

Title: Deep Mine Rescue

Presenter: Mark V. Lonsdale, Diver & Training Officer - LA Sheriff's SEB Dive Team

Overview: An 'Extreme Diving' accident in an 85 year old flooded mine initiates an 8-hour rescue effort and subsequent US Air Force Special Investigation in Los Angeles County.

In September, 2000, rescue assets of the LA County Fire Department and Los Angeles County Sheriff's Department responded to a problem that was as far from being considered "text book" as any other they had confronted.

While personnel from L.A. County Fire Department (LACFD) USAR and the Montrose Search and Rescue Team (MSART) concentrated on the tunnel aspects of this operation, LA Sheriff's Emergency Services Detail (ESD) divers and LA County Lifeguard divers concentrated their efforts on the underwater portion of the mine.

Before getting into this particular operation, it would be helpful for the reader to have an understanding of diving operations in general within LA County. With its rugged coastline, great beaches and close proximity to Catalina and the Channel Islands, Los Angeles County is home to some of the best scuba diving in the world. However, with its sheer size and diversity, including mountains, deserts, lakes, rivers, dams and canals, it is also one of the nation's most challenging environments from the perspective of public safety mountain rescue, swift water rescue and recovery dive teams.

The diversity of diving operations is equaled only by the diversity of the bodies of water within the county. On an annual basis, and in addition to the innumerable mountain rescues, the LA Sheriff's ESD and SEB divers will log over 1,500 dives responding to missing persons, boating accidents, overdue divers, lost swimmers, drowned surfers, homicides, evidence recoveries, body and weapon recoveries, submerged vehicles, stolen boats, plane crashes, narcotic interdictions, swift water rescues and now flooded mines.

Side Bar:

Emergency Services Detail (ESD), LA County's premier law enforcement dive team, is a division of the Sheriff's Special Enforcement Bureau (SEB). All members of ESD are first and foremost SWAT trained paramedics cross-trained in mountain rescue, helicopter operations and public safety diving. To augment their diving capabilities, ESD supports a reserve dive team, SEB Marine Company, made up of highly trained professional divers from within the county. On larger search operations, particularly off the beaches, harbors and in the deep mountain lakes, LA Sheriff's divers will join forces with LA County Lifeguard divers to form a unified County Diving Taskforce, in turn supported by additional assets from LA County Fire and the Sheriff's Marina Division.

THE TUNNEL / MINE OPERATION

Initial Report of Incident:

13:17 - Citizen walked into LA Sheriff's Crescenta Valley Station to report "diver lost in submerged water tunnel".

Informant said that his brother, an Air Force PJ diver & Master Sergeant, had entered a flooded mine with 2 hours of air but failed to return after 2 hours.

13:19 - Sheriff's dispatcher activated county Emergency Response System - LA Co. Fire dispatch notified

13:20 - SEB desk & ESD received the call, dispatching Unit 240R2, a rescue truck already in the mountains with ESD Deputies Hitchcock & Airhart. LA Sheriff's reserve mountain rescue team from Montrose Search & Rescue was also notified. This team is certified and equipped as a Mine Rescue Team. Sheriff's rescue H3 helicopter, Air 5 with additional ESD deputies was also notified.

ESD Deputies Tommy Hitchcock and Dale Airhart arrive at the mine within minutes and were met by the victim's brother. Responding in rescue mode, they entered the 200-foot tunnel of the dry part of the mine to assess the situation. Their justification for entering this potentially hazardous environment, understanding the dangers of unstable structure and bad air, was that they were responding in RESCUE mode and the informant had already spent two hours in the mine waiting for the diver's return. In addition, with the frequency of earthquakes in California, if the tunnel was going to collapse it would probably have done so already. They also knew that additional support assets were on site or en route.

Upon seeing the confined, overhead nature of the entrance to the flooded part of the mine, and upon further interview of the victim's brother, the decision was made to pull out of the mine. It had already been over two hours since the missing diver had entered flooded mine so it was calculated that he would be out of air, in which case he had either surfaced in an air pocket or this was going to be a recovery operation.

The ESD deputies did not proceed with the dive at this point since they were not correctly equipped for overhead environment diving. Since they must also carry full mountain rescue, medical and SWAT equipment on the rescue trucks, ESD divers carry the minimum of dive equipment. This is essentially "open water" scuba equipment consisting of single tanks, regulators and BCs, appropriate depth, time and pressure gauges, wetsuits, masks, fins, knives, lights and weight belts. This gear is ideal for a quick jump on a missing swimmer, diver or car in the water, but not suited to the complexities and dangers of overhead environment diving. For more demanding dive operations, ESD has commercial surface-supplied diving equipment consisting of helmets, hoses, control panel and underwater communications, but this is carried on the team's mission specific dive truck.

