

Exhibit Diver

Revised August 25, 2019



South Carolina
Aquarium

South Carolina Aquarium Dive Operations

Arnold Postell

Dive Safety Officer / Senior Biologist

(843) 579-8536

apostell@scaquarium.org

Ryan Yuen

Assistant Dive Safety Officer

(843) 579-8503

ryuen@scaquarium.org

Markus Pallos

Research & Maintenance Diver

mpallos@scaquarium.org

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

- Power Point Presentation
- Quiz
- 2 Dry Days
- 2 Checkout Dives
 - > **Supervised by DSO or Designee**

On Show

- Remember, you are always representing the aquarium, both in, out, and above our tank.
- When in public view:
 - > **Wear proper uniform**
 - > **Do not talk or text on cell phones**
 - > **No food or drink in public areas**
- When above the GOT, “behind the scenes”:
 - > **There are behind-the-scene tours always**
 - > **Be modest when**
 - *donning/doffing wetsuits*
 - *using the insta-hot shower*

When You Should Consider Not Diving

- If you have sinus issues
- If you have open cuts or abrasions
- If your doctor has recommended you not dive
- If you just don't feel "right"

You can still come in and assist as Topside Support

GOT Exhibit Opening Duties

1. Emergency Checklist
2. Food Prep
3. Fill Rinse Buckets & Disinfect Footbaths
4. Wiping Public Windows
 - > *Changing Diver ID Cards on public board*
5. Shut Off GOT Airstone / Bubbler
 - > ***Before 9am***



Emergency Checklist

Emergency Checklist

- Dive Alarms
- Radio
- Emergency Dive Gear
- First Aid Kit
- Emergency Oxygen
- AED
- Stokes Basket
- Diver Recall

Other Emergency Gear

- Spine Board
- Life Jackets
- Throw Ring
- Man Hook
- Ropes

Emergency Checklist_(cont.)

Dive Alarms

1. Call Security on Channel 1
 - > *"Security this is GOT" *wait for response**
 - > *"I'd like to test Dive Alarms" *wait for response**
 2. Active each alarm separately for 2 seconds
 3. Security will verbally confirm *"Two good alarms"*
-
- Alarms Location
 - > **Topside – under cover plate**
 - > **In-Water – on a pull string**

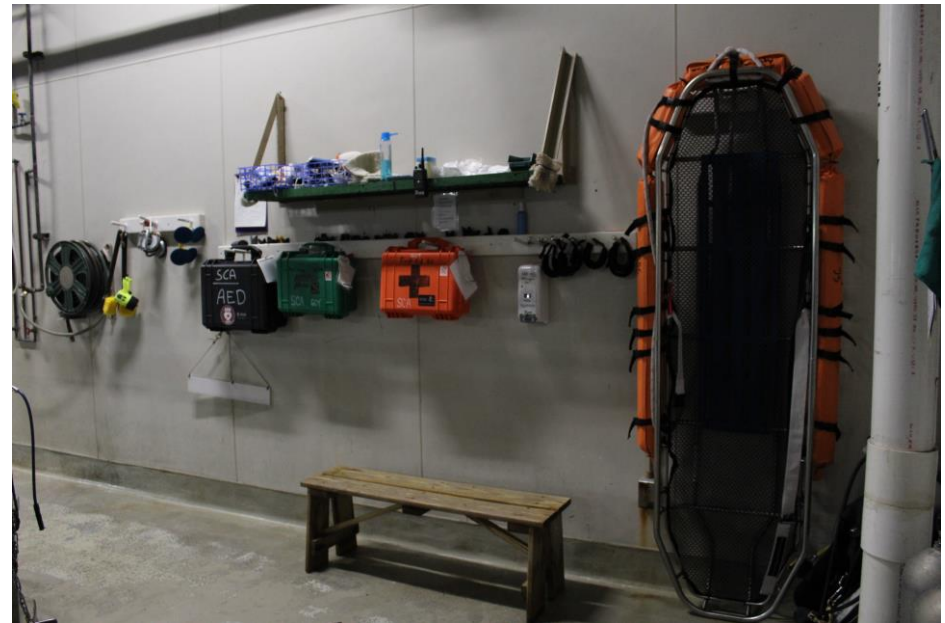
Emergency Checklist_(cont.)

