APPENDIX D

HEALTH AND SAFETY PLAN/DIVE PLAN FOR CARLSBAD HYDROLOGIC UNIT SDRWQCB INVESTIGATIVE ORDER R9-2006-076 LAGOON TMDL MONITORING

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1.0 INTRODUCTION

The California Regional Water Quality Control Board, San Diego Region (SDRWQCB) has issued Investigation Order No. R9-2006-076 (IO) to the dischargers to the creeks and lagoons in San Diego County that are 303(d) listed for sediment, nutrients, TDS and bacteria. This IO requires collection of monitoring data for the development of Total Maximum Daily Loads (TMDLs) as authorized by the Clean Water Act (CWA).

The City of Encinitas is acting as the Lead agency among the Responsible Parties within the Carlsbad Hydrologic Unit (CHU), who are working together on a watershed basis to implement the IO for four lagoons; Loma Alta Slough, Buena Vista Lagoon, Agua Hedionda Lagoon, and San Elijo Lagoon. The IO Responsible Parties within the CHU include the cities of Carlsbad, Encinitas, Escondido, Oceanside, San Marcos, Solana Beach and Vista, the County of San Diego, Caltrans, and the City of Escondido Hale Avenue Resource Recovery Facility (HARRF).

Merkel & Associates, Inc. (M&A) has prepared this Health and Safety Plan/Dive Plan (HSP) in accordance with project requirements for conducting a TMDL monitoring program at four coastal lagoons located in San Diego County. This HSP covers field activities conducted by M&A, and shall be performed in accordance with all applicable portions of the federal standards (OSHA 29 CFR 1910 and USCG 46 CFR 197), California General Safety Orders (Title 8 Group 26 ART 152 and 153), and. Army Corps of Engineers EM 385 1-1.

1.1 PURPOSE

The purpose of this HSP is to define M&A's health and safety related planning process, requirements, and procedures to be used for the safe and compliant execution of work conducted under this IO.

1.2 SCOPE OF WORK

The project will require sampling the four lagoons located in north San Diego County (Figure 1). All field activities will be under the direct supervision of an M&A Task Manager and/or Chief Scientist. The field tasks that will be completed during the project include:

- In-situ measurement of water quality parameters
- Post-storm sediment samples
- Collection of receiving water samples

This HSP applies to all personnel who access the work area managed by M&A during field activities, including, but not limited to M&A employees and Federal, State, or local representatives.

1.3 IMPLEMENTATION OF THE HSP

The M&A Project Manager is responsible for implementing this HSP and will coordinate with the Diving Safety Officer, or On-Site Supervisor on all project-related health and safety

matters. All M&A personnel will be required to read and comply with the HSP and sign a HSP Compliance Agreement.

1.4 ALTERATION OF PLAN

If for any reason the HSP is altered in mission, depth, personnel, or equipment, the M&A Project Manager, Diving Safety Officer, or On-Site Supervisor shall be contacted and shall review any revision prior to actual operation.

2.0 SITE BACKGROUND AND SETTING

The coastal lagoons of San Diego County represent approximately one-third of the remaining estuarine acreage in Southern California and provide critical natural habitat for terrestrial and aquatic species. They serve as refuge, foraging areas, and breeding grounds for a number of threatened and endangered species as well as significant spawning and nursery habitats for commercial and non-commercial fish species. However, these lagoons are heavily influenced by their urbanized watersheds. Watershed runoff, coupled with reduced tidal influence from restricted inlets, has resulted in beneficial use impairments in many systems, including low dissolved oxygen, excessive algal growth, eutrophication, presence of pathogens, excessive sedimentation and suspended sediment. Santa Margarita Lagoon, Loma Alta Slough, Agua Hedionda Lagoon, Buena Vista Lagoon, San Elijo Lagoon, Los Peñasquitos Lagoon, and Famosa Slough have been added to the State's list of impaired waterbodies (303d list) for at least one of the following constituents: sediments, total dissolved solids, enteric bacteria, and/or nutrients. As a consequence of this listing, total maximum daily loads (TMDLs) must be developed for the critical constituents in each of the lagoons.