Note: The deputies must be commended at this point for pulling back and not continuing with the dive in the face of pressure from family members and the team's pride in "never quitting". Over the years, many lives have been lost in the rescue community, as a result of egos taking precedence over common sense. It often takes uncommon courage to back-

off and re-evaluate an obviously hazardous situation rather than bow to the many pressures placed on first responders.

So the decision was made to contact the SEB Marine Company Dive Team training officer, Mark Lonsdale, because of his experience in commercial diving operations and deep cave diving. It was also known that Mark was equipped for diving in overhead environments.

Lonsdale was paged at 14:10 hours and a Sheriff's helicopter dispatched to Santa Monica Airport to expedite his response. By 14:45 Lonsdale was at SM Airport with 200 pounds of cave diving equipment, which in itself was a potential problem for a Hughes 500 helicopter that was already carrying a full fuel load. A set of double steel tanks alone weighs in at over 80 pounds; a weight belt is 20 pounds; then add to that a 230 pound diver plus diving suit, lights, reels, stage bottle, spares; all on a hot day for flight going up into the mountains; and you have a pilot a little concerned about flight performance.

Cave Equipment:

The key difference between cave diving equipment and open water scuba gear is that in an open body of water, the diver can usually ascend directly to the surface if there is a problem. In an overhead environment such as a cave, tunnel, pipeline or wreck, this is not an option so the diver must have built in redundancies for safety. These redundancies consist of two tanks manifolded together with an isolation valve and topped with two independent regulators. In addition, the diver carries a primary light, two back-ups, a primary reel, a safety reel, line cutters, depth gauge and bottom timers, and a specially designed long hosed regulator to be used for extracting an out-of-air diver through narrow restrictions.

In addition to advanced open water diving skills and having a good head for dark, confined spaces, the Cave Diver training process is without doubt one of the most demanding certifications in recreational diving, if done correctly and up to standards. There are only three recognized Full Cave Certifications and those are issued by the National Speleological Society – Cave Diving Section (NSS-CDS); National Association of Cave Diving (NACD); and Global Underwater Explorers (www.GUE.com). In addition to several years as a deep saturation diver in the oil fields and working as a consultant to various military and governmental agencies, Lonsdale has all three of these cave certifications.

Back to the problem at hand. Upon arrival at the mine, Lonsdale was given an initial briefing by ICS/Fire/Sheriff's personnel as ESD deputies and USAR personnel transported his cave diving gear in through the dry shaft to the flooded portion of the mine. He was briefed by Incident Command that this may no longer be a Rescue and that the dive was to be executed in Recovery Mode with the utmost caution. He was further briefed by the ESD Diving Supervisor, Sergeant Mike Connolly, that if he felt that the dive was not safe, he should not feel compelled to continue. However, if he was able to navigate the flooded section of the mine and locate the victim, he was to make an immediate recovery.

Supported by Deputies Airhart, Sambolich and Vilander, Deputy Hitchcock was teamed up with Lonsdale and lead the way through the first 200 feet (approx) of smelly, damp mine. This required a stooped walk up a sloping shaft showing several indications of rotting timbers, with the last 50 feet or so being a steeper crawl space up through an old major collapse. At the top of this crawl space the divers found themselves in a small chamber with a pool of muddy water that formed the entrance to the flooded portion of the mine. This pool was approximately six feet in length and three feet in width. Below the surface, the restriction in the rock through which the missing diver had wriggled was approximately two feet high and three feet wide.

Assisted by ESD deputies, Hitchcock and Lonsdale readied their dive equipment to do an initial survey of the entrance with no plan to make full penetration. The initial concerns were of an underwater roof collapse since rotten timbers were visible from the surface. Fire Department USAR rescue personnel had already rigged lights and communications but were still concerned about air quality. They indicated that oxygen levels in this part of the shaft were marginal at less than 19% so began pumping in air.

After setting up, testing and double-checking their gear, Lonsdale entered the water first and was able to barely negotiate the small entrance into the flooded restriction with his double tanks (approximate 2 feet high and 3 feet wide). Visibility was zero at this point as he dropped about 6 feet into the first area - a chamber about 6 feet wide and 3 feet high.

Following the thin line run by the victim for several feet underwater, Lonsdale was immediately confronted with a mass of old rotten timbers and the line disappeared into this apparent collapse. The bottom of the chamber was also strewn with loose rock and old punky timber.

By this time, Hitchcock had followed Lonsdale into this first chamber but there was no room for the two divers to move and there was a concern with the instability of the area so Lonsdale used squeeze signals to signal Hitchcock to surface and re-evaluate the situation. (In zero visibility where hand signals are not possible, Sheriff's divers use pre-arranged squeeze signals to communicate. For instance, 2 squeezes means continue while 3 squeezes means back up or surface).

While discussing the situation with USAR personnel back on the surface, the divers could hear small amounts of roof material falling into the chamber behind them – probably dislodged by their tanks hitting against the overhead. The biggest concern at this point was triggering a collapse, but they had still not found where the victim's line lead, so the divers decided to try working with one diver on a tether with the second diver as back-up.

THE GO / NO GO DECISION

At this point, considering the condition of the mine and time that had elapsed, it would have been quite justified to abort the dive and exit the mine. However, there were several factors still influencing the divers' decision-making process.

There was still the possibility of a rescue since the missing diver may be waiting in a bubble cave. Lonsdale recalled an incident where two missing cave divers were rescued after over 36 hours trapped in an air pocket deep in a South American cave system. Further delays waiting for surface-supplied equipment may only deplete what little air the victim had or cause him to lapse into hypothermia.

The use of surface-supplied diving systems was not ideal since it would mean dragging a bulky umbilical across possibly unstable timbers.

The missing diver was a highly trained rescue professional, so if any one could survive in there, it would be him.

It was late in the day and a very large rescue contingent had now been assembled and was waiting outside the mine for Lonsdale and Hitchcock's decision.

Lonsdale had still not found where the victim's line emerged from the collapsed timbers.

So the decision was to go again. Attached to a 150-foot rescue rope and communicating with the support team now by line-pull signals, Lonsdale re-entered the first chamber to attempt to find the entrance to the submerged vertical shaft that had been described to him in the initial briefing. By feeling his way around and moving some of the debris he was able to move deeper into this first area and found what appeared to be a down-sloping, horizontal shaft, off-set to the right of the entrance. This ran contrary to the briefing where he had been shown a drawing indicating a ten-foot vertical entry shaft, but never-the-less, this was where he re-located the victim's line.

Even though visibility was improved in this side tunnel, the line still appeared to disappear down a small, roughly cut, shoulder-width passage about four feet high supported by some very old and suspect timbers.

Following the thin line, the next 50 feet (approx) seemed to be a long narrow S bend of rough-hewn tunnel, supported by old timbers, with numerous areas where roof rock had dropped to the bottom creating small bubble caves and debris pile restrictions. Each area where the roof had collapsed created a debris pile that required the diver to move up and over the restriction, all the time avoiding banging his tanks on the ceiling and dislodging more material.

Since visibility had now improved considerably, the further he moved into the tunnel, and aided by a powerful hand-held light, Lonsdale made the conscious decision to push in a little further, but still with no real intention of making a full penetration. His own safety was still paramount in his decision making process, and he did not want to create a situation that may require more divers to have to attempt his own rescue. That would have been way to embarrassing not to mention potentially fatal.

The next section was a more linear underwater tunnel, still rough-cut and supported by assorted pieces of old wooden shoring material, and still with a low overhead. This then turned into a more formed mine tunnel with squarer sides that eventually surfaced into a horizontal shaft over 100 feet long and half filled with water (about 3-4 feet deep). In some areas Lonsdale had to swim but in others he could stand in waste deep water.

Upon entering this tunnel, Lonsdale felt some resistance on his tether but was hesitant to pull on it and risk disturbing timbers in the tunnel between him and his only source of egress. What Lonsdale did not realize was that he had already penetrated 150 feet and the support crew was hustling to attach a second rescue rope to add length to his tether.

When the rope became slack, Lonsdale continued to move into the tunnel that was now three to four feet wide and over seven feet high. He was now periodically turning off his light to see if he could see the victim's light but all he saw was inky blackness – a total absence of light.

The black hole of this partially flooded tunnel continued into the mountain beyond the range of Lonsdale's light, but being in such a large air space made removing his regulator very tempting. However, through prior training, he knew the dangers of listening to this temptation.

Mid-way down this shaft, still with his regulator firmly clamped in his mouth and breathing off his Scuba tanks, Lonsdale found the victim floating his right side, partially submerged, and wedged between two heavy timber posts. This was now over 185 feet back into the mine based on the rope that Hitchcock had paid out to him.

The victim was not sitting up and eager to greet him as Lonsdale had sincerely hoped, but non-responsive, his head underwater; his mask was on but regulator was out of his mouth. Not seeing a collapse or any obvious form of injury, Lonsdale suspected that the victim had succumbed to bad air either in the shaft or in his tanks.

The victim's gear appeared to be in order; his mask and weight belt were on; he had 2,700 psi in his twin 80 cubic inch tanks (that had a start pressure of 3,000 psi); the buoyancy compensator was fully inflated; fins were on; hands were empty; a blue reel was attached to his harness; and knife was still sheathed. The fact that he had near full tanks and a working regulator only added weight to the possibility that he had made the fatal mistake of removing his regulator in the mine.

