

# Underwater Speleology

*Journal of the Cave Diving Section of the National Speleological Society*

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Of The Arctic Circle**

**Cave Diving And Yoga**

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**Gas Analysis And Bottle Marking**

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July/Aug/Sept 2016*

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Photographer: Jon Ottar Runde

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# from the

Spring is over and summer is upon us. For the first time in a long time your board has no fires to put out. This is a good thing. Our 2016 Workshop was a resounding success thanks to the efforts of your Workshop Chair Curt Bowen and board members Sylvester Muller, Cheryl Doran and Al Clements. All went above and beyond the call of duty with their extraordinary commitment and work. We also want to thank all of our sponsors and our members because without them none of this could happen.

A special thank you goes out to Mike Young and Kiss Rebreathers for their generous donation of a Kiss Sidekick rebreather which was raffled off for very handsome \$6000 return. In total this years' workshop netted the NSSCDS approximately \$16000, possibly a record high.

We have a new webmaster, Rod O'Connor and he is working very hard to make ours a site you will enjoy and be proud of. Thank you Rod. Please check it out if you have not already done so and if you have checked it out, please let us know how we can improve your online experience. It is at [www.NSSCDS.org](http://www.NSSCDS.org).

We also now have an online forum up and running. It is similar to other boards you may be familiar with. I would like to ask that our members start using it and posting on it. If you have something of interest to post put it in our forum and then put the link in Facebook and any other social media you might use. This will drive traffic to our site and make it more valuable to our advertisers and sponsors. If we wish to attract the hard earned dollars of sponsors we need to offer them an attractive and viable website with heavy traffic in a concentrated, highly targeted market. People may like us but the decision to advertise is a business decision and we need to offer them a good value proposition.

The website also has a photo gallery under the Forum section. We encourage you to enjoy the images there. Check back often and watch it grow. I would also request that those of you who are photographers to open your own photo gallery on the site. You can upload your images and have a gallery under your name.

Some of you may be wondering why we have not had the vote on the amendments to the Constitution and By-Laws yet. Well, the reason is multifaceted. First was that we want to do it electronically and there is a bit of a learning curve with respect to which software to use and how to use it. This saves money (postage) and trees (paper). In the future we hope to be able to hold all of our elections electronically. We also made two minor edits to the proposals: The first is that to sit on the Board it is required to be a current member of the NSSCDS as opposed to only the CDS (Article IV). We believe as a board member you should be required to be a member of the NSS. The second edit is that we dropped the "Any property of the NSS-CDS shall revert to the National Speleological Society (NSS) or any organization having nonprofit status selected by a simple majority of the Board in the event of the

dissolution of the NSS-CDS” because we believe this is no longer necessary. The lawsuit is over and we can protect assets in other ways. The updated amendments of this issue follow and will be posted on our website for your perusal. Please consider these amendments and vote on them. Remember that member participation is the heart and soul of every organization.

Looking towards the future we have the Midwest Workshop coming in September and we will be exhibiting at DEMA in November. Al Clements has stepped up and volunteered to be the 2017 Workshop Chair. Al has lots of new and exciting ideas to implement and is already lining up speakers. We expect to have more and better door prizes and we intend to make changes to the food menu. If you want to be involved, contact Al. It is a great way to make new friends and dive buddies.

Respectfully,

Joe Citelli  
Chairman, NSSCDS

## **THE CONSTITUTION**

### **Article II**

The purpose of the organization shall be the same as that of the National Speleological Society (hereafter referred to as NSS), with the additional purpose of organizing NSS members **and all other persons** who are interested in cave diving so that they may better promote the objectives of the NSS **or the NSS-CDS**. These objectives include 1) promotion of the conservation, exploration, and study of underwater caves; and 2) education for increased awareness, safety, and skill in cave diving.

### **Article III**

Membership in the NSS-CDS shall be open to **all interested persons and shall consist of two types: NSSCDS and CDS**. NSS-CDS members shall enjoy all of the rights and privileges of membership in both the NSS and in the CDS. CDS members shall enjoy all of the rights and privileges of membership in the CDS only

### **ARTICLE VI**

This Constitution may be added to, or amended by approval of greater than two thirds (2/3) of the membership of the NSS-CDS **and CDS combined** who cast ballots on a written ballot following a minimum of sixty (60) days written notice to all members. A minimum of one fifth (1/5) of the total membership must cast ballots to qualify as a valid polling of the NSS-CDS **and CDS**. Notice of proposed amendments must be provided ...

### **Article VIII**

The Constitution, and Bylaws of the NSS shall **not** be binding on the NSS-CDS.

### **Article X**

Any property of the NSS-CDS shall revert to the National Speleological Society (NSS) **or any organization having nonprofit status selected by a simple majority of the Board** in the event of the dissolution of the NSS-CDS.

## **THE BY LAWS**

### **Article I: Purpose and Powers of the Corporation.**

The Cave Diving Section of the National Speleological Society, Inc. (“NSS-CDS”) possesses and may exercise all lawful corporate powers necessary and convenient for promoting the missions, purposes, goals and objectives of the National Speleological Society, Inc. (“NSS”) **and the Cave Diving Section (CDS)**, including public education, the interests of its members in conservation, exploration and scientific investigation of underwater caves, and the education of divers for increased awareness, safety and skill in cave diving.

### **Article II: Membership**

A. General Qualifications. Membership in the NSS-CDS shall be **open to all interested persons and shall consist of two types: NSS-CDS and CDS**. NSS-CDS members in good standing and whose dues in both the NSS and the CDS are paid current shall enjoy all of the rights and privileges of membership in both the NSS and in the CDS. CDS members in good standing and whose dues in the CDS are paid current shall enjoy all of the rights and privileges of membership in the CDS only and be defined as a partial membership

#### **B. d) CDS Partial Membership**

- i) Can vote in any election brought before the membership
- ii) Can hold office if meets other qualifications and joins the NSS

Continued on Page 25

A diver in a cave, illuminated by a bright flashlight beam. The diver is wearing a full diving suit, mask, and regulator. The cave walls are rocky and textured. The text is overlaid on the lower half of the image.

*Pluta: Cave Diving  
on the Edge of the  
Arctic Circle*

By: Peter Buzzacott

For some years I had wanted to dive the Plura system north of Mo I Rana, an industrial town in mid-Norway known as the 'Gateway to the Arctic Circle'. Then, in 2013 I was testing experimental dive equipment in Croatia when I met a decompression scientist from the Norwegian west coast. "You should come visit my laboratory" he said, so we applied for a research grant and one year later there we were, wearing scrubs in his hyperbaric lab.

On Friday we wrapped up our meetings, the Norwegian team cordially looked forward to visiting me back at my own lab and I boarded the Dash 8-100, a twin-engine commuter plane perfectly suited to short-runway take-off and landing. None of us had seat numbers so I took a window and watched the ground-crew guy unplug an electrical cord from the front of the plane. He gave a thumbs up and the props started turning. The engines really roared during take-off; the whole plane vibrated and shook itself down the runway and then we were up and airborne. Norway is a beautiful country with vast forests, rolling hills and burgundy houses with white window frames. Even in summer, snow was common across the many bare-rock summits below us. Rivers and lakes mirrored the blue sky; no wonder everyone I met loved the outdoors.

We landed and took off beautifully, dropping off or picking up rotating shifts of miners as we travelled ever northward till finally, at the third landing, the Captain parked our plane neatly in front of the Mo I Rana airport, a single-story building opposite the town's motor-racing circuit. Soon my newest buddy Tom arrived to collect me. I would be staying at his place for the weekend. Norway in general is quite expensive but this is especially the case in remoter towns, so I was grateful to have Tom's guest room.



Above: The Pluradalen valley and snow-melt feeding the cave system  
Photo: Peter Buzzacott

Left: The main passage is heavily scalloped  
Photo: Jon Ottar Runde



The entry lake and rental cottage for cave divers behind me  
Photo: Peter Buzzacott

In fact, I was welcomed with open arms by his family and even given the keys for a night while they attended a wedding! Time and again I am humbled by the camaraderie we share in cave diving. It reminds me of the army.

First we visited the local club-house where I met Raymond, our buddy for tomorrow, and we collected tanks and gas. Raymond lent me a backplate and wing, Tom gave me a spare long-hose because I hadn't brought mine and pretty soon I was appropriately configured so Tom and I set off. We drove to the Pluradalen valley, about a half-an-hour out of town, called-in to see the farmer and his wife who own the property Plura cave is located on, then we drove on and parked by a picnic table among low trees covered in new light-green foliage. We carried our manifolded double-120's down to the water and assembled the rigs there. We had small bottles of argon for suit inflation, plus a spare stage of nitrox and some oxygen for safety, which we dropped near the entrance. Both of us had a few minor gear issues to start with, which were soon resolved but I decided to leave the GoPro outside the cave today while adapting to the unfamiliar surroundings. Then my helmet was hitting the manifold so I left that behind too; just small issues but they delayed us leaving the shore and the water was only a few degrees above freezing. The cave is actually fed by melting snow. I'd had a leaking suit three weeks before but had bought some goop from the local dive centre which had sorted out my leaking wrist seals nicely. But, I still had pin-prick holes all over my back and, really, it's probably time for a new suit. Today though I was in three layers of undergarment with dry-gloves and a Fourth Element 7mm hood so I was ready for action no matter what the temperature.

This cave is spectacular – the scalloping all around is just marvellous. Tom was hoping we could reach an air chamber at about 1000 ft in so he was swimming steadily while I was looking around like a kid in a candy store. The passage was huge; I couldn't even make out the walls in



© Jon Ottar Runde

*The banding in the rock is beautiful*  
Photo: Jon Ottar Runde

some places.

There were dark bands through some huge cream-coloured boulders, and rust-like excreta growing out of the bands. At 100 ft depth I was starting to feel short of breath so I slowed down. Vis was only ten feet or so and I wasn't really happy swimming along at a clip while wearing a manifold, something I've grown unaccustomed to since selling mine a few years ago. I was getting cold too, and my lips were stinging like they were on fire. At the 600 ft mark I signalled the turn and led out slowly, taking in the view.

We exited at 40 mins, made a few minutes of decompression and surfaced at 45 minutes, shivering by now and with cramps hitting behind my quads while both my feet and hands were burning from the cold. Gee-whiz I was glad I hadn't pushed-



© Jon Ottar Runde

*The entry from the inside*  
Photo: Jon Ottar Runde



*Peter checking out the awesome scalloping Photo: Peter Buzzacott*

on to the air chamber. The air is breathable in there but the guys don't always surface, sometimes they sit at 3 ft or so and then return to the exit. I am sure I would have been in some considerable discomfort if I'd pushed-on in this dive.

Plura hit the cave-diving world's headlines in January 2014 when two Finnish divers perished in there attempting an incredible traverse through 400 ft depth over many hours. I'd crossed paths with Jari H, the first of the deceased, and his buddies a couple of times in south France and those guys were extremely-keen cave divers. Jari's Mercedes Benz van, for example, had three floors inside it; the bottom for the heavy stuff like tanks, the middle for rebreathers and scooters and the top floor for sleeping.

Whenever they pulled-up at the cave diving center it was a bit like AC/DC had arrived. It is such a tragedy when we lose the shining lights of our sport. We're aware of the risks, especially those that push the boundaries and explore, but still we are drawn to these beautiful, inhospitable places we love so much. An international team were assembled including Rick Stanton, Jason Mallinson and Mark Dougherty but the restrictions and capricious environment forced the Norwegian authorities to abandon the recovery effort in late February. Then, in March, the surviving members of the Finnish team returned and completed the most remarkable recovery so far in cave diving, (given that David Shaw succeeded but did not survive the ordeal). I won't re-hash the epic here, a simple



*When the visibility is good, the cave is spectacular*  
Photo: Jon Ottar Runde

full Norwegian breakfast for me. There was sliced moose sausage, reindeer, fresh vegetables and cheeses, juice, tea and coffee, a full table. Norwegians are very proud of their healthy lifestyles, long life-expectancy and socialist society in which taxes are high, university education is free and the poorest are looked after. Like my friends in Michigan, everyone I met seemed to have a cabin in the mountains; hunting is very popular, and when the sun comes out Norwegians lay around soaking it up. I really like Norway and will certainly return.