Setting the appropriate TMDLs must be based on an understanding the hydrodynamics, sources, loading, transport and cycling of constituents of interest. Dynamic simulation models are the best tools for determining load allocations. These models must simulate loads from the watersheds as well as fate and transport in the estuary or lagoon. Complete data required to develop these models are not currently available for Southern California coastal lagoons. Partial data exist for some lagoons and will be included where applicable. Thus, the purpose of the monitoring program is to address the principal data needs required to develop watershed loading and lagoon water quality models for the targeted contaminants of interest in the lagoons. These models will then be used for TMDL development and implementation in each of the lagoons. This program only involves four of the lagoons mentioned above, and include: Loma Alta Slough, Buena Vista Lagoon, Agua Hedionda Lagoon, and San Elijo Lagoon (Figure 1).

Access to lagoons will be by vessel (either motorized or non-motorized), or in the case of Loma Alta slough, by foot. Vessels may consist of flat-bottomed skiffs, pontoon-style vessel, kayak, or float tube. Each vessel will provide a platform for conducting all the necessary sampling including storing equipment.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

3.1 PERSONNEL RESPONSIBILITIES AND DIVE TEAM ASSIGNMENTS

Ultimate responsibility while on board the vessel is the vessel's captain. The vessel will have all safety equipment as per Coast Guard regulations regarding a charter vessel of opportunity (e.g., fire extinguishers, life jackets, flares, first aid kit). The captain will be responsible for briefing all passengers as to the location of the safety equipment on the vessel, emergency procedures, and ensuring that all passengers act in a safe manner while on board. If, in his judgment, conditions are unsafe for vessel or passengers, he may suggest options, seek safe anchorage, or return to port. Safety of personnel will not be compromised to conduct the survey.

The dive team will be comprised of M&A personnel presently certified by the M&A Diving Program that complies with M&A's Diving Safety Manual. Each diver must meet the requirements specified in this manual in order to dive on company projects. As defined by the manual, diving activities include skin diving, snorkeling, and diving with self-contained underwater breathing apparatus (SCUBA).

The dive team for this project will have three positions/functions with authority and responsibility: Onsite Health & Safety Coordinator, Divemaster, and Chief Scientist. These responsibilities are assigned as below, but may be reassigned on a daily basis depending on the personnel present and skills required.

- The Vessel Captain is responsible for ensuring a safe working environment on board the vessel. This includes maintaining and operating the vessel in a manner that is safe and consistent with M&A's Diving Safety Manual and Policy. The Captain has the authority to suspend or alter operations if, in his opinion, conditions are unsafe.

- The Chief Scientist is responsible for directing scientific operations. These include collection of sonar and biological data. Additional activities may include filming with 35-mm or digital still or underwater cameras.

- The Onsite Health & Safety Coordinator is responsible for monitoring onsite activities to ensure compliance by all divers and support personnel with appropriate Health & Safety procedures.

- The Divemaster is responsible for overseeing the technical aspects of dive operations and ensuring that general field activities are performed in a safe manner. He has the authority to suspend diving operations if, in his opinion, conditions are unsafe. Under emergency conditions he may alter provisions set forth in the M&A Diver Safety Manual, but only if the change will enhance personnel safety. He may also temporarily deny a diver permission to dive on the project.

Figure 1. Project Area and Location of Hospitals

The following shows the present delegation of personnel responsibilities. These responsibilities may change during the course of this project depending on job requirements and available personnel.