- Emergency Dive Gear
 - > (M) BC, regulator, (M) fins, 16lbs weight belt, mask, Al 80 main, & Al 6 pony
 - > Changed out every Friday Shift
 - > Pressure Checked
 - *Both Tank Pressures must be 2500psi or greater*
- Leave staged, Shutdown, & Purged
 - > *Leaving it ON for the day risks leaking and bleedout*
 - > *Leaving it primed but OFF for the day can put the emergency response diver at risk*

Emergency Checklist_(cont.)

Emergency Equipment

- Radio
 - > Clipped to shelf, Medium Volume, set to Ch. 1
- AED, O2, FA Kit
 - > Present, Tagged, & Locked out
- Stokes Basket
 - > Present, 2x Straps undamaged & fully lengthened



Emergency Checklist_(cont.)

Diver Recall - Test

1. Power On
2. Volume at middle level
3. Cue handset microphone and listen for positive squealching or feedback
 - > Tapping the microphone and hearing feedback is also adequate



Emergency Checklist_(cont.)



Diver Recall - Use

Used to recall divers when evacuation of exhibit and/or building is necessary

1. Gently lower the speaker into the water
2. Open white box and turn radio on
3. Check Volume is at middle level
4. Remove handset and keep message simple: *"ALL DIVERS PLEASE SURFACE IMMEDIATELY"*
5. Remove speaker from water once divers surface

Emergency Checklist_(cont.)

Exhibit Evacuation

Reason: Fire, Earthquake, Bomb Threat, Active Shooter, etc.

- Topside support personnel will use the diver recall to notify divers to begin an immediate ascent
- Once surfaced, all divers will remove scuba gear, exit tank, and roll call with Team Leader
 - > **Use the dry erase board to roll call that all divers are present and out of exhibit**
 - > **Remove gear from exhibit if the situation safely allows**
- As a group, proceed to the nearest or safest fire exit stairway
- Do not use elevators

Logging Dives

- Dry Erase Dive Log Board



- Paper Log

[illegible]

- Computerized Individual Dive Log

Dive Log |
 Dive Stats |
 User Profile |
 Change Password |
 Sign Out

Dive Log

Hello, Mara Southard!

Dive Log History

Drives: 29 Total time: 15hrs 55min Average drive: 33 minutes

Location	Time In	Duration (hrs:min)
GOT	07/30/2017 13:25:00	35
GOT	07/30/2017 10:55:00	25
GOT	07/30/2017 09:35:00	45
GOT	07/30/2017 19:35:00	35
GOT	07/19/2017 14:55:00	30
GOT	07/16/2017 13:25:00	30
GOT	07/16/2017 10:55:00	35
GOT	07/14/2017 09:40:00	30
GOT	06/28/2017 18:50:00	40
GOT	06/18/2017 14:50:00	30
GOT	06/18/2017 13:25:00	30
GOT	06/18/2017 10:50:00	30
GOT	06/18/2017 10:05:00	40

Showing 1 to 13 of 29 entries

New Dive Log

- * Dive started:
- * Purpose/Task: Nothing selected
 - Use New Shrimp or proficiency dive?
 - No Training Proficiency
- * Bottom material:
- * Surface interval: Minimum
- * Best specific site: ** Not Listed Other **
- * Not Listed Other site:
 - Site GPS: pinpoint specific site location
 - * Max depth (ft):
 - * Diving mode: Standby
 - * Decompression: Dive Computer - Sherwood
 - * Breathing gas: Air
- Specialized environment: Nothing selected
- * Surface condition: Calm
- * Underwater condition: Good
- Buddy List: Nothing selected
- Tender: Nothing selected
- Comments:
- Animal observations:

* required field
Save Log
Cancel

Logging Dives - Dive Log Board

Posted PRIOR to Dive

- Name
- Tag #
- Surface Interval
- Buddy
- Task/Purpose
- PSI In (Main & RASS)
- Time In

Posted AFTER the Dive

- Time Out
- Bottom Time
- PSI Out (minimum 1000 psi required!)