We joined Raymond at the cave and today we geared up at the picnic table. My back was feeling those double steel 120's after yesterday, plus I still had the argon bottle. At 46 years old, I was glad I'd already carried my stage tank down to the water. In the water however, it breathed like an old dog and when I adjusted the cracking pressure it free-flowed so I said to the guys "look, I don't care how far in we go, let's just have a swim around and take



*The rock is clean, the silt below is dense*  
Photo: Jon Ottar Runde

Google search for Plura will lead interested readers to the full story and a movie documenting the recovery dives, called "Diving into the Unknown", is currently screening around the world. At the time of writing a US distributor is yet to secure a showing in the US. By June 2014 the cave had not long re-opened and we were among the first to return to it. RIP Jari.

I didn't sleep that night, because the sun did not go down. The sun dipped low, almost setting, but then it came back up. I checked the clock every hour through the night; 2am, 3am, 4am, was it time to get up yet? I may also have been a little excited. In the morning Tom and his family laid on a



*Deco is more fun with a buddy*  
Photo: Peter Buzzacott

some photos." I had my GoPro in one hand and a borrowed video light in the other so I really wanted a simple dive anyway. Being the great hosts they were, both said "okay" and off we went, Raymond leading and me in the middle.

By 20 minutes I was once again cold to the bone so I gave the turn signal. On the way out I paused for photos, few of which worked out, this cave is just so massive and dark. I made seven minutes of deco and surfaced, very happy to have dived here at last. Afterwards, Raymond left for work and Tom drove me further up-valley, where snow-melt streams disappear into rock and reappear in caves upstream from Plura. This was the focus of recent exploration, to extend the known system upstream. It is tough, tough cave diving. Even

today, at the height of summer, there was snow on the ground in thick patches here and there. And this cave is dived all year round!

We hiked over to Steinugleflaget, the exit from the traverse from Plura and staging area for the recovery. It was rather bleak, even in the summer sunlight and we fell quietly into a sombre reverie. I may dive here next visit, all going well, and another sidemount cave called litjåga. There is plenty to see and do in Norway. The next day I waited at the airport while local motorheads drifted around the racetrack out front. My twin-propped plane landed; I climbed aboard and mentally said farewell to Mo I Rana. At latitude 66°N this is the highest I've dived so far, even well north of Scapa Flow, and it would not have been possible without the generous support of my Norwegian pals Tom and Raymond.



*The rock in Plura alternates between light and dark*  
Photo: Jon Ottar Runde

*Acknowledgements: An earlier version of this trip report was published in 2014 in Guidelines, the magazine of the Cave Divers Association of Australia. Sincere thanks to Jon Ottar Runde and Øyvind Hegle for their photographs of Plura Cave.*

*Like swimming through a giant honeycomb*  
Photo: Øyvind Hegle



# Texas A&M Galveston's Scientific Diving Class Attends 2016 CDS Workshop

By Monika McGuinness

The NSS-CDS Workshop was a great experience from beginning to end. The Friday night social did not disappoint with the good people and the craft beer. I enjoyed being able to look around at the tables before Saturday when the speakers were on stage talking about their research. I already knew what I wanted to get and who I wanted to talk to before the talks started. This was a good thing because once the talks got started, I would not have had enough time to look around and talk to people like I got to the night before. All of the speakers were passionate about their work and really eager to share their experiences with others, but two of the speakers really grabbed my attention.

The first speaker, Nathalie Lasselin, talked about the exploration of cave systems in China and I was blown away. As a new cavern diver, the world of caves and cave diving is still an unbelievable mystery to me. Not only is this kind of diving an incredible feat but the process of being able to get there was also incredible. Talking with the locals and gaining their trust and learning things about them and their lifestyle was amazing. I thought it was so cool how everyone welcomed them with open arms. The other speaker that stood out to me was Cristina Zenato because of her strong passion for cave diving and following in the footsteps of past cave divers to add onto the map of the cave system that she was exploring in the Bahamas. Listening to her speak about the caves was engaging, I did not take my eyes off her or her screens once.

The passion that everyone who spoke had for what they were doing was incredible. The passion and the love for cavern and cave diving from everyone that participated helped put into perspective why they care so much about the education for this sport and the protection of the cave systems. The video that Curt Bowen and others made was a great example of how important it is to be trained properly before you go cavern or cave diving. It was great to meet the people I saw in this video. They showed how much they truly care about what they are doing and the safety of others.



*Texas A&M University at Galveston Scientific Diving students display their line arrows, personally signed by Forrest Wilson (at left), presented to them as newly certified CDS Cavern Divers. Dr. Thomas Iliffe (at bottom) is the instructor for this class as well as a long-time NSS-CDS Cave Diving Instructor.*



# Cave Diving And Yoga

By: Bill Harrison

Cave diving led me to Yoga, and Yoga has both improved my cave diving and transformed my life.

I chose to become a cave diver in the good old days (2003), which meant back mounted double 104s and valve drills. During my first dive in a borrowed set of 104s, my friend who loaned them to me came on the dive to supervise my first attempt at a valve drill. It was only an attempt, as my over-the-shoulder reach in a dry suit came nowhere near any part of the handles! My improvised home stretching routine to extend my reach was making some progress, but a dive buddy suggested that attending some Yoga classes might accelerate my progress. Since I was willing to try just about anything in my pursuit of becoming a safe cave diver, I started going to some various Yoga classes around town.

It was instantly obvious in Yoga class that my shoulders were not my only joints with a limited range of motion, and that I had tight muscles everywhere. Strictly from a physical standpoint, I made some rapid progress that not only allowed me to perform my valve drills, but also boosted the power and endurance of my frog kick as well as improving my SAC rate. The SAC rate improvement came as a result learning to be more efficient and at ease in all my movements, as well as through the Yoga practice of controlling the breath and keeping it smooth even while performing vigorous exercise. I was also learning to release the muscular tension that I was carrying with me throughout the day, which resulted in fewer sore back issues and more comfortable neck and shoulder zones.

Those are the aspects of Yoga that I hoped for and truly appreciated in improving my cave diving. How-

ever, those are just the “cavern zone” benefits of a good Yoga practice! As I got further and deeper in to Yoga, I began receiving additional and far greater life benefits, some of which are the same things many of us love about cave diving. These include the feelings of mental focus and clarity, peace, and the feeling of being completely immersed in what you are doing and accomplishing, and that you are always making progress toward some of your life goals. There is also a drive to learn to become present in the moment and pay attention to what you are doing, thinking, and feeling – and how it all affects those around you. I am a better person for it.

For quite a while I was practicing Yoga for flexibility, and alternating weight lifting workouts for strength (including the strength it took to get up off the ground wearing double 104s on my back and climb hills in them). Eventually I discovered Power Yoga – sometimes also called Ashtanga Yoga or Vinyasa Flow Yoga. Power Yoga offers an excellent balance of strength and flexibility pose sequences that build functional body strength while still providing all the other benefits I have listed. Currently my daily Yoga practice commitment varies somewhere between a simple 10-minute sequence, a more frequent 30 to 45-minute sequence, and the occasional 75 to 90-minute practice. To round out my fitness to dive regimen, I also do frequent power walks or bike rides, and weekly kettlebell workouts.

I am now an enthusiastic side mount diver, having broken down all of my doubles several years ago. But I am forever thankful that I my need to perform back mount valve drills led me to becoming a Yogi – and now a Yoga teacher as well!

# Gas Analysis and Bottle Marking

By Ken Sallot

I recently heard a story that happened to a good friend and it compelled me to write this article. My friend was doing a dive on his CCR and everything went flawlessly on the dive. I wish I could say that the story ended there, because I would have not spent the time putting together this article, but it doesn't. When he got back to deco and was sitting at 20', he could not get his PO<sub>2</sub> above 0.9. Even doing multiple oxygen flushes did nothing to help the problem.

For non-rebreather divers, performing an O<sub>2</sub> flush involves venting all of the gas in the breathing loop, and holding down the oxygen addition button to re-fill the loop with pure O<sub>2</sub>. When you're sitting at 20', performing an O<sub>2</sub> flush should spike the PO<sub>2</sub> output up to 1.6, but here he was stuck with a reading of 0.9. This could have been caused by a number of things, the most likely being either bad oxygen cells, or something like gas contamination.

During rebreather training we're taught "when in doubt, bail out" and I'm glad to say that my friend bailed out to open circuit, finished his decompression and his story has a happy ending. During the post-dive analysis of his gear he identified the cause of the problem; in his haste to set up, he never analyzed the oxygen supply for his rebreather, and what was supposed to be pure O<sub>2</sub> was in reality only 50% nitrox.

While forgetting to analyze his gas was a non-event for this friend, I knew two other people that were not so lucky due to cylinder marking and gas analysis, and two that were just wrong.

## Bobby

It was the summer of 1995, and the Technical Diving Revolution was in full swing when Bobby McGuire drowned. Although I only met him once or twice, by all accounts he was a heck of a diver and a heck of a nice guy too.

He was doing a 150' deep cave dive, and his dive plan called for using a stage bottle filled with 25% nitrox on the bottom, and a stage bottle of 50% nitrox for decompression from 70' to 20'. Stage bottles are an additional aluminum 80 cylinder with a working first stage, second stage, and pressure gauge, that is carried by the diver to

provide additional breathing gas. Typically, the bottles are carried underneath a divers body. Frequently, divers will put different breathing gas, such as oxygen or 50% nitrox, in a stage bottle to speed up decompression.



Because he planned to use one bottle at one point of the dive, and the other at another point in the dive, he labeled the stage bottles "1" and "2".



During the dive, Bobby picked the wrong bottle to breathe from and he breathed 50% nitrox at 150'. Being under 5.5 ATA of pressure, this gave him a PO<sub>2</sub> of almost 2.8 – double the recommended maximum recreational limit of 1.4!

At some point during the ascent, Bobby suffered a grand mal seizure from CNS oxygen toxicity, and because he spit out his regulator during the seizure, he drowned.

### ***What should Bobby have done differently?***

Although I do not know for sure what Bobby was thinking when he labeled his tanks, my best guess is that he marked them the way he did because he would use cylinder "1" on the first portion of the dive and "2" on the second portion.

As hard to believe as this incident sounds, back in the early 90s, tank labelling and marking were not universally standardized and the reasoning that led to his tanks being labeled this way is understandable given the accepted norms at the time. It took several incidents, including Bobby's, to make technical divers come to a consensus on how to label Nitrox tanks. If he had taken a different approach to marking his stage bottles, there's a strong likelihood that he would be alive today.

The best method for labeling stage bottles that I can think of is the one adopted by the WKPP and other people. It's simple and allows for both self-checking and buddy verification. There are two components of this stage bottle marking technique.

The first component is to place in a location that the diver can read, on the cylinder neck, a piece of tape with the cylinder gas analysis in big numbers. You should also put the date of the analysis, your initials, and the MOD on the tape. I typically carry the gas analysis out to the 1/10th of a percent, but given that our oxygen sensors are only good to within  $\pm 1\%$ , that may be overkill.



The second step is to place a label with the MOD on either side of the cylinder, horizontally in such a fashion that everyone on the team can read it. There should be nothing except the MOD on these labels, the only exception is pure oxygen, which should simply read "oxygen" so that

it is not misread at an inappropriate depth, such as 120'. Most divers using this strategy will find themselves dedicating a few cylinders to certain depths, and attaching permanent MOD stickers. The most common depths include 190' (either 18/45 or 21/35), 120' (usually 30/30 or 32%), 70' (50%) and Oxygen, and permanent labels can be found for those depths at many dive shops. If you decide not to dedicate a cylinder for a specific depth, you should at the very least use a piece of duct tape and label the MOD for the gas that is in the cylinder in this fashion.



Remember, the key with the MOD marking is that everyone on your dive team should be able to visually see what gas you are breathing quickly, so both sides of the bottle need to be labeled. Some people have recently adopted the practice of placing a third MOD label on the bottom of the cylinder in such a manner that a diver following behind can also see the MOD.