Name	Responsibility
Robert Mooney	Vessel Captain, Chief Scientist, Biologist, Diver
Rachel Woodfield	Vessel Captain, Divemaster, Biologist, Diver
Lawrence Honma	Vessel Captain, Divemaster, H&S Coordinator, Chief Scientist, Diver
James Schacher	Vessel Captain, Divemaster, H&S Coordinator, Biologist, Diver
Seth Jones	Divemaster, Biologist, Diver
Geoff Daly	Divemaster, Biologist, Diver
Keith Merkel	Divemaster, Biologist, Diver
Jimmy Reeves	Biologist, Diver

3.2 DIVE PLAN/HEALTH AND SAFETY PLAN REVIEW

The M&A Chief Diving Supervisor, Project Manager, and Principal will review this HSP. The responsible Onsite Health & Safety Coordinator will verify that all individuals involved in the operation have read and understood this HSP before they participate. M&A personnel will sign the attached certification page signifying they have read, understood, and accepted this plan. A copy of this HSP and the M&A Diver Safety Manual (5/19/99) will be available to all field personnel onsite during all diving activities

4.0 FIELD OPERATIONS

Field operations involve three different aspects of the program: continuous monitoring, sediment collection, and water collection.

Continuous monitoring will be conducted via data sondes, which will attached to fixed moorings below the water. Divers will generally be required to retrieve the data sondes to conduct data downloads and maintenance, and also to replace the units onto the moorings.

Sediment collection will require the use of ponar (or similar) grab to collect surficial sediment samples at various locations in each lagoon. Sediment samples will be homogenized, transferred to sample containers, and placed in cool ice chest for delivery to the lab for analysis.

Surface water samples will be collected from various locations within each lagoon. Samples will be collected by placing the sample container below the water surface, capping when full, and retrieving the container after capping. All samples will be placed in cool ice chest for delivery to labs for analysis

4.1 TECHNIQUE SELECTION AND RATIONALE

SCUBA diving is the methods of choice for the activities as the expected maximum diving depth is approximately 12 feet (well within depth restrictions for use of this equipment), the sample locations are accessible by vessel, and use of this equipment allows the scientists to collect additional information. SCUBA diving equipment is easily transported, minimizing special handling problems and elaborate support. In addition, visual descriptions of geological and biological conditions, which are often important in the understanding of the situation at a site, are possible with divers. This effort is considered safe for all personnel within the context of our present knowledge of the existing conditions.

Based on previous knowledge of the survey area and the planned activities, normal SCUBA diving equipment will provide the proper level of protection for this field survey and divers will not be encapsulated. This is because it is not expected that divers will come into direct contact with either contaminated sediments or undiluted contaminated water based on the observations and results from previous site visits. The survey area has few sources of contamination, thus contact with contaminated sediments or water is unlikely. Normal gear for both types of diving will likely include mask, snorkel (skin diving), fins, wetsuit for thermal protection and from rocks, and underwater breathing equipment (SCUBA). Divers will also wear gloves for skin protection.

4.2 DIVING EQUIPMENT, SUPPLIES, AND INFORMATION

The equipment is selected to protect personnel from physical hazards and temperature extremes.

4.2.1 Dive Suits

Water temperatures at the project area are expected to range from 52 to 68 degrees F. All divers will wear appropriate neoprene dive gear (typically 7mm) and will be instructed to regain body warmth during surface intervals and to avoid diving if their bodies become too cold.

4.2.2 Dive Masks

Regular snorkeling or SCUBA equipment will be used by divers (i.e., mask and snorkel).

4.2.3 Other Diving Equipment

Divers will use aluminum SCUBA tanks that hold approximately 80 cubic feet of volume, a regulator with an octopus, depth and pressure gauge or dive computer, buoyancy compensator, releasable weight belt, dive knife, wet suit, fins and gloves.

4.2.4 Breathing Gas Supply Requirements and Air Certification

Divers will utilize a mixed atmospheric gas supply maintained in aluminum 80 SCUBA tanks. SCUBA tanks will be filled at Underwater Schools of America, a dive shop that has its air systems certified quarterly, most recently on July 2007.