Logging Dives – Paper Logs

- Information must be transferred from the Dive Log Board to the daily paper log
 - **Transfer all Intern, Staff, & Volunteer Diver information**
- **Date & acting DPIC** must be transferred onto paper log as well

[illegible]

Logging Dives – Computerized

- Divers are required to maintain their individual computerized dive log, daily.
- Dive Hallway Computer has shortcut to access the logs
 - > Username: firstnamelastname (ex. johnsmith)
 - > Password: scadiver
- Staff & Dive Interns will be responsible for digitizing their own dive logs

The screenshot displays the 'DIVE Log' application interface. At the top, a navigation bar includes links for 'DIVE Log', 'Dive Statistics', 'Diver Profile', and 'Change Password'. The main content area is titled 'Dive Log' and shows a greeting 'Hello, Mara Southard!'. On the left, a 'Dive Log History' table lists recent dives with columns for Location, Time In, and Duration (minutes). On the right, a 'New Dive Log' form allows users to enter details for a new dive, including Purpose/Task, Bottom minutes, Surface interval, Site GPS, Max depth, Diving mode, Decompression, Breathing gas, Specialized environment, Surface condition, Underwater condition, Buddy List, Tender, Comments, and Animal observations. The form includes 'Save Log' and 'Cancel' buttons at the bottom.

Location	Time In	Duration (minutes)
GOT	07/30/2017 13:25:00	35
GOT	07/30/2017 10:55:00	25
GOT	07/30/2017 09:35:00	45
GOT	07/20/2017 18:55:00	35
GOT	07/16/2017 14:55:00	30
GOT	07/16/2017 13:25:00	30
GOT	07/16/2017 10:55:00	35
GOT	07/16/2017 09:40:00	30
GOT	06/28/2017 18:50:00	40
GOT	06/18/2017 14:50:00	30
GOT	06/18/2017 13:25:00	30
GOT	06/18/2017 10:50:00	20
GOT	06/18/2017 10:05:00	40

Showing 1 to 13 of 20 entries

New Dive Log

* Dive started: [text input]

* Purpose/Task: Nothing selected

Was this a training or proficiency dive?

No Training Proficiency

* Bottom minutes: [text input]

Surface interval: hh:mm

* Select specific site: ** Not Listed/Other **

* Not Listed/Other site: [text input]

* Site GPS: pinpoint specific site location

* Max depth (ft): [text input]

* Diving mode: Standby

* Decompression: Dive Computer - Sherwood

* Breathing gas: Air

Specialized environment: Nothing selected

Surface condition: Calm

Underwater condition: Good

Buddy List: Nothing selected

Tender: Nothing selected

Comments: [text area]

