Manifest

A Quarterly Newsletter

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A Message From The Wheelhouse

Hello Divers –

Thanks for checking out our new newsletter, "The Lookout." This is something we've toyed with doing for years and finally, thanks to having some help writing and assembling the newsletter, we're getting it off the ground. This is our first issue and we are aiming to publish it quarterly. The purpose of this newsletter is to provide updates on what is happening with the Gauntlet and to tell you about some of the exciting dives we're doing – exploring new shipwrecks and documenting known ones. Yet, we also hope that it will be informative and educational, as well as get people interested in shipwreck diving – and of course, getting out diving! We plan to discuss topics that are "technical" with regard to equipment, team approaches to diving, and gas management – of interest to all divers, be they recreational or technical divers, open circuit or rebreather. We also will focus on shipwreck diving, as this is our passion and main interest in the type of diving we offer. We will cover wreck diving techniques as well as more general topics related to shipwreck diving – such as profiling certain local wrecks and the perhaps some emphasizing details that put the shipwreck – or something unique about it – into a historical context. For example, in this issue we describe a brief history of schooner barges and highlight a few examples that can be found in Mass. Bay. So, if you have an idea or you're interested in contributing to this newsletter, please contact us. Thanks again and we hope you enjoy!

Heather & Dave

USS Nezinscot Exploration Report

The following is an exploration report from dives made to the wreck of USS Nezinscot during the 2007-2008 seasons. Archival information is based on documented first hand accounts, US Navy correspondence, and newspaper articles following the sinking.

USS Nezinscot

The Nezinscot was constructed in 1897 as the DeWitt C. Ivins for the Moran Towing Company. She was built by the Neafie & Levy Shipbuilding Company of Philadelphia, PA. The tug was constructed to 88 feet in length, 19 feet in beam, and a draft of 10.2 feet. On March 25, 1898, the Ivins was purchased by the US Navy Auxiliary Board and commissioned on April 3, 1898 as the USS Nezinscot.

The Nezinscot was dispatched to Key West, Florida, where she supported efforts during the Spanish-American War. She remained there until August 24, 1900, when she was reassigned to Portsmouth Navy Yard in Portsmouth, New Hampshire. For the next eight and one-half years the Nezinscot operated out of Portsmouth as a towboat, as well as a coastal cargo tug, transporting supplies to and from New York, Boston, and points in Maine.

The most compelling part of the USS Nezinscot's history began to take form on August 10, 1909 as the Nezinscot was loading in Portsmouth Navy Yard, preparing to transport anchors, chains and cables to Boston for the USS Missouri. The following morning, at approximately 3 am on August 11, 1909, the Nezinscot departed Portsmouth Navy Yard. On board were Captain Evans; his wife and son; a young US Navy surgeon, Dr. Charles F. Trotter; and in addition, nine enlisted men who comprised the crew.

The weather was clear and windy, with strong gale force winds out of North Northwest. As the tug approached Cape Ann, MA, the seas grew increasingly worse and her exposure to wind and waves caused the vessel to roll significantly. The Nezinscot was struck with a series of three waves that caused the tug to capsize. Once the Nezinscot capsized, her passengers, most of whom were already on deck or close to an exit, were thrown into the water. All, except two men from the crew, emerged; those two were presumed to have gone down with the tug.

The individuals that made it out and survived the initial capsizing broke out into three groups: 1) Captain Evans, Dr. Trotter and crew member A. Belfric entered the water and were clinging to debris; 2) crew member C.H. Pratt plus three other men entered a lifeboat; and 3) Evans' wife, son, Chief Boatswain's mate F.R. Bitter, and Leroy Edwards entered the water and were clinging to debris.


NAVAL TUG SINKS, FOUR ARE DROWNED

The Nezinscot's Cargo of Anchors Shifted and Heavy Sea Carried Over the Tug.

Almost immediately, Edwards began to panic. He grasped at the others and as they pushed him away in a fight for survival, Edwards drowned. Shortly thereafter, the remaining survivors of this group were picked up by Pratt and the others in the lifeboat. However, instead of going to look for Evans, Trotter and Belfric, they left the scene of the sinking and rowed several miles to Lanes Cove in Gloucester, MA, where they alerted the life-saving station that there were others still at sea.

Captain Nelson King and the men of the Old House Cove Life-Saving Station in Gloucester immediately put to sea in search of the three men left behind, reaching them nearly five hours later. The three men were still alive when the rescuers reached them, but they were growing weak and could not hold out much longer. During the rescue, in a selfless and brave act, Trotter told the rescuers to save Belfric first, as he was nearly ready to give up, but sadly when they returned to get Trotter, he had disappeared. Trotter was presumed drowned – but Belfric was saved. In the end, four men died as a result of the Nezinscot's sinking.

Trotter was a hero, but in the days and weeks following the sinking, the Navy began a witch hunt to find its coward. In fact, almost immediately – within hours of the group's rescue – accusations began to fly. Captain Evans accused the crew of cowardice for abandoning them at sea. He contended that all could have been saved had the crew not left them. The crew claimed that they never saw Evans waving and signaling to them.

A Board of Inquiry was formed and initially focused on a man named John J. Tawresey, who up until that time had no known involvement in the demise of the Nezinscot. The Board determined that overloading was the cause of the Nezinscot's sinking and on September 15, 1909 charged Tawresey with negligence. In a court martial, the Board claimed that Tawresey had responsibility, since as a naval constructor he had observed the Nezinscot being loaded. While this might have been a duty he was generally responsible for conducting, on August 10, 1909 he was in Portsmouth on unrelated business and not assigned to the Nezinscot. He happened to see the Nezinscot being loaded and remarked to Captain Evans that the tug was being overloaded. However, he did nothing to stop this, as he was not supervising the loading in an official capacity. Despite a sensational court-martial, Tawresey was acquitted.


A porthole and a china dish on the wreck of the Nezinscot

Next, the Board of Inquiry turned to the crew and charged the 5 enlisted men, among them F.R. Bitter, with cowardice and refusing to render aid to a fellow man while at sea. The men were subject to court martial and ultimately Chief Boatswain's mate F.R. Bitter was convicted. The remaining crew was convicted of culpable inefficiency of duty, but these convictions were overturned and the men were restored to duty. Bitter was sentenced to loss of rank and benefits, six months hard labor, and dishonorable discharge. Many felt this was a terrible injustice. When he was rescued, Bitter passed out from exhaustion and was unconscious for most of the time the men were on scene; and as he claimed, was not in command while the lifeboat pulled away leaving the other three men behind. Nevertheless, the Navy had found its scapegoat. Captain Evans was largely protected from blame – in his court martial he was found not responsible for the sinking and not guilty of negligence. He was later sued by the widow of Leroy Edwards in civil court, but the outcome of those proceedings is presently unknown. Chief Boatswain's mate F.R. Bitter took the fall.

Eventually, after pleas and appeals from family, friends, and the Spanish-American war veterans – his wife even going as far as writing to the President of the United States seeking a pardon – F.R. Bitter was released, but his conviction stood and he was disgraced as a coward over the sinking of the Nezinscot.

On July 19, 2007, the Nezinscot was seen for the first time in 98 years, and her story would be reviewed once again. When the team first reached the wreck, a large pile of chain and an anchor were discovered on the deck, near the stern. This was an unusual place for such items, and given their size relative to the size of the wreck, they were clearly part of a cargo. This immediately suggested that this was no ordinary wreck. It was the long lost Nezinscot.

Dave Caldwell helps Peter Piemonte suit up

Following research that began in 2005, two years passed while waiting to visit the site where the Nezinscot was discovered. The team made three trips in 2007 and six additional trips in 2008 in order to study and document the wreck site. The Nezinscot is an extremely challenging dive for several reasons, one being its depth. At 250 feet there is little room for error, particularly with gas supplies. Even short dives require fairly long decompression, and there is an increased risk associated with deeper dives like these. Successful dive operations required teamwork, both for the purpose of studying the wreck site and ensuring the safety of all.

The Nezinscot is a fairly small vessel at 88 feet in length, and the wreck has about 6-8 feet of relief. While the entire superstructure of the wreck has degraded and fallen onto the sea floor, there are still potential entanglement hazards. The bow section of the Nezinscot has a large dragger net that is somewhat "rolled up" – in other words, not stretched out and billowing like a blanket. However, it is fairly sizeable, full of hooks and other fishing tackle, and stretches up about 20 feet up into the water column from the wreck. At times, the mooring line was fouled in this net and dive teams were forced to use the net as the reference line for the remainder of the descent to the wreck. While the visibility in the water column can be spectacular at 30-40 feet, near the bottom and on the wreck the visibility tends to be low – on the order of 3-4 feet at times, to 5-10 feet on average. If the tide is favorable (a flood tide) and there has been little disruption of the site, 10-12 feet is possible. However, overall, the visibility is poor and this makes diving on the wreck even more challenging, especially with regard to general observation and visual identification of features.

Eric Takakjian illuminates the Nezinscot's fire monitor

A few things contribute to the poor visibility: 1) it is a low lying wreck on a mud bottom in a geographic basin; 2) a group of divers are all exploring a relatively small (approximately 88' x 20') area and this inherently stirs up silt; and 3) there are extremely large cod fish moving about the wreck. On one dive, the first team down encountered many cod fish that were literally in a pig pile in the bow area. As soon as the divers arrived, the cod fish scattered, kicking up a giant silt cloud and greatly diminishing visibility.

Exploring areas adjacent to the wreck has proven quite difficult given the low visibility. Provided there is a reference, that being the outer hull of the wreck, a team of divers working together can fan out 10-15 feet into the mud. Some sand sweeps have been made using a reel, but at times the visibility is so poor that it is hard to see the bottom and this can be disorienting. Overall, the progress in studying this wreck is at times slow, as the best laid plans can be revised in an instant when the visibility does not cooperate. While the site is relatively free from strong tidal currents, at times there can be current in the water column, and almost always starting around July, there are large schools of dogfish to keep divers company during decompression.

Exploration efforts will continue on the wreck of the Nezinscot.

Nezinscot Exploration Team:

Pat Beauregard, David Caldwell, Jeff Downing, Tim Dwyer, Brian Holmes, Heather Knowles, Steve Pace, Peter Piemonte, Roman Ptashka, Eric Takakjian, and Scott Tomlinson

For more information:

http://northernatlanticdive.com/shipwrecks/Nezinscot_PR.pdf

A Brief Overview of Schooner Barges

The waters off the coast of New England, and in particular Massachusetts Bay, contain a number of schooner barge shipwrecks. These vessels can be found both deep and shallow – and knowing some background about the historical relevance of a vessel like a schooner barge might make your dives a little more interesting on some of our local schooner barge wrecks!

A schooner barge is a sailing vessel, such as a fully-rigged schooner, that was "cut-down" in order to convert it into a vessel that could be used more efficiently for transporting cargo, such as coal. As schooner barges became more popular, some vessels were constructed as schooner barges and no conversion was necessary.

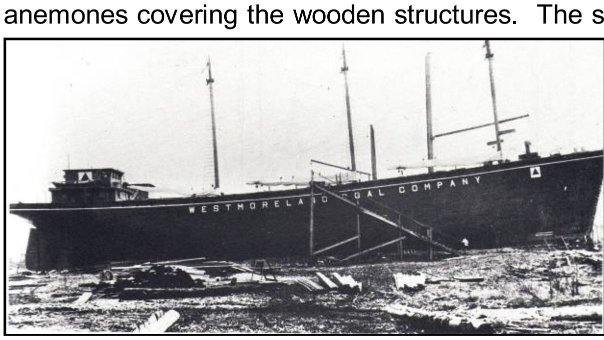
The origins of the schooner barge trace back to the Great Lakes, where challenging navigation led to barge towing becoming the preferred method of moving cargoes. The success of this method on the inland waterways led to the proliferation of schooner barges in the late nineteenth and early twentieth centuries on the eastern seaboard, as steam powered vessels began to emerge as the new workhorses of the ocean over fully-rigged freight schooners. Use of steam tugs with a series of schooner barges in tow, for example, was more economically efficient than operating individual schooner freighters. Moreover, in the years following the Civil War, coal was in great demand – and particularly so in the Northeast where surviving cold, harsh winters depended heavily on the influx of coal into the region. While an economic depression further strained the profitable operation of freight schooners, there were still needs to be met and money to be made. This led a number of shipping companies converting their vessels into schooner barges for the purposes of transporting large amounts of coal under tow, rather than continuing to use their schooners singularly as freighters.

The process of converting a schooner into a schooner barge was fairly straightforward and inexpensive. The rigging was cut down to the lower section of each mast, the bowsprit was cut off flush with the hull, and the forward deckhouse was removed. This allowed more open space for access to the holds, which were covered by hatches running down the length of the deck. Removing the bowsprit eliminated any obstructions to the towing bridles and hawsers. Usually, the aft deckhouse would have a small pilot house added to the top of it. In the bow, the usual equipment like winches and a small donkey steam engine to operate equipment would aide in the process of setting anchors or operating pumps. Large towing bitts would be added as well. With these relatively simple modifications, the industry exploded as this was an extremely inexpensive way to transport coal and maximize profits.

By the early twentieth century, the tug-barge system of transportation dominated. Tows were becoming longer and longer, with tugs pulling a series of barges spread out as much as a mile in length. This lead to a number of collisions and accidents at sea, and around the turn of the century, resulted in congressional hearings to determine whether regulations for their operation and safety needed to be imposed on shipping companies using this method of transport. Competing steam and sail freight companies fought hard for this, presenting convincing evidence that tows with as many as 5 or 6 barges spread over nearly a mile posed great risks to the tow itself, as well as other vessels navigating the waters. Ultimately tug / barge operators were forced to comply with laws regulating safety and tow requirements.

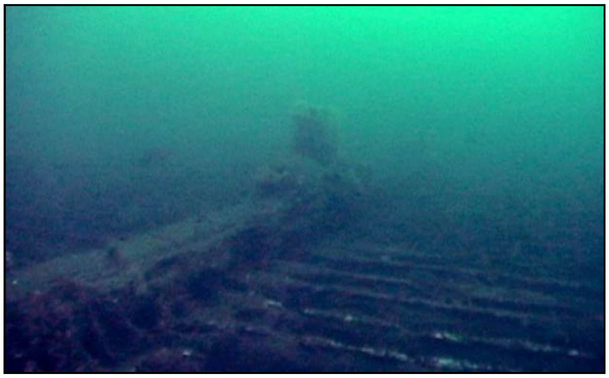
Though this era of schooner barges lasted for decades, as schooner barges themselves aged and were ultimately replaced by better and more efficient vessels, and as the coal trade industry as a whole suffered a decline — they became less relevant. Many schooner barges eventually were cut down completely, with no rigging at all, and were used as simple barges. While plenty of schooner barges sank due to accidental causes – foundered during storms, wrecked on ledges or shoals during storms, and sank due to collisions, for example, others were abandoned and became derelict vessels that were essentially hazards taking up space and serving no useful purpose. Job creation programs rolled out in the early 1930s led to many of these vessels being identified for removal in the clean-up efforts. As a result, some of these schooner barges were intentionally sunk – or scuttled – because they had been abandoned or had become unseaworthy since they had degraded in such a way that the cost to repair them exceeded their value.

In Massachusetts Bay, there are schooner barge wrecks that can be found both deep and shallow. The deeper wrecks tend to be more intact, that is, their hulls are intact although the upper structures and deck planking has long since eroded away. These shipwrecks also tend to be very heavily fished, especially the ones located in the dumping grounds, as in this area the gillnet fishery is quite active. Typically, these wrecks are enshrouded in heavy, cloth-like dragger nets as well as thin, but incredibly strong monofilament. Diving on these wrecks requires great care since the netting can be difficult to see and often is weaved into the anemones covering the wooden structures. The shallower wrecks tend to be more broken up – either debris fields or "footprints" of a vessel with the keelson, ribs and beams laid out on the seafloor with otherwise very little vertical relief. One key difference between a schooner barge and a schooner is the amount of rigging (for sail) that is found. Generally, a schooner barge wreck site will have a minimal amount of rigging, whereas a schooner will have more masts and more rigging scattered about the site.



The Winsor in preparation for launch, circa 1923.

One of the shallow water schooner barges that can be found in Massachusetts Bay is the Winsor. Originally built by the Kelley-Spear Company of Bath, Maine in 1923 as a three-masted schooner barge for the Westmoreland Coal Company, the Winsor was converted to an unrigged barge in 1928. This 202 foot long, 1,034 gross ton vessel never saw service as a fully rigged



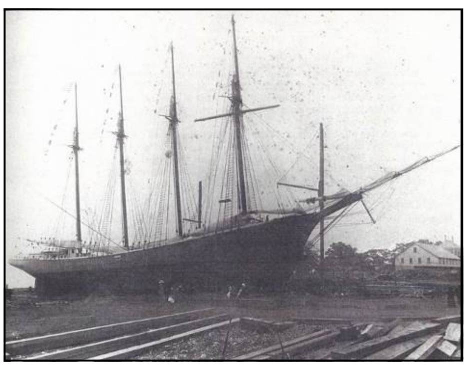
A view of the keelson with ribs perpendicular, stretching out about 15-20 feet on each side.

schooner, and at the time of her sinking during a winter storm was the third barge in a tow. The Winsor broke free of her tow and quickly foundered. Two crewmembers were rescued by the Coast Guard shortly after the sinking; however, the other two crewmembers drowned and were never recovered. The tug and the other two barges remained afloat.

At the time of her sinking on December 2, 1946 the Winsor was carrying 1,800 tons of anthracite coal. She settled into 95 feet of water off Scituate, MA. This wreck fits the description of a shallow-water wooden wreck site. There is very little relief and mainly a footprint of a vessel, with ribs, beams and a keelson running the length of the contiguous wreckage. Near the wreck, there are what appear to be the remnants of a carved bow ornament. The ribs are home to lobsters and codfish – which are plentiful on this wreck. There is some derelict fishing gear along the edge of what appears to be the port side of the vessel. The visibility tends to be excellent with 25-35 feet of visibility, depending on the tide and conditions. Overall, while this is a fairly small wreck site (relative to the original size of the vessel), it's an interesting dive with pleasant conditions that affords excellent opportunities for photography as well as training.

The contiguous wreck abruptly ends with some scattered wreckage and debris in the surrounding sand.

An example of a deeper wreck, which may hold more allure for technical divers as well as those interested in wreck photography, is that of the Lieut. Sam Mengel – better known locally as the Bone Wreck because of the skeletal whale remains found within her hulk.



The Lieut. Sam Mengel – rigged as a 4-masted schooner.

The Lieut. Sam Mengel was constructed by Percy & Small of Bath, Maine in 1918 for the Mengel Box Company. She was a freight schooner working in the West African mahogany trade. Following her maiden voyage on October 5, 1918, the 187 foot long Mengel sailed for 15 years, even managing to avoid sinking by German u-boats during WWI in her transatlantic crossings, before conversion into a schooner barge in 1933. On her fateful voyage during a New England gale on October 23, 1935, she was the last of two barges in tow and carrying 1,400 tons of coal. The Mengel broke free, separated from her tow and was set adrift, wallowing in the storm. The vessel began sinking, but for some time remained awash. Debris, including the deckhouse, had begun separating from her. The crew clung to the Mengel until they were rescued. Any floating remains were destroyed once the storm abated.

