



Internal Audit Report

Scuba Diving Oversight

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I. EXECUTIVE SUMMARY

Audit and Management Advisory Services has completed a review of scuba diving oversight. The audit was conducted in conformance with the International Standards for the Professional Practice of Internal Auditing prescribed by The Institute of Internal Auditors. The purpose of this review was to evaluate the assessment of diver qualifications and issuing certification cards. This audit was included on our FY23 Audit Plan. The audit was initially intended to cover both recreational and scientific diving. However during audit planning it was discovered that the recreational diving classes held by Athletics and Recreation had ended around the beginning of the pandemic and had not restarted fully as of the time of this audit. Therefore the scope of this audit was modified to only include scientific diving.

Records are kept for all scientific divers at UC Santa Cruz using the “WebDiver” web tool, and is backed up with physical documents (for things like training records and medical approvals) and electronic records for other things like equipment checks and diver logs. WebDiver has an administration page that summarizes key information including the number of recent dives and periodic safety requirement due dates. We reviewed the accuracy of the information on this summary page by sampling 10 divers and reviewing source documents, specifically medical approval, equipment log, and annual review dates, to match against the information presented in the summary. We also reviewed the dive logs for these 10 divers plus an additional 10 divers to validate the dive logs contained the proper elements required.

Generally we found that the Scientific Diving Program had fairly accurate record keeping. While we found a small number of data entry errors in our analysis, some level of data entry errors are to be expected. For the data we reviewed, the overall percentage of fields with data entry errors seemed to be less than 2% of data entered.

However, we did make one observation requiring management corrective action to address a control weakness:

A. Excessive retention of old and no longer relevant documentation

We found a number of documents in diver’s folders that were clearly no longer needed and well past the period in which it was reasonable to retain.

Agreement was reached with management on recommended actions to address risks identified in these areas. The observation and related management corrective actions are described in greater detail in section III.

II. INTRODUCTION

Purpose

The purpose of this review was to evaluate the assessment of diver qualifications and issuing certification cards. This audit was included on our FY23 Audit Plan.

Background

On July 1, 2022, Environmental Health and Safety (EH&S) assumed responsibility for the campus diving and boating safety program. The program provides oversight of UC Santa Cruz's SCUBA, breath-hold diving and scientific/occupational boating activities in support of classes, faculty, researchers, and staff. The program has two full time EH&S staff: a diving safety officer, a boating safety officer, and an Institute of Marine Sciences marine operations manager.

Policies and procedures are set forth by the Diving Control Board, which maintains independent and autonomous authority over the scientific diving program's operations. The board is made up of various diving stakeholders including the diving safety officer, faculty researchers, staff, an undergraduate and a graduate student. The Diving Control Board ensures that all UC Santa Cruz recreational, scientific, and other diving activities meet all relevant community, state, and federal regulations. They also make recommendations to campus administrators concerning the management and safe operations of diving programs. On a day-to-day basis the diving safety officer is responsible for implementing the policy of the Diving Control Board.

The primary relevant local policy found at UC Santa Cruz regarding scientific diving is the "Standards For Scientific Diving Certification & Operation Of Scientific Diving Programs," which is commonly simply referred to as the "Dive Manual." This policy was developed locally to reflect the standards derived from the American Academy of Underwater Sciences (AAUS). The AAUS is an organization which has a primary mission of advancing and facilitating safe and productive scientific diving. The Occupational Safety and Health Administration now recognizes AAUS as the standards-setting organization for scientific diving best practices and that organizational member activities represent the current scope of scientific diving programs. All UC campuses adhere to AAUS standards and there is an effort in process of developing system-wide policies and procedures. The diving program also complies with standards set by the National Association of Underwater Instructors (NAUI) for recreational training.

Scope

The audit was initially intended to cover both recreational and scientific diving. However during audit planning it was discovered that the recreational diving program offered by Athletics and Recreation had been discontinued in December 2020 and still had not yet resumed at the time of this audit. Therefore the scope of this audit was modified to only include scientific diving.

During the audit, we reviewed controls the university has in place to manage safety risks associated with scientific scuba diving.

- We reviewed standards set forth by the AAUS, NAUI, and local policy included in the UC Santa Cruz Dive Manual.
- We interviewed the dive safety officer and various other key players.
- We reviewed web resources provided to students, staff, faculty, and the public.
- We analyzed equipment inspections, medical approvals, and training dates, for a sample of 10 divers to verify completeness and accuracy.
- We reviewed the dive logs of the same 10 sampled divers, plus an additional 10 divers.

III. GENERAL OBSERVATIONS

The Dive Manual provides specific requirements for training, equipment inspection, and medical clearance for scientific divers at UC Santa Cruz. The diving safety program maintains a record of individual's compliance with these requirements, including the dates in which requirements were met and when they expire, in a system called "WebDiver." Furthermore, the diving safety program also maintains a combination of hard copy and digital records to support the information contained within WebDiver.

As part of the audit, we reviewed these source records to ensure they were present and the dates contained within the source documents matched the dates within WebDiver. Specifically, we reviewed the accuracy of the information on the WebDiver summary page by sampling 10 divers and reviewing source documents, specifically medical approval, equipment log, and annual review dates, to match against the information presented in the summary. We also reviewed the dive logs for these 10 divers plus an additional 10 divers to ensure accuracy of the required information within the dive logs.

Generally we found that the Scientific Diving Program had fairly accurate record keeping. While we found a small number of data entry errors in our analysis, some level of data entry errors are to be expected. For the data we reviewed, the overall percentage of fields with data entry errors seemed to be less than 2% of data entered.

Training and Insurance Requirements

According to the Dive Manual, divers must undertake a number of trainings when first qualifying to conduct scientific dives as well as retake several trainings periodically in order to stay proficient. These required initial and reoccurring trainings are provided by the Diving Safety Program. These requirements are in line with AAUS standards and a survey conducted by Internal Audit found that stakeholders at the university generally thought they were appropriate.

New divers must successfully complete prerequisites, theoretical aspects, practical training, and examinations for a minimum cumulative time of 100 hours and a minimum of 12 open water dives. Some of the specific required training includes CPR training, first aid, and oxygen administration. These three specific training topics must be periodically retested in order to maintain proficiency.

Additionally, divers must maintain coverage for diving medical evacuations (DAN membership).

During our review of ten diver hard-copy folders, we found all ten divers had all their training records properly included in their folders and all the dates we reviewed matched between WebDiver and the source records. However, we did find a single instance in which the expiration date for DAN membership for a diver was incorrectly recorded in Webdiver as expiring on the 30th of a particular month when the source record actually indicated it should have expired on the 20th of that month. We did not deem this one error to be significant enough to warrant a formal Management Corrective Action.

Medical Requirements

The dive manual specifies that medical evaluations are required to be completed every 2-5 years depending on the diver's age. Specifically, divers under 40 are required to have medical evaluations performed every 5 years, divers aged over 40 but under 60 are required to have these evaluations performed every 3 years, and divers 60 and older are required to have medical evaluations every 2 years.

The diving safety program does not maintain the full medical evaluation that a physician performs, but instead collects the approval page in which the examining physician simply states if the individual is fit to dive and if they recommend any restrictions or limitations. This is a good practice as it minimizes the collection of sensitive medical information.

During our review of ten diver hard-copy folders, we found all ten divers had all their medical clearance forms properly included in their folders and all the dates we reviewed matched between WebDiver and the source records. However, we did find a single instance in which additional medical information was included in the folder that was not necessary to maintain. The Diving Control Officer agreed to destroy any unnecessary medical documentation that is found.

Equipment Check Requirements

The Dive Manual describes the specific equipment maintenance and inspection requirements for diving. Specifically, all scientific divers must have the equipment they are using inspected on an annual basis by the Diving Safety Program. Individual divers are also responsible for adhering to the manufacturer's specified service interval for their personally owned equipment. Equipment included in this inspection include:

- Scuba regulators
- Gauges
- Buoyancy control devices
- Dry Suits
- Dive computers
- Full Face Masks

Scuba cylinders are maintained by the units that own the. They must be hydrostatically tested every five years and have visual inspections on intervals not to exceed 12 months. These inspection records are maintained electronically. All equipment modification, repair, test, calibration, or maintenance service should be logged.

During our review of ten diver electronic records, we found all ten divers were in compliance with these equipment inspection requirements.

Dive Logging Requirements

According to the Dive Manual, "Each authorized scientific diver shall log every dive made under the auspices of the UCSC program, and is encouraged to log all other dives. Dives should be logged into WebDiver at the earliest reasonable opportunity but no later than 1 month following the dive." Among other things, the dive log should include things such as

- The date, time, and location of the dive

- The name of diving buddy
- Diving modes used.
- If the dive was a scientific dive or other purpose

These dive logs are an especially important control as it provides an audit trail to ensure divers are getting their required number of dives annually and it shows what type of dives these individuals are performing. One potential challenge is that because this information is self-reported by the diver, there is little way to ensure the information is accurate, or that it is logged at all. One imperfect way to check the accuracy of the dive logs is to compare pairs of dive logs of individuals who listed each other as dive buddies. Dive buddies should have logs that match as they are conducting identical dives.

In reviewing the dive logs of 20 divers, we found that these dive logs generally did match between dive buddies. However, we did find several instances of dive buddies listing dates that were 1 day apart.

We did find two instances in which the dive records had a clear data entry error. In both these cases dives were logged for a date a number of years in the future. These were likely typos when the user entered in the dates for the dives.

Additionally, an internal audit conducted in 2020 found some instances of scientific dives being recorded while participants were out of date on at least one required item such as a training certificate. Specifically, the audit found 8 of the 134 (~6%) divers reviewed had recorded a scientific dive while they were out of date on at least one required item. Since the time of this prior audit, we did not find any new instances of this occurring.

Finally, we found the dive logs did contain the required elements, such as pre-dive plans.

IV. OBSERVATIONS REQUIRING MANAGEMENT CORRECTIVE ACTION

A.	Excessive retention of old and no longer relevant documentation					
We found a significant amount of documentation maintained in folders that was very old and should not be retained.						
Risk Statement/Effect						
Following the UC retention schedule is critical for promoting responsible records management and ensuring consistent compliance across UC. Disposing of outdated records helps reduce unnecessary costs and potential burdens of having an unwieldy amount of excessive records.						
Agreement						
A.1	The Diving Safety Officer will make a plan to dispose of old, no longer necessary to maintain, documentation in accordance with the UC "Records Retention Schedule."	<table border="1"> <tr> <td data-bbox="1177 747 1466 810">Implementation Date</td> </tr> <tr> <td data-bbox="1177 810 1466 873">December 1st,2023</td> </tr> <tr> <td data-bbox="1177 873 1466 936">Responsible Manager</td> </tr> <tr> <td data-bbox="1177 936 1466 1106">Diving Safety Officer</td> </tr> </table>	Implementation Date	December 1 st ,2023	Responsible Manager	Diving Safety Officer
Implementation Date						
December 1 st ,2023						
Responsible Manager						
Diving Safety Officer						

A. Excessive retention of old and no longer relevant documentation

During the review of hard-copy diver folders which contained things such as training records, medical clearances, and DAN insurance cards, we found a common trend of folders containing a fair amount of superseded and/or very old documentation within the folder.

It seems that in many instances when updated records such as DAN insurance cards are added to the folder, the older records remained. Consequently many folders had numerous copies of certificates from the various years in which the certificates were issued. In many cases these copies of certificates were quite old and clearly not necessary to maintain. For example we found a number of First Aid/CPR/Oxygen Administration training certificates and DAN membership cards which were over ten years old within the files and which had been superseded by more recent training. In one folder we found a number of documents which were from the mid 1990's.

Retaining these old documents incrementally makes finding current/recent documents that are actually needed more difficult.

APPENDIX A – SUMMARY OF WORK PERFORMED AND RESULTS

Preliminary Analysis	
Work Performed	Results
Review key guidance and criteria associated with diving safety.	The primary relevant local policy found at UC Santa Cruz regarding scientific diving is the “STANDARDS FOR SCIENTIFIC DIVING CERTIFICATION & OPERATION OF SCIENTIFIC DIVING PROGRAMS,” which is commonly simply referred to as the “Dive Manual.” This policy was developed locally to reflect the standards derived from the American Academy of Underwater Sciences (AAUS). The AAUS is an organization which has a primary mission of advancing and facilitating safe and productive scientific diving. OSHA recognizes AAUS as the standards-setting organization for scientific diving best practices and the University of California adheres to these standards. The diving program also complies with standards set by the National Association of Underwater Instructors (NAUI) for training provided by the diving program.
Review databases associated with diving safety.	Records are kept for all scientific divers at UC Santa Cruz using the “WebDiver” web tool, and is backed up with physical documents (for things like physical approvals) and electronic records for other things like individual dive logs.

Fieldwork	
Work Performed	Results
Ensure individuals conducting scientific diving have been trained and certified in accordance with UCSC and AAUS requirements.	We reviewed WebDiver records to conclude that all active divers had taken mandatory training required by UCSC. UCSC Training is in compliance with AAUS requirements.
Ensure individuals are up-to-date on mandatory safety requirements.	I found divers were generally in compliance with safety requirements. Specifically I found only a single instance in which a diver had an out-of-date certificate since 2020.
Ensure diver certification records are accurate.	Our review found very few instances of dates being incorrect (and in these cases, they were off by only a single day) and therefore we believe the record keeping for the population as a whole is likely to be fairly accurate.
Ensure pre-dive plans are completed prior to when they occur.	I found that pre-dive plans generally were created for dives that I reviewed.
Ensure dives are logged after they occur.	Dive logs are an especially important control as it provides an audit trail to ensure divers are getting their required number of dives annually and it shows what type of dives these

	<p>individuals are performing. One potential challenge is that because this information is self-reported by the diver, there is little way to ensure the information is accurate, or that it is logged at all. One imperfect way to check the accuracy of the dive logs is to compare pairs of dive logs of individuals who listed each other as dive buddies. Dive buddies should have logs that match as they are conducting identical dives. In reviewing the dive logs of 20 divers, we found that these dive logs generally did match. However, we did find several instances of dive buddies listing dates that were 1 day apart.</p>
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