### **Jonathan**

I was introduced to Jonathan Gol in 1997, and he and I did about a dozen dives between 1998 and 2000. In November 2001, after recovering from a prolonged viral infection, he decided to go on a dive in Jackson Blue Spring. When he got to his 20' decompression stop, he

switched to an aluminum 40 that he normally kept filled with oxygen for decompression, and he was dead within a minute.

Although we do not know for sure what events transpired before he died, we have a theory and it is a pretty good theory. He made two fatal mistakes that cost him his life and what happened is a lesson that we should all learn from.

His first fatal mistake happened a couple of months before his death. Jonathan was a home blender and usually had several helium bottles at his house that he rented from a local gas supplier. When he became sick with the viral infection, he decided he did not want to pay the monthly rental on the helium cylinders and he used his Haskel to fill an aluminum 40 with the helium from those bottles before returning them.

His second fatal mistake happened the day he died. Once he was medically cleared to dive, he packed up his truck and drove the ten hours from Houston to Marianna. In his haste, he did not analyze the tank that should have had pure oxygen in it. The cylinder label said "100%," but in reality, it was 100% helium and not oxygen. Being anoxic, it was incapable of supporting life. He died as a result.

### ***What should Jonathan have done differently?***

The first thing that he should have done differently was not to fill a tank dedicated to one gas with something else. Once a cylinder is dedicated to a gas, i.e. it is labeled permanently for that gas, you should **NEVER** fill it with anything else. If it's an oxygen bottle, it should only get oxygen. Period. Ditto for 50% (70'), 32% (120'), etc.

And then the most important thing he should have done differently was that he should have **VERIFIED** the contents of the gas before he put a regulator on the tank.

A lot of people dislike analyzing their cylinders at the dive site because of the effort it takes to do it correctly, but do you see what I wrote in the paragraph above? I used the word **VERIFIED**, not "analyzed."

You should analyze your tanks whenever you fill them at the shop, and label them as I described in the section about Bobby. However, you only need to **VERIFY** them whenever you are about to put a regulator on them.

The difference is simple: to properly analyze a tank you need to use a flow meter and calibrate your sensor with a known gas (typically air). These things take a little bit of time, and most of us "normal humans" dislike the extra time it takes to do a proper gas analysis in the field and so we won't do it.

However, **VERIFYING** the contents is very quick and can be as easy as holding the sensor face into the flow. The oxygen reading will likely be off by as much as 3%, but the purpose of this step is to confirm that the gas is something close to what you are expecting and not wildly off the mark. It only takes a few seconds to do, and if the gas is wildly off then you can do a more time consuming analysis to find out exactly what is in those cylinders.



If Jonathan had done this simple check, he would have quickly seen that his "oxygen" bottle did not have oxygen in it. This step would have only cost him 10 seconds, rather than the cost he paid by skipping it.

Sadly, Jonathan's story was not unique, and as recently as 2013 there was an oxygen toxicity event that took a diver's life under a similar set of circumstances (dedicated bottle, no verification).

### **You don't always know what you think you know...**

In 2013 I found myself teaching a decompression procedures course to a couple of guys that worked at a scientific program which had a fill station. The program had several sets of doubles for use in pool training, and they each checked out a set of doubles from their dive locker. In their minds, because their fill station was incapable of pumping anything but air, and those doubles were reserved for pool use only, they should only have had air. Nothing else.

As they were assembling the gear for the first dive of the course, I asked them to analyze their tanks. They both laughed and said "why are you making us do this, these have air!"

Travis went first. He put my analyzer on his set of doubles, and it quickly read 28%. He told me, "I think something's wrong with your analyzer, it's reading 28%!"

verified the analyzer on a set of my tanks, and handed it back to him. "Check it again," I said, and once again, it read 28%.

We then handed the analyzer over to Ian, and his doubles read 29%.

"There's no way!" he said, but he analyzed them again and got the same reading a second time.

A week later the mystery was solved. It turns out that someone else from the same program had checked out multiple sets of doubles, and got them filled at a local dive shop with nitrox so they could go cave diving. Figuring that the tanks would never be used except in the pool, the culprit failed to label them.

What if someone else made the same assumption as Travis and Ian and checked out a set of doubles to do a deep wreck dive, such as the Hydroatlantic (175' to the sand)? That could have gone bad really quick.

The lesson here is that just because you think you know what is in your tanks and what you are filling them with, that does not mean you are correct and you still need to analyze and verify your tanks.

Even when getting fills from a "dedicated nitrox fill station," you should take the time to analyze your tanks. I

cannot believe how many times I've seen people say "I don't need to analyze my tanks, I got them filled at <insert dive shop name here> and they always fill 32%!" and that kind of laziness needs to stop.

### A few simple rules

My friend is a very experienced diver, and he knew better than to dive a tank that hadn't been properly analyzed. However, we are all only human and sometimes we get a little complacent and skip our simple checks. But when playing around with gasses and diving, we need to keep on our toes. In summary, here are a few simple rules to follow:

1. Always **analyze and label** your cylinders when you get them filled. Label them with both the gas content on the neck in a place easily visible by the diver, and MOD on the sides in such a way that everyone on the dive team can see it.
2. Never fill a dedicated cylinder with something other than the correct gas. If you do, it's no longer a dedicated cylinder.
3. Always **VERIFY** the contents of your cylinders before putting a regulator on it. This step takes only a few seconds, and can save you your life.



The NSS-CDS will have a booth at DEMA 2016! Stop by and visit! Dates: November 16-19, 2016 Place: Las Vegas Convention Center, South Halls, Las Vegas, Nevada USA If you wish to volunteer for this event, please contact Al Clements

[property\\_manager@nsscds.org](mailto:property_manager@nsscds.org)



River Lovers!

It's time to register for the Great Suwannee River Basin Cleanup!

To learn more and register, go to

<http://tinyurl.com/zaoonhf>

# The Grim Reaper Is Back

By: TJ Johnson

Volusia Blue Spring has had many signs placed inside its cavern zone at around 60 feet, but they all eventually deteriorated, were vandalized or were stolen. The last one disappeared over a year ago. It's amazing how a sign, 24 by 20 inches, could just walk out of the cavern and then the park. However, the culprits couldn't remove the heavy base it was attached to. But they did manage to move it down, deeper in the cavern and into the high flow opening at 120 feet.

Those of us that planned to replace the sign decided that this might actually be a good place to leave the base until another sign was procured. That was the primary reason... but it sure was heavy.



When the time came to actually install the new sign, divers from Dayo Scuba Center, LLC, of Orlando, Florida returned to pull the concrete base out of the high-flow vent, take measurements and assess its next placement location. There was damage on the aluminum framing where the sign would be attached, so plans were made to repair that also when the new sign was installed.



Since signs tended to get stolen, there was some discussion about making a new one that wasn't so 'cool', but after some discussion it was decided to use the standard NSS-CDS Grim Reaper sign. To make it less 'steal-able' the sign was enlarged to 24 by 30 inches and built of the thickest aluminum available. The sign company in Winter Park, Florida finished it just a few minutes before they closed on the day before it was to be installed by a small army of divers.



To attach the sign, we decided to move the old base up to its final position at 60 feet and use tools there to do all the attachments. A pneumatic drill and cutter were procured by Dayo Scuba, as well as a regulator to drive them that was custom built to attach to a scuba tank. Screws and rivets were to attach the sign to the base after some aluminum was riveted to the base to correct it. Well, that was the plan.

The next morning, a weekday morning, after having picked up the sign, the crew headed to the spring to get it done. Everyone was to meet at the gate at 8am, and everyone did eventually arrive... including Mr. Murphy.

The van with all the tools and most of the tanks was parked as close to the spring as possible. Everyone geared up and moved gear and tanks to the water, up the run and down to the sign.



After positioning the base, we realized it was backwards. This was quickly corrected. As soon as we started drilling holes in the aluminum frame, the hose driving the drill blew up. To resolve that, the pneumatic tools were quick connected directly to the tank and regulator. It was a bit awkward slinging and holding an LP120 attached directly to the drill but it worked! The aluminum was all riveted, and the sign was attached by rivets and stainless steel screws. The anchor, authorized by the park, was placed and attached.

We took pictures, cleaned up our tools and left the spring with a sign very clearly visible to divers entering the cavern zone.



Those involved were Carol Sugars, Teddy Garlock, Nash & Pierce Hoover, Oscar Hidalgo, Lukas Müller (from Germany), and me (Thomas Johnson, aka TJ). Joe Tegg and Chip Wuerz helped with planning. The sign, equipment and accessories were purchased and donated by Dayo Scuba Center LLC, Orlando.



**Never stop exploring!**



**2016 NSS-CDS MIDWEST WORKSHOP**  
 CJ MUGGS 101 WEST LOCKWOOD AVE, WEBSTER GROVES, MO 63119  
 SEPTEMBER 17TH, 2016 AT 8:30AM  
 FRIDAY NIGHT SOCIAL SEPTEMBER 16TH @ 6:30PM

**Incredible speakers and awesome prizes!**

Prizes include a Shearwater Perdix, Dive Rite LX20, Scuba Force Dryglove ring system, PMI 300ft Pit rope and much more!

**SHEARWATER**



**SCUBA FORCE**



**PMI**



Go to [www.eventbrite.com](http://www.eventbrite.com) and search "2016 NSS-CDS Midwest Workshop" to register!



# Cost Of The Law Suit To The NSS-CDS

## SPENCER V CAVE DIVING SECTION aka SCHOOL SINK LAW SUIT

John Guyton of Rywant, Alvarez, Jones, Russo & Guyton was hired in February of 2011. A \$10,000.00 retainer was paid at this time.

By December 31, 2011 a total of \$8,153.16 in legal fees were paid.

By December 31, 2012 the retainer was long gone and the CDS paid \$11,108.09 in legal fees for the year.

In October of 2013 Joseph Citelli became the 3rd CDS Chairman for the year and the BoD inherited an on-going lawsuit, remnants of a bounced checkbook and \$12,066.00 in outstanding, unpaid legal bills.

By November of 2013 the CDS was on their 3rd treasurer for the year as well as having had to replace three BoD members who had resigned. Despite the turmoil, a time of severe austerity and planning was in place by December.

\$16,641.90 in legal fees accrued for 2013.

In 2014 the money market savings account was depleted and money was tight, but the bills were slowly being paid. Legal fees were \$11,116.57 for this year.

We truly thought that 2015 would end the legal battle, but the court dates had once again been delayed until February of 2016. Unfortunately the legal bills were not delayed and \$16,182.50 in new legal fees were billed to and paid by the CDS in 2015.

Member donations helped offset a portion of the legal expenses. \$8,432.00 was received in donations, \$4,542.00 of this being donated in the eight days between October 29 and November 5, 2015.

Through member donations, the sale of Cathedral Sink, liquidation of our savings and the previous years of planning and austerity, our legal bills were up to date and we approached 2016 and the prospect of a jury trial with hope and a plan if faced with the worst.

The worst did not happen and we were saved the cost of a trial but still have amassed \$3,700.00 in legal fees in 2016. Our final bill has been paid and we can now look to the future. I would also thank our attorney for the fair and thoughtful way in which he treated us. His billing hours could have been much higher, as could his hourly rate, especially his court time.

A total of \$73,159.02 was expended on the School Sink lawsuit and countless man hours of preparation, planning, discussion, debate, worry and high emotions far surpassed that dollar amount. Even without going to trial, which would have more than doubled our expended amount, this suit took a devastating toll on our organization. Hopefully we can look past this and plan for the future once more.

Respectfully submitted,  
Cheryl Doran  
Treasurer

# MILESTONES



## Al.... I've Got Your Camera!

By: Daniel A Weekley

Sean, Al and I met at Ginnie Springs on the morning of June 3rd. The plan was to dive up Hill 400 to the jump at approximately 1200'-1300' of penetration that goes into what I call the backside of the double lines up towards the ice room. This is the jump about half way between the 1000' line marker on Hill 400 and the Bats.

All three team members were diving sidemounted 85's with a stage and a deco bottle.