The 905 gross ton Mengel settled into 180 feet of water. Today the hull can be found largely intact, listing to port. As is typically the case, the deck planking has long since degraded, but the hull and cross beams remain relatively intact. The wreck has approximately 10-15 feet of relief, depending on location. A considerable amount of derelict fishing gear can be found on this wreck, some of which is suspended as high as 20 feet into the water column. This dictates even greater care to be taken when diving on this wreck, because of the often low visibility found here. Unfortunately, the visibility usually varies around 10 feet, though 15-20+ feet can be seen if the conditions and tide are just right. The best time to dive this wreck for visibility seems to be the May to early July timeframe when the water is still fairly cold. A good amount of coal can be found among the wreckage in addition to whale bones. The wreck contains numerous pieces of vertebrae and skull belonging to a whale – possibly a humpback given their prevalence in these waters. It has been speculated that the whale became entangled in abandoned fishing gear and drowned. As a note, whale remains are considered protected and should not be removed or disturbed, and given the unique nature of this wreck, leaving the whale skeleton as it is preserves the integrity of the site. This is a more challenging wreck due to the combination of low visibility and derelict fishing gear, but its uniqueness makes the dive extremely worthwhile.

The Lieut. Sam Mengel following conversion to a schooner-barge.

Photos of whale remains that can be found among the wreckage of the Lieut. Sam Mengel.

Approaches to Mixed Team Open-Circuit and Closed-Circuit Rebreather Diving (Part 1 of 2)

As rebreathers gain popularity in technical sport diving, mixed dive teams are becoming increasingly common. The phrase "mixed" team is commonly used to refer to an in-water team (i.e., buddies) comprised of both open circuit (OC) and rebreather divers. Fundamental to safe and effective team diving is in-depth understanding of the equipment and procedures that will be used by the entire team with an emphasis on standardization where possible. Diving in a mixed team is no different than diving in a team using the same type of equipment; it just more complex and less established within the dive community. A mixed team faces issues, such as different equipment, decompression profiles, gas requirements, and procedures for dealing with problems or emergencies.

Part 1 of this article reviews our approach to addressing differences with equipment and decompression profiles. Part 2, planned for Issue 2, will review our approach to gas management and procedures.

Equipment and Configuration

Diving in mixed teams is more complex than OC teams due to a broader range of equipment and configurations. Mixed teams can include OC equipment and different types of rebreather equipment, such as closed-circuit (CCR), semi-closed circuit (SCR), and variations of each (e.g., fully electronic versus manual CCR). Also, rebreathers of all types utilize different designs, technologies, displays, alarms, etc., such that even a team consisting of all CCRs can be considered "mixed."

It is necessary to educate mixed team members on the operation and function of the team's equipment. In most cases, divers utilizing CCRs have prior experience with OC and therefore understand how it functions; however, not all divers in our team had prior exposure to or experience with CCRs. In order to educate the team members about the rebreathers being used, we reviewed the design, function, and operation of the rebreather equipment, including a hands-on workshop where the OC divers could participate in the assembly and disassembly of the CCR. In our case, this exercise was simplified because our equipment is limited to OC and the Steam Machines Prism Topaz CCR. Team education allows OC divers to interpret the actions of rebreather divers in the water, the readings on their displays and provide more effective assistance in an emergency.

It is necessary to combine and standardize OC and rebreather configurations to the extent possible in order to promote simplicity, provide effective support in an emergency and facilitate interchangeability. The team's OC equipment configuration is based on a hogarthian style and therefore, our rebreather configuration adopts aspects of an already familiar and effective OC configuration:

- Backplate with a hogarthian-style, one-piece harness configuration with D-rings in the same locations as the OC configuration.
- Similar rigged bailout / stage / decompression bottles that are worn on the diver's left side.
- Attachment of the suit inflation bottle to the backplate on the diver's left side.
- Attachment of the primary light canister on the diver's right side.
- Pressure gauges bundled together and attached to the left hip D-ring.
- General streamlining and de-cluttering of the configuration (e.g., proper length hoses and wires).

Decompression Profiles

Chosen bottom (OC), onboard rebreather (diluent), and bailout gas mixtures, as well as rebreather setpoint choices, can produce significantly different decompression schedules between OC and CCR divers using current decompression algorithms, which can make it difficult or impossible for the team to stay together during the ascent. Our aim in standardizing our approach to mixed team diving was to select setpoint, and breathing, decompression, and bailout gases such that they produce decompression schedules that can be dived on OC or CCR. This would also allow the team to share gas in an emergency situation. Fundamentally, this requires that one or both divers give something up in order to harmonize the profile. For example, for a certain dive, a CCR diver may dive what appears to be a more "conservative" schedule relative to what could be done on CCR alone so that it is consistent with an OC profile.

Our process in selecting setpoint and gas mixtures to produce harmonized decompression profiles was initially defined by "constraints" – fixed assumptions from which we would not deviate. The bottom setpoint for CCR, and the OC max backgas PO2 were both chosen as 1.2 ATA. For extreme dives (e.g., open water dives deeper than 250 ft), even lower PO2s may be considered; however, extreme dives using mixed teams include additional considerations and are outside the scope of this article. For OC, our parameters required that we continue to utilize our team's "standard mixes" of EAN28, Trimix 21/35, 18/45, and 15/55 for bottom gases, with decompression gases of EAN50 and 100% oxygen. These mixtures were selected based their maximum operating depths relative our local diving environment, as well as our utilization and familiarity with these mixtures while OC diving.

Table 1 below illustrates one way in which a harmonized decompression schedule can be achieved without major modifications to either OC or CCR decompression profiles using the above-mentioned mixtures.

Table 1: Dive to 150 fsw for 25 minutes								
CLOSED CIRCUIT REBREATHER Diluent 15/55, Setpoint 1.2 ATA, Bailout Gas 21/35 and EAN50				OPEN CIRCUIT 21/35, EAN50, 100%		OPEN CIRCUIT 21/35, EAN50		Combined OC and CCR
Depth	Diluent	Set Point	Time (min)	Gas	Time (min)	Gas	Time (min)	Harmonized Schedule
150	15/55	1.2	25	21/35	25	21/35	25	
80	15/55	1.2	1	21/35	1	21/35	1	1
70	15/55	1.2	1	EAN50	1	EAN50	1	1
60	15/55	1.2	1	EAN50	1	EAN50	1	1
50	15/55	1.2	2	EAN50	1	EAN50	1	2
40	15/55	1.2	3	EAN50	2	EAN50	2	3
30	15/55	1.2	4	EAN50	3	EAN50	3	3
20	15/55	1.2	6	100% O2	5	EAN50	6	6
10	15/55	1.2	11	100% O2	8	EAN50	12	12
Total Decompression Time			29		22		27	29
Tables generated using GAP v 2.3, Build 1665. Model: Bühlmann ZH-L16B, GF 80-20								

Looking across the profiles, one observes that a CCR diver carrying bailout of 21/35 and EAN50 and diving a harmonized profile with an open circuit partner can dive the same schedule whether it is under normal circumstances or in a bailout setting. Overall, for the CCR diver, utilizing a harmonized schedule with an OC partner has advantages in that only one set of tables needs to be carried that will be adequate for normal and bailout schedules, and both divers can act as resources for each other with regard to gas supply/sharing. A disadvantage for the CCR diver is that the CCR diver may need to carry a larger supply of bailout gas to support the OC diver or a longer bailout schedule than might have otherwise been required. For the OC diver, there may also be a slightly longer decompression associated with diving a harmonized schedule.

This trend or pattern of behavior with decompression schedules works for a wide range of profiles. However, as the depth and / or bottom times become greater, there are divergences. Generally speaking though, modern decompression algorithms do not reward CCR divers with significant decompression time advantages over OC on deeper, longer dives. A more practical problem presents itself for the CCR diver on deeper dives – bailout gas volume requirements. The harmonized approach works well even on deeper dives, as outlined in Table 2 below, until the diver enters a bailout situation. Bailout gas strategies are discussed in Part 2 of this article; however, suffice it to say that for deeper dives, a CCR diver is eventually confronted with the problem of carrying enough bailout gas, and this is a situation where support divers have a critical role in the dive operation.

Table 2: Dive to 230 fsw for 20 minutes								
CLOSED CIRCUIT REBREATHER Diluent 15/55, Setpoint 1.2 ATA, Bailout Gas: 15/55 and EAN50				OPEN CIRCUIT 15/55, EAN50, 100%		Combined OC and CCR	CCR BAILOUT Bottom 15/55 Deco EAN50	
Depth	Diluent	Set Point	Time (min)	Gas	Time (min)	Harmonized Schedule	Gas	Time (min)
230	15/55	1.2	20	15/55	20	20	15/55	20
130	15/55	1.2	1	15/55	1	1	15/55	1
120	15/55	1.2	1	15/55	1	1	15/55	1
110	15/55	1.2	1	15/55	1	1	15/55	1
100	15/55	1.2	1	15/55	1	1	15/55	1
90	15/55	1.2	1	15/55	3	3	15/55	3
80	15/55	1.2	2	15/55	2	2	15/55	2
70	15/55	1.2	2	EAN50	2	2	EAN50	2
60	15/55	1.2	3	EAN50	3	3	EAN50	2
50	15/55	1.2	5	EAN50	3	5	EAN50	4
40	15/55	1.2	5	EAN50	5	5	EAN50	5
30	15/55	1.2	7	EAN50	7	7	EAN50	7
20	15/55	1.2	12	100% O2	10	12	EAN50	12
10	15/55	1.2	19	100% O2	18	19	EAN50	26
Total Decompression Time			60		57	62		67
Tables generated using GAP v 2.3, Build 1665. Model: Bühlmann ZH-L16B, GF 80-30								

In summary, when diving in a mixed OC and rebreather dive team, some thought and planning is required to safely and effectively execute technical level dives. In doing so, some trade-offs are made by the rebreather diver. Divers may need to do extra decompression or carry extra gas; however, this is the compromise necessary to harmonize what may otherwise be an incompatible dive team. In some cases a mixed team approach may not be appropriate because practical constraints (such as bailout scenarios or gas supply) require too much of a deviation from the most straightforward or efficient plan. In these cases, more stringent standardization should apply within the team, which may mean an exclusive OC team or CCR team with support divers available.

Disclaimer: No decompression procedures of any sort can guarantee that DCS will not occur. As noted in the tables above, some of the decompression schedules presented have been modified from the referenced decompression planning software output. We do not suggest the use of these schedules by others and have not sought endorsement of our modifications by any decompression software vendor or expert modeler. All decompression planning software programs generate decompression profiles based on various theoretical calculations. These decompression profiles should be taken to be experimental in nature and should not be used without an understanding of the inherent risk of decompression sickness. In other words, don't sue us if you get bent.

Gauntlet News

In between dive charters, the Gauntlet stays busy with a host of other activities ranging from the continued build-out of bunks in the forward section, upgrade and replacement of aging systems, and non-diving operations. Here are a few highlights!

Bow Pulpit Project

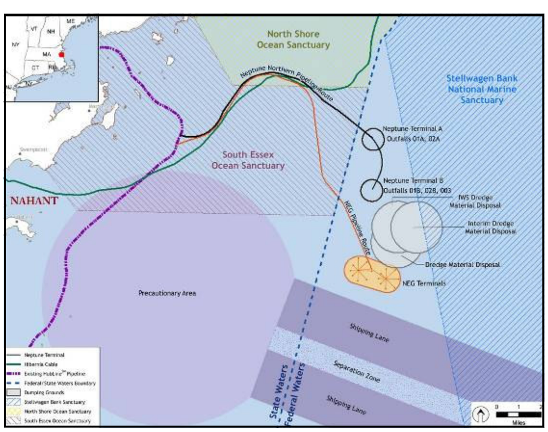
Gauntlet's new bow pulpit

The "business end" of a dive boat is definitely in the bow since this is where we are tied off to buoys or anchors. Usually, there is very little scope in the line when we are tied into a wreck to ensure a fast descent and provide a solid line to use as a reference. The downside of this is that it puts significantly more stress on the bow roller and deck cleat since there is less line to absorb the shock of the boat bucking in the seas. In order to distribute the force more evenly to avoid damage and make it easier for the crew to work with lines while getting the boat secured in rough seas, we decided to install heavy duty equipment. Our new bow pulpit is based off of a design in use aboard the R/V Quest. Our friend Eric Takakjian of Quest Marine Services designed one with us specifically for the Gauntlet and then constructed it for us! The pulpit is made of 316 grade stainless steel and has been welded together and electro-polished so that it will always have that "new" look to it. We installed Hancock Blocks on either side of the pulpit's horizontal bar, which in addition to having a roller in the block that makes it easy to handle lines, also rotates so that the line can move about more freely, further reducing strain on the boat.

Fall Haul Out

Gauntlet operates year round, which doesn't leave much time for maintenance. Once each year we haul out in the fall for about one week to maintain the fiberglass and gelcoat, as well as maintain / improve other components that can only be addressed with the boat out of the water. This year, weather conspired against us and the early season hurricanes sent boat yards into a frenzy. As a result, we were not able to get indoor storage space as we usually do. We did a quick haul out for bottom painting, installation of a new thru-hull to help us more efficiently operate our saltwater wash-down and live well pumps, and got the hull buffed. Back in the water, we did some much needed fiberglass and gelcoat repairs to the back deck – dive gear is very hard on a boat!

LNG Terminals



Map of proposed and current LNG terminals in Mass Bay

Over the past two years, offshore LNG terminal construction has been ongoing in Massachusetts Bay. The installation of offshore terminals is intended to allow LNG (Liquefied Natural Gas) tankers to unload their cargo while still at sea. The ships pick up a buoy that allows them to "couple" with an undersea pipeline, turn the gas from a liquid state into a gaseous state, and then transfer the gas to a facility on land. While we have mixed feelings about this, one thing is for sure, it's here to stay and there is a lot of activity and work associated with it. Gauntlet has been supporting scientific projects being conducted by marine mammal researchers engaged in acoustic monitoring and recording during pipeline construction and terminal operation. One of the mandates of the project is to monitor marine mammal (whales primarily) activity using several techniques. One type of monitoring is real-time monitoring through the use of "auto-buoys" that are placed in various locations in Mass Bay. These transmit real-time acoustic data on whale activity to a lab, which in turn can notify the LNG terminal operators or construction vessels that there is a marine mammal in the vicinity. This triggers a series of actions – which can include shut down of operations – while the marine mammal is within the exclusion zone. Other types of monitoring equipment include marine acoustic recording units (MARUs), also known as "pop-up" buoys. These are placed in chosen locations throughout the terminal corridor and areas of influence to record longer-term data at

Researchers prepare to deploy pop-up buoys for acoustic recording experiments

three month intervals. Since these are submerged and are literally resting untethered on the seafloor, periodically they need to be retrieved for data download and maintenance. The MARUs have a self-release mechanism that can be initiated by a researcher using a programmed acoustic sequence. The buoy floats to the surface and is retrieved by the boat. Sometimes the pop-ups get moved inadvertently by fisherman trawling/dragging or the batteries die before retrieval and divers are needed to search for them. This work is slated to continue through at least 2012 and Gauntlet will remain involved as needed.

Currently, the Excelerate Northeast Gateway Deepwater LNG terminal is in operation with two buoy sites, and the Suez Energy Neptune LNG terminal will also have two buoy sites when it is completed in 2009. This will mean that there are four LNG buoy sites in Mass Bay in an area we recently learned has been nicknamed the "toxic triangle." All boat operators should make sure they have noted the exclusion zones around the Northeast Gateway (NEG) terminals. The NEG location is approximately 5 miles ESE of Marblehead with the location of Buoy A at 42-23.6'N / 070-35.5' W and Buoy B at 42-23.9' N / 070-37.0' W. There is a 500 meter federal security zone around each buoy and a 1250 meter avoidance zone around each buoy. The reason for the extended zone is that there is approximately 400 feet of two (2) inch polypropylene line floating on the surface that is used as a pick up line for retrieving and connecting to the submerged turret-loading buoys. Running this over would hurt your boat. Finally, as the Neptune LNG terminal construction concludes in 2009, be sure to obtain the appropriate navigation information pertaining to exclusion zones around those buoys.

This Quarter In Shipwreck History…

January

Jan. 3, 1923 – The schooner Alice M. Colburn sinks off Egg Rock in Manchester, MA
Jan. 6, 1892 – The revenue cutter Albert Gallatin sinks after striking Boo Hoo Ledge
Jan. 7, 1922 – The schooner barge WA Marshall sinks off Boston, MA
Jan. 10, 1977 – The Chester Poling breaks into two pieces and sinks off Gloucester, MA
Jan. 11, 1932 – The steamer Coyote is scuttled off Boston, MA
Jan. 11, 1945 – The minesweeper YMS-14 sinks following a collision off Boston, MA
Jan. 18, 1857 – The barque Tedesco wrecks off Swampscott, MA
Jan. 18, 1884 – The steamer City of Columbus sinks off Martha's Vineyard
Jan. 21, 1921 – The steamer Massasoit is scuttled off Boston, MA
Jan. 21, 1947 – The barge Sherwood sinks in Buzzards Bay
Jan. 22, 1855 – The schooner Favorite is wrecked off Marblehead, MA
Jan. 22, 1906 – The steamer Trojan sinks just outside of Buzzards Bay in a collision
Jan. 24, 1909 – The RMS Republic sinks off Nantucket following a collision
Jan. 21, 1941 – The fishing vessel Mary E. O'Hara sinks off Boston, MA in a collision
Jan. 21, 1941 – The barge Winifred Sheridan sinks after colliding with the Mary E. O'Hara

February

Feb. 1, 1898 – The schooner Charles A. Briggs wrecks off Little Nahant, MA
Feb. 1, 1992 – The fishing vessel Josephine Marie sinks off Provincetown, MA
Feb. 7, 1978 – The pilot boat Can Do is lost during the Blizzard of '78
Feb. 10, 1957 – The tanker Chelsea sinks off Rockport, MA after running aground
Feb. 12, 1928 – The steam tug Mohave runs aground on Harding Ledge
Feb. 12, 1942 – The freighter Dixie Sword sinks off Monomoy Island
Feb. 18, 1952 – The tanker Pendleton breaks up and sinks off Monomoy Island
Feb. 18, 1952 – The tanker Fort Mercer breaks up and sinks off Monomoy Island
Feb. 20, 1961 – The fishing vessel Hilda Garston sinks in Buzzards Bay
Feb. 29, 1853 – The Forest Queen sinks after running aground off Scituate, MA

March

Mar. 2, 1925 – The schooner barge James M. Hudson sinks off Boston, MA
Mar. 7, 1893 – The schooner Martin L. Smith is wrecked off Marblehead, MA
Mar. 7, 1944 – The freighter Herman Winter sinks off Martha's Vineyard
Mar. 10, 1909 – The steamer Horatio Hall sinks off Pollack Rip Shoal following a collision
Mar. 11, 1924 – The 6-masted schooner Wyoming sinks off Chatham, MA
Mar. 24, 1986 – The fishing vessel St Jude sinks 80 miles northeast of Boston, MA
Mar. 25, 2008 – The fishing vessel Miss Sonya sinks off Gloucester, MA

What's Ahead?

The next issue of our newsletter will be published in April. There's a lot of diving and writing to do between now and then! In the meantime, don't forget - Gauntlet runs year-round from Pickering Wharf Marina in Salem, MA. January, February, and March 2009 dates are posted! Send us a request or sign up for a scheduled trip. Winter is a good time to check out those wrecks that tend to have lower visibility in the summer. The cold water helps create great visibility!

Are you interested in recreational or technical dive training? If so, contact us right away! This is the best time to meet, talk about your goals, and set you on the right path to acquiring any necessary gear and scheduling dives. We offer instruction through both NAUI and TDI.

Be sure to also check out these local events coming up in March! NADE will be exhibiting at the Boston Sea Rovers Clinic – stop by and say hello!

Boston Sea Rovers 55th Annual Underwater Clinic
Fairmont Copley, Boston MA
March 7-8, 2009
http://bostonsearovers.com

Beneath the Sea
Meadowlands Exposition Center
March 27-29, 2009
http://beneaththesea.org