4.2.5 Diving Safety Equipment

The following diving safety equipment will be supplied by the M&A Diving Program. Prior to leaving for the dive site, the Divemaster will ensure that this equipment is present and in working order.

- First aid kit
- Bag type manual resuscitator with transparent mask and tubing, or One-way valve oral breathing tube
- First aid handbook
- Dive flags - Alpha (blue and white) and recreational (red with a diagonal white stripe)
- Backup dive gear (regulator, mask, snorkel, fins, dive knife, BC, etc.)
- Temporary floats for marking hazards
- Canister fog horn and whistles
- Waterproof bags
- Baking soda, vinegar, and meat tenderizer (MSG)
- Dive Plan/Health and Safety Plan
- M&A Diver Safety Manual

4.2.6 Diver Support

Dive support will consist of the vessel operators, dive supervisor, and a standby diver, equipped with dive gear and ready to enter the water if the need arises to render aid. Supplementary air and first aid will be present on the vessel. A satellite/cell phone and/or VHF radio will be available for emergency contact.

Equipment available will include all of the above referenced SCUBA diving equipment, dive support equipment, and recommended first aid supplies listed in Table 1. Other equipment will include measuring tapes, cameras, and recordkeeping supplies.

4.2.7 Diving Mode

All dives will be conducted using standard SCUBA gear and equipment and will comply with the U.S. Navy no-decompression dive limits. The majority of the dives will be spent at depths less than 100 feet. Maximum bottom time will be 60 minutes. Each diver will be equipped with an octopus to provide a backup air supply.

4.2.8 Lockout/Tagout Procedures

The work being conducted under this dive plan will not require the use of any lockout/tagout procedures.

4.2.9 Dive Operation Schedule

The sampling events are scheduled from January to February 2007. The survey will be conducted between the hours of 0700 and 1700. It is anticipated that it will take approximately 8 hours to complete the survey.

4.2.10 Personal Health and Emergency Information

Information on medical conditions that may affect emergency procedures such as allergies to natural sources and medications, and medications being taken will be supplied by each individual to the Divemaster in writing prior to the beginning of field operations. These may be sealed for privacy, if so desired. An emergency contact person and phone number will be included with this information.

Divers with known sensitivities must have the appropriate prescriptions from their doctor. These prescriptions must be clearly labeled with the divers name and the situations for proper use, and kept in the onsite first aid kit.

4.2.11 Training

All divers hold, at a minimum, an Open Water Diver I certification (or its equivalent) from an accredited SCUBA agency. All team members are currently employed by M&A, and under company diving regulations, have passed a diving medical examination, and had an extensive dive protocol review prior to start of work. Finally, all divers hold Red Cross certifications in basic life saving/CPR and basic first aid.

4.3 VERIFICATION OF EMERGENCY NUMBERS

Prior to departure, the Divemaster will confirm all emergency phone numbers applicable to the planned activities and identify the most efficient method of establishing contact (i.e., marine radio, satellite/cellular phone). These activities will be completed before diving operations begin.

4.4 PRE-DEPARTURE PROCEDURES

Prior to leaving the dock, the boat captain will conduct a general boat safety briefing.

4.5 PRE-DIVE PROCEDURES

4.5.1 Hazard Communication

The Chief Scientist, Divemaster, and On-site Health & Safety Coordinator will meet before any field activities commence to discuss the purpose of the operation, safety precautions, and sample procedures.

At the start of each diving day, the diving team will meet to discuss the day's activities and each individual will be provided an opportunity for input. The Chief Scientist will review the tasks planned for the day to ensure that all understand the planned activities; the Divemaster will review the HSP with emphasis on components that apply directly to the planned activities, discuss the day's specific HSP profile, and discuss specific dive hazards; and the On-Site Health & Safety Coordinator will discuss the pertinent Health & Safety issues for the day, anticipated problems, problems from the previous day's activities, and emergency procedures specific to the site. The Divemaster will coordinate diving operations with ongