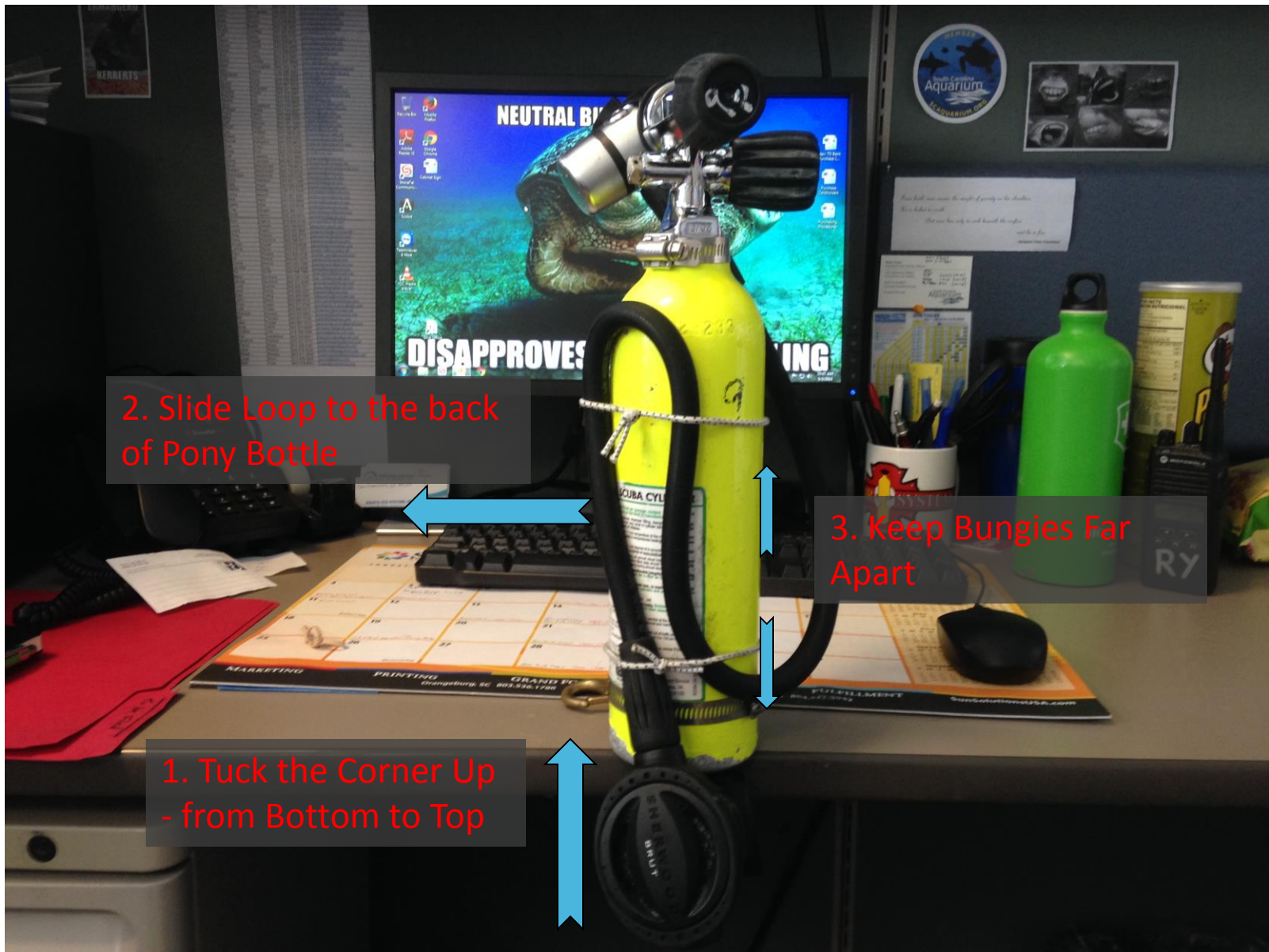
Hose pointed downward





Form an "L" with the hose  
- Pinch the corner of the L





2. Slide Loop to the back of Pony Bottle

3. Keep Bungies Far Apart

1. Tuck the Corner Up - from Bottom to Top