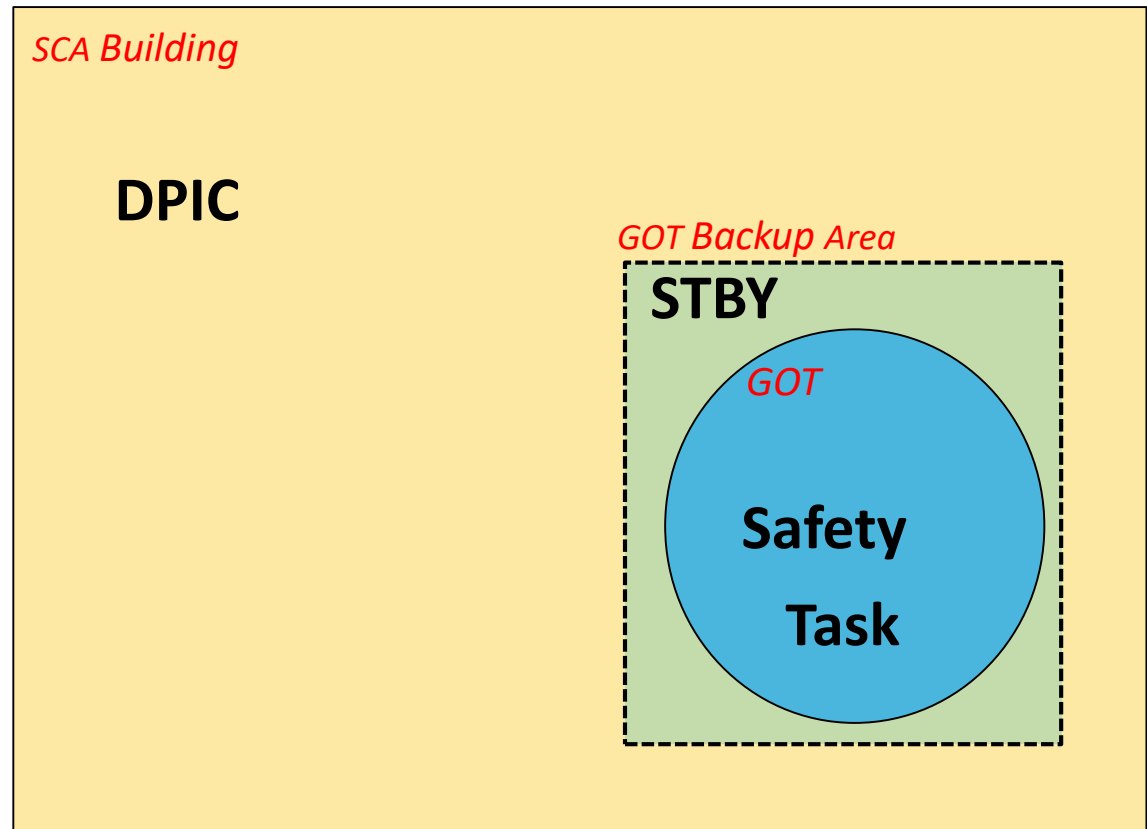
Animal observations: [text area]

* - required fields

Save Log Cancel

Diving Protocol

- Team of 4 is required to start a GOT Dive
 - > DPIC
 - > STBY
 - > Safety Diver
 - > Task Diver



Diving Protocol *(cont.)*

DPIC – Dive Person in Charge

- *topside role; in building*
 - > Staff member appointed by the Dive Safety Officer, for the day's diving operations
 - > Fully trained in SCA Dive Program
 - > Available in the building by Radio
 - > Responds to Dive Team's need and any emergencies



Diving Protocol *(cont.)*

STBY – Standby (Diver)

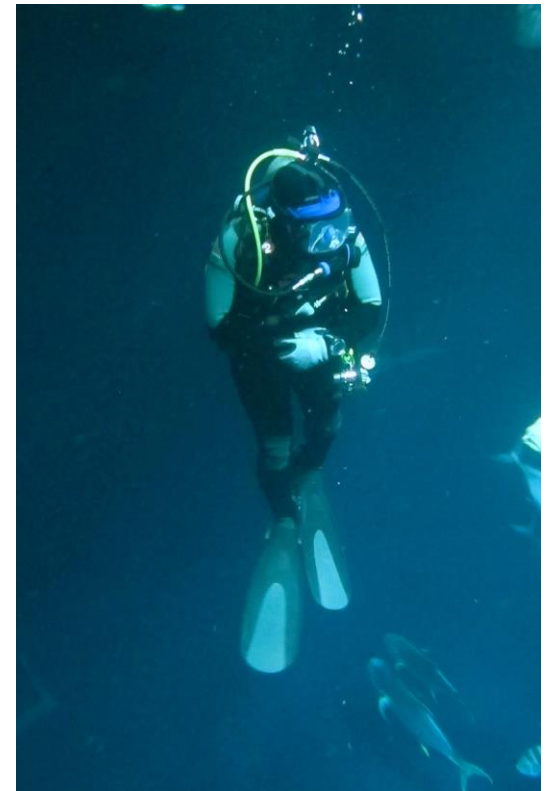
- *topside role; at dive site*
 - > Qualified Diver
 - > Available at the actual dive site
 - > Watching bubbles & helping divers in and out of water
 - > Logging Dives on Whiteboard
 - > Able to respond in water to an emergency
 - *Can be dressed & enter tank in street clothes w/ lifejacket*
- *Cannot* leave dive site to:
 - > Fill Tanks
 - > Use hallway computer
 - > Use bathroom (*Radio Dive Office for relief on Ch. 2*)



Diving Protocol *(cont.)*

Safety Diver

- *in water role*
 - > Every dive will have person assigned as safety diver for their task
 - > Dive task is focused on in-water safety
 - > Safety diver should be first in and last out
 - > Hover mid water towards the back of tank
 - > Signaling wrench needed
 - > Constantly looking at divers and animal interactions



Diving Protocol *(cont.)*

Task Diver

- *in water role*
- This diver's purpose is:
 - > **Cleaning**
 - > **Presenting a Dive Show**
 - > **Observing Animals**
 - > **Interacting with guests**
- There can be multiple Tasks divers



Diving Protocol *(cont.)*

Team Diving

- No solo diving is permitted in any exhibit without direct approval from the Dive Safety Officer
- Team diving is exactly the same as the Buddy System, with the exception that you're checking on multiple divers VS one diver
 - > Perform Self Air Checks periodically
 - > After Self Air Checks, bubble count Team Members, then visually check Safety Diver Position
 - > Safety Dive visually checks all Team Member positions
- Position yourself where others can see you



Dive Gear

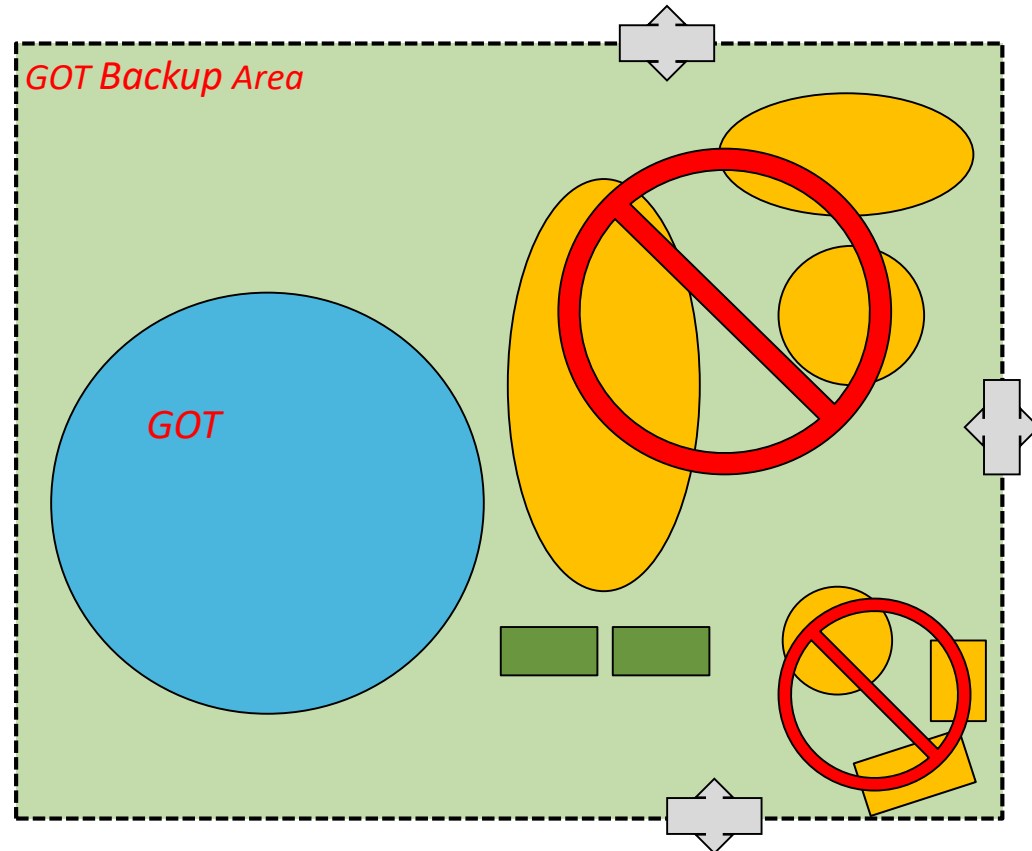
- Diver provides wetsuit, booties, gloves, hood and mask
- Diver also provides swimsuit and towel
- SCA provides everything else
 - > **Personal gear like regulators, BCD's, and fins are not allowed without prior approval of the DSO**
 - > **Personal wrist-mounted dive computers may be used only as secondary to Aquarium provided computers**
 - *See Dive Computer Training class for proper protocols*

Personal Cameras

- Divers are required to ask permission for camera use from the DSO
- Use is supported, but there are some special considerations with lights and animal interaction that need to be discussed
- The aquarium also requests copies of any “good” photos for aquarium use.

Cross Contamination

- Several quarantine tanks occupy the GOT backup area
- Divers need to prevent water or salt transfer from these tanks to your wetsuit
- When in a wetsuit, to minimize cross contamination between GOT & quarantine do not:
 - > **Approach quarantine tanks**
 - > **Sit on floor**
 - > **Rest or lean against tanks**



Disinfection

- Critical that all dive gear be disinfected properly to avoid contamination
- Any personal gear must be disinfected before you enter the exhibit
- All gear, including personal items, should be disinfected at the end of the diving day
- If personal gear is not used between aquarium visits, it can be considered clean



Disinfect Procedures

- BCDs, wetsuits, & other neoprene will be disinfected by:
 1. Place in disinfect bucket for 10 minute
 2. Rinse in freshwater bucket
 - > *BCDs should be rinsed inside & drained using hose or BC-hose adapter*
 - > *Fill BCD with air and hang in storage room to dry*

Disinfect – Regulators

1. Insure that the first stage cap is in place prior to placing in water
2. Rinse regulator in freshwater
3. Remove and spray second stage with Birex
4. Let it sit for 10 minutes
5. Rinse regulator in freshwater
 - > **Drain mouthpieces & FFM's of water**
6. Return regulator to gear closet

Disinfect – Guardian FFM

- Rinse Full Face Masks in freshwater
- Spray microphone and inside of mask with Birex
- Let it sit for 10 minutes
- Rinse GFFM in freshwater
- Drain all water from mask, mouth pocket, & reg barrel
- Return to gear closet

Disinfect – Hard Surfaces

- The following need to be rinsed in freshwater only for 10 minutes:
 - > **Cylinders**
 - > **Fins**
 - > **Weights**

Disinfect – Feeding Equipment

- All equipment used in feeding (buckets, tongs, trays, etc.) is to be disinfected in the designated feed disinfect bucket
- Place in disinfect for 10 minutes
- Clean food containers again in food prep
- Return to proper location in food prep

Problems with Dive Gear

- All broken gear (except tanks) should be tagged, reported to the acting DPIC, and put on the ***floor*** of the compressor room
 - > **Use the corresponding tag to mark the nearest location to bubbling or hissing**
- A problem with a tank such as missing O-ring: tag tank and place on left slot in rack adjacent to the fill station



Entry

- Use Controlled Seated Entry only
- Check area for animals prior to entering
- Enter water gently to minimize stress on animals
- Signal OK
- Descend with Team



Animal Interaction

- Become familiar with the habits of certain fish and where they like to hide
- If you have to redirect an animal, use ONLY the closed backside of your hand to redirect
- Do not feed any animals while in the water
- Petting any animal is prohibited

Animal Interaction - Sharks

- We are in “their space”
- Sharks may occasionally bump into a diver
- Report any unusual shark behavior immediately to the DSO or husbandry
- Examples of unusual shark behavior:
 - > **Bumping**
 - > **Arched back**
 - > **Pectoral fins down**
 - > **Tight s-curve swimming**
 - > **Erratic change in swimming behavior**

FOB – Fish On Bottom

- When there is a distressed, sick, dying, or dead animal that needs Husbandry attention, we use the codeword “FOB”
- Call “Husbandry, FOB in *exhibit name*”
 - > *Tone of voice will dictate how quickly you need assistance*
 - > *“Need help, immediately” will get a response to your location with haste.*
- Your DPIC or Husbandry will instruct you on what to do
- We use the codeword to not panic guests or cause them to jump to conclusions
 - > Guests of the aquarium may be able to hear transmissions
 - > This way we can control the messaging and teach why the animal is having an issue and what our response is.

FOB – Fish On Bottom *(cont.)*

- Never net, extract, or recover any fish or carcass from the tank without first getting approval from the DPIC
 - > A carcass in your hands will paint your hands as a target for predators
 - > Netting a live fish can put undue stress on the animal and cause it to crash and die.
- Husbandry or your DPIC will make those necessary calls based on the animal health and situation.
- They will also provide you with the proper tools to be safe and successful

Exhibit Environmental Hazards

Overhead

- There is a Middle & Lower Cave
- A dive light & a spotter are required before any diver enters cave
 - > *Do not enter cave unless you are Vacuum cleaning or on a task that requires it*
- The spotter should be positioned at cave's entrance until diver exits cave
- Either the spotter or diver can carry the flashlight

Piping

- There are 13 outflow pipes located in the caves
- Outflow pressure could potentially flood or remove a diver's mask if diver lifts head into the outflow

Safety Stop

- All dives in the GOT will include a safety stop during the ascent
- A safety stop will be a minimum of 3 minutes at a depth between 10 to 20 feet
- Maximum ascent rate of 30 feet per minute

Exit

- Be aware of any animal activity
- Count and check that all items taken in are still with you at surface
 - > Head buffs & beanie caps still on head?
- Remove:
 - > Weights
 - > Full Face Mask, if equipped
 - > BCD
 - > Fins, last
- Last 2 Divers should alternate handing gear up and exit simultaneously

GOT Exhibit Closing Duties

- Dump all disinfect and rinse buckets
- Fill and store all tanks
- Complete & File away all Dive Logs
- Clean and disinfect feeding buckets and return to food prep
- Clean and disinfect food cart and return to outside of food prep
- Pour some bleach solution on the locker room floor, hose down, and squeegee dry.

GOT Exhibit Closing Duties *(cont.)*

- Hose down and squeegee the floor around the GOT
- Ensure all safety lines and gates around GOT are secured
- Alert Security *“All Divers are out of GOT”*
- Return radios to charging stands
- Turn off all lights and lock all doors around GOT backup area

Night Dives

- Night dives may be scheduled in the GOT for special events or tank cleaning periodically
- All actions required for routine dives will be repeated at the start of the Night Shift
 - > **Re-do full Emergency Checklist**
 - > **Start new paper dive log**
 - > **Cleaning and Disinfecting gear**

Dive Emergency Procedure

Topside Response – *reference video ERT Standby Diver*



Dive Emergency Procedure

Underwater Response – *reference video ERT Safety Diver*



Dive Emergency Procedure

Building Response

- Security has a audible & visual lightup board for all emergency activated alarms in building
 - > **Dive Alarms**
 - > **Venomous Snake Bite Alarms**
- When activated, Security will call 911 without hesitation
- For Dive Alarms, DPIC will arrive on scene and Radio to Security the exact details of the emergency
 - > **Security will relay details to 911 & escort their arrival from Loading Dock to the Exhibit**

Unable to Make Your Scheduled Dive

- If you are unable to work your assigned dive day use SCA Diver Listserve to try to find a replacement diver
 - > Send an email as soon as possible (multiple days in advance) to give other divers time to respond
- scadiver@googlegroups.com
- If you find that you will not be able to work on short notice, you must also call Security at
(843) 579-8507
 - > Calling in sick or any other last minute changes