Lonsdale immediately signaled Hitchcock by three line pulls that he had found the victim and began dragging and maneuvering the body back through the flooded mine without removing any of the victim's gear. The victim was already in some early stage of rigor mortis and his legs were locked in a splayed position. Since the victim was already oriented feet first toward the exit, Lonsdale began pulling the victim out by his legs. He did not want to risk pushing the body out and getting it stuck in a restriction blocking his own escape or causing a collapse.

Twenty feet short of the exit, Lonsdale realized that he could not get the body any further without removing gear so began removing equipment and passing it out to Deputy Hitchcock. He also dumped all the additional air from the victim's BC.

After some struggling, Hitchcock, Sambolich and Lonsdale were able to pull the body through the final restriction, where they removed additional equipment and prepared the body to be dragged through the dry portion of the mineshaft in a Sked.

The divers then exited the mineshaft, leaving it to the other ESD deputies and fire department USAR personnel to extract the body and additional dive gear. While packing up their dive gear to be trucked back down to the road, the brother of the victim asked the ESD divers if they had recovered his brother's video camera. This came as an unwelcome surprise since Lonsdale and the other divers had not been told the victim had a camera before entering the mine, so had not looked for it on the initial recovery.

Since there was no evidence of foul play, and because of the hazardous nature of the mine, ESD Diving Supervisor Sergeant Connolly made the decision that it was not necessary to recover the camera. The cause of death was somewhat self-evident, pending the Medical Examiners report, so it was not worth risking life to recover something as insignificant as a video camera. At that point, Lonsdale fully agreed with the Sergeant and expressed no great interest in re-entering that particular hole.

In their post operational reports, both Hitchcock and Lonsdale emphasized the fact that this was not a dive that should have been attempted by anyone with less than full cave certification, mission specific equipment configurations and a lot of confined space experience. Narrow restrictions, poor visibility, old timbers, rock falls and potentially bad air all contributed to making this a very advanced dive; and one that common sense should dictate a hasty retreat or at least extreme caution.

However, the story was not to end there....

U.S. AIR FORCE OFFICE OF SPECIAL INVESTIGATIONS (OSI)

Two days later Lonsdale was contacted by the Air Force OSI investigators about the possibility of recovering the victim's video camera and taking air samples in the mine for their own internal investigations. Special Agent Jim Mowry, an Air Force forensic investigator, and Special Agent Tanya Harrison, the lead investigator on this case, needed answers to several unanswered questions.

The Air Force was also concerned that a friend or family member of the victim may attempt to dive the mine to recover the camera trying to bring some resolution for the victim's wife. Lonsdale knew this would be extremely hazardous for anyone not specifically trained and equipped for this type of diving, but also knew that it was quite possible considering the emotionally charged situation that had developed.

Apparently the Air Force had already looked at using Air Force or Navy divers to do the recovery, but felt that Lonsdale was still the most qualified to re-enter this particular mine. Since Lonsdale had his cave diving partner, Jarrod "JJ" Jablonski, from Florida staying with him that weekend, they agreed to assist the Air Force. JJ is also the President of Global Underwater Explorers and holder of the world record for deep cave penetration.

On Monday, 25 September, supported by Air Force Pararescue PJs, LA Sheriff's ESD, and Fire Department USAR teams, Lonsdale and JJ re-entered the mine and recovered the victim's video camera, which was found about forty feet past where the victim was found. They also collected five air samples in test-tubes and shot photos of the accident site.

This part of the operation was complete without incident or injury much to everyone's relief, particularly the Air Force since they were the driving force behind this second dive. The Air Force was very aware of the risks related to what they had been asking of these two divers.

Based on the air samples, the Air Force labs came back with a report of between 4% and 10% oxygen in the mine – well below the percentage necessary to support life (16% - 21%). The video from the victim's camera also showed, in vivid clarity, the last ten minutes of his life. While negotiating the underwater sections of the mine, the victim can be clearly heard breathing on his regulator. But when he surfaces and pans the camera around the partially flooded tunnel, his breathing can no longer be heard through the regulator. Within seconds he succumbs to the bad air and drops back into the water.

THE END

Dedication:

To the memory of US Air Force Para-rescue (PJ) Master Sergeant Paul Hayden – a highly trained and respected member of the military special operations rescue community. He lived his life “So that Others May Live” (The PJ motto)

About the Author:

Mark Lonsdale is a Diver, Diving Supervisor and Training Officer for Los Angeles Sheriff's Special Enforcement Bureau SEB Marine Company Dive Team. Mark is also the Director of the Specialized Tactical Training Unit (www.STTU.com) where he consults to US government and military groups on counterinsurgency and Afghan operations.

In addition to having written for several magazines, Mark is the author of “SRT DIVER – A Guide for Special Response Teams” and most recently, “ALPINE OPERATIONS – a Guide to Cold Weather Warfare and Mountain Rescue”. (www.sttu.com)