Al was in the rear with video, Sean was in the middle with extra video lighting, and I was swimming lead.

We entered the Eye and left our deco bottles just past the start of the gold line. We swam stages through the Lips and dropped them between the lips and the keyhole. It was a good place to leave them and not worry about drag through the rest of the dive.

We swam up to Hill 400, and I placed the jump reel to the floor and then over to Hill-400. We then proceeded past the jump at 1000' to the double lines. I then ran a jump to the floor and over to the jump towards the ice room. I turned the dive on thirds about halfway between our sec-

ond jump and the jump to the ice room. We were just before the passage to skid row.

Our team did manage to silt it up a bit on the turn. We came back down the line to Hill 400 in a silt out for about 50'. Before we reached Hill 400, Al signaled me and I turned to discover him showing me that his Go-Pro camera was missing from his helmet. I then signaled this to Sean. We left both reels in on exit as previously planned to support the dive Sean and I were planning for later in the day. We saw no sign of the camera on the way out.

Al had to leave for work after the dive. The next dive was supposed to be the double lines circuit, a dive I have done a few times and Sean has not done before. This was to be my 100th cave dive since full cave training. I decided to change the plan and do the same dive again, to enhance our chances of recovering the missing Go-Pro. We entered at the eye and ran pretty much the same dive plan, utilizing the reels we had placed earlier that day. We were scanning and searching everywhere in the hopes of recovering/rescuing our missing buddy (Go-Pro) from the earlier dive. When we arrived at the second jump at approx 1200-1300' the Go-Pro was wrapped in my jump

line by the reel. Obviously another cave diver saw it and made the assumption that it belonged with my reel. Sean recovered the camera, and gave it to me to stow away safe in my dry suit pocket. Sean then showed me his wet notes where he wrote **100!!!**, his way of saying congratulations on 100 cave dives. Our primary recovery mission was now accomplished. We then decide to leave the reel and continue up Hill 400 to the Bats. We turned at the Bats and pulled both reels on the exit.

After deco and exiting the water I had a cold chocolate milk at my truck. This was a tradition for my main cave diving buddy, George Turner, and myself after a good dive. George and I went through all of our cave training together. He has been fighting cancer and is finally winning. He has not been in the water for a few years. I wish we could have shared our 100th cave dive together. This one was for him!

**Would you like to share your story or submit your application for your Award?**

**Email me at [abedavis@nsscds.org](mailto:abedavis@nsscds.org) or mail them to me at PO Box 150096 Fort Worth, TX 76108 Awards applications can be found at <http://nsscds.org/NSSCDSAwards>**

**Dive Safe,**

**Eric Parks  
NSS-CDS Awards Coordinator**

## NSS-CDS BUSINESS AFFILIATES



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954.292.2901 [info@wtdive.com](mailto:info@wtdive.com)

# We Are Stronger Than Me

From The Conservation Chair: Michael Angelo Gagliardi

## How Do You See The Cave?

When you're diving, how do you see the cave? Does it look the same as it did the first time you saw it? Maybe it looks different now. Maybe it doesn't look as good as when you first laid eyes on it. Chances are it doesn't.

It is difficult, if not impossible, to explain to another diver how we visualize cave deterioration. We need to see it to believe it. To make things more difficult, it is nearly impossible to convey to a diver how the system looked before s/he dived it. Confused now? Let me explain it this way. I first dove the Devil's System in 1997 during my Intro class. Now, no matter how someone tries to explain to me what the system looked like before 1997, my mind will always see the system as it looked in 1997. That's when the visual stimulus got wired into my brain. Divers who are first seeing the system in 2016 will be hard pressed to imagine what it looked like in 1980. I might as well be trying to explain the landscape of the fourth dimension.

So, how do we show changes in underwater cave systems so that we may learn to conserve them better? We have an idea. "Photoarchiving" is one method that the CDS Conservation Committee has proposed. What we want to do is pick a specific location in a system, then find as many photos of this location as possible. We would sort through these photos and select those that show the location from the same or similar view, going as far back in time as possible. Using these photos, we can create a short video or slideshow by chronologically sequencing them. Take the Cornflakes in the Devil's System, for example. The first slide shows the Cornflakes in all of its glory in 1985. This first photo

dissolves into a second photo shot from a similar viewpoint in 1990, which dissolves into a view from 1995, and then every five years until the present. In just a few short minutes, we'd have a visual record of how the Cornflakes has changed. We'd return to the same location each year and photograph it again as part of an ongoing record.

Here are a few sites we've proposed as a starting point:

- Devil's system: The Lips from the downstream side and the Cornflakes from the downstream side.
- Cow Springs: The basin from the surface, photographed from approximately where the top stairs are today. The clay banks from any view.
- Little River: The basin from the top of the stairs.

The archive will be part of the conservation page on the new NSS-CDS website. I am asking the cave diving community for a lot of help with this project. If you have any photos of these areas and you are willing to let us use the image, please contact me at MA9001@aol.com. All photos will be watermarked with your name, copyright information, the year, the system, and the location.

Thank you!

"We are stronger than me."

Michael Angelo Gagliardi

Continued from Page 5

iii) Can participate in any CDS function

v) Will not be eligible to receive any merchandise discounts offered to full members of the NSS-CDS

vi) Receives Underwater Speleology ("UWS")

#### **Article III: Board of Directors**

B. Qualifications. Directors and candidates must be current members of the NSS-CDS or the CDS in good standing for at least one (1) year prior to being nominated for a directorship. The Training Director and candidates for that directorship must also be current and active NSS-CDS instructors in good standing.

C. Election of Directors. Six (6) directors shall be elected by the general membership of NSS-CDS and the CDS: three each year, for a term of two (2) years. The one (1) director serving as Training Director shall be elected biennially by current and active NSS-CDS ...

1. On or before six months prior to the annual membership meeting, the Chair shall appoint a nominating committee consisting of three (3) or more NSS-CDS and/or CDS members in good standing responsible for identifying candidates for election to the board of directors. No sitting director shall be a member of this nominating ...

3. On or before four months prior to the annual membership meeting, the nominating committee shall solicit recommendations for nominees from the NSS-CDS and CDS membership through a publication of general membership circulation, or the NSS-CDS website...

6. On or before ten weeks prior to the annual membership meeting, the administrator of the election shall post on the NSS-CDS website, and shall mail as hard-copy to every NSS-CDS and CDS member in good standing, a ballot and the platform statements of the candidates. Every ballot must contain a serial number...

9. At the next meeting of the board, the candidates who received the highest total number of votes from the voting membership shall be seated in place of the outgoing directors for their new terms as directors. **These members must be current NSS-CDS members before being seated.** At this meeting, outgoing board members shall turn over all NSS-CDS materials and files in their possession to the newly elected board.

G. Meetings of the Board of Directors

3. Open Meetings. ...Any NSS-CDS or CDS member may address the Board of Directors at any open meeting. It is requested but not required that the NSS-CDS member submit his/her request in writing to the Chairman to place on the agenda.

#### **Article V: Committees**

A. The Chair shall appoint, with board approval, NSS-CDS or CDS members in good standing to serve as committee coordinators. The Chair may also appoint other NSS-CDS or CDS members in good standing to serve on the committees ...

#### **Article VII: Amendments**

These Bylaws may be modified or amended by approval of two-thirds (2/3) of the members who return ballots in the election on the matter, provided at least one-fifth (1/5) of the combined total NSS-CDS and CDS membership in good standing has cast ballots in the election on the matter. ...

To create the Non-voting Board Member Emeritus position we must amend our bylaws:

Motion to amend By-Laws and create Board Member Emeritus:

One former board member who has served six years may be elected to the non-voting position of Board Member Emeritus. (S)he would be eligible to speak and sit in on all meetings, including closed sessions and would also be put on the regular election ballot and voted in by the membership using the same criteria as is required for any other board position. There will be no limit on the number of years a person can serve in this capacity.

The By Law changes would be as follows:

#### **Article III: Board of Directors**

C. Election of Directors. Seven (7) directors shall be elected by the general membership of NSS-CDS and the CDS: three each year, and the Board Emeritus position shall be elected each odd numbered year, for a term of two (2) years. The one (1) director serving as Training Director shall be elected biennially by current and active NSS-CDS ...

#### **Article IV: Officers**

A. Required Officers. The officers of the corporation shall include a chair, vice chair, secretary, treasurer, two (2) program directors, and a training director. At the regular Annual meeting of the directors each year, these officers shall be appointed by the board of directors from among its members. Two officer positions may be combined and filled by a single director. In the performance of their executive duties, NSS-CDS officers shall be held to the General Standards in Art. III.E.1 above. **An officer emeritus position shall be filled by that member elected for this position in the general elections.**

H. The Officer Emeritus shall be a non-voting position

1. A former Board member who has served six years

2. S)he would be eligible to speak and sit in on all meetings, including closed sessions

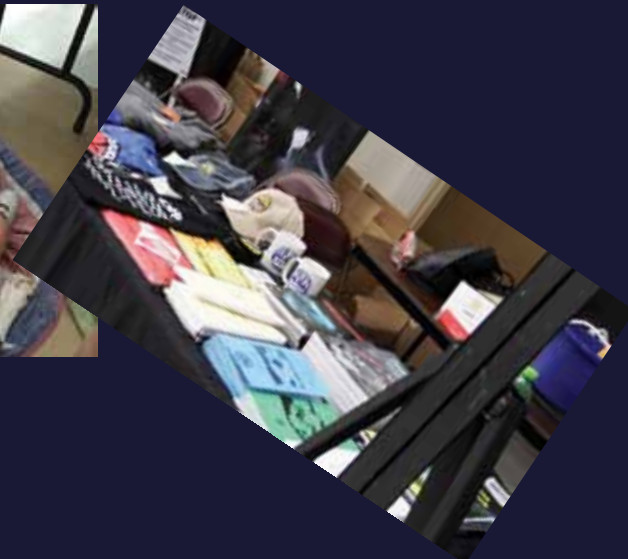
3. Would also be put on the regular election ballot and voted in by the membership using the same criteria as is required for any other board position.

4. There will be no limit on the number of years a person can serve in this capacity.

The proposed By Law changes are also available on the NSS-CDS website.

# 2016 NSS-CDS Workshop

Photos courtesy of TJ Johnson, Samantha Auyeung and TJ Muller



If you missed the NSS-CDS 2016 Workshop, you missed a lot!

There were volunteers and t-shirts and babies and dogs and the CDS store.

There were friends and friendly faces. And the students from Texas A&M.

And sponsors! Lots of sponsors and the NSS-CDS thanks them all.



Shearwater  
Amigos  
Kiss  
Scuba Force  
Subgravity

Manta  
Dive Outpost  
Silent Diving  
Golum Gear  
Hollis

IANTD  
Dive Rite  
Cave Adventurers  
Rainbow Reef  
JJ-CCR USA

Our non-profit friends from NFSA, Sierra Club and ADM Foundation also joined us.





There were door prizes and awards.

And a winner was drawn in the Kiss Rebreather Raffle.

Congratulations Kristine Deel!



And food, lots of food. At the Social and at the Workshop. And an extra thank you here for Kenny, he was a life saver.

There may have even been beer...



There was beer..... and it appears there was also a beer tapping presentation.



There were speakers. Great speakers.

Andrew Pitkin, Joe Dituri, Tom Iliffe, Cristina Zenato, Nathalie Lasselin, Charles Roberson, Michael Angelo Gagliardi, Curt Bowen and I am pretty sure, even though he didn't give a presentation, Paul Heinerth still managed to say a few words in there.



And on Sunday....a rebreather try and fauna count presentation.

If you missed this workshop... you missed a lot.

Stay tuned for information ont the 2017 NSS-CDS Workshop. Plans are already under way.

# Current NSS-CDS Instructor Listing

Jim Wyatt, Training Director, [trainingdirector@nsscds.org](mailto:trainingdirector@nsscds.org)

**Jon Bernot 378 Basic**  
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**Peter Butt 186 Cave**  
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**Juan Carlos Carrillo 342**  
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**Ricardo Castillo 386 Cave**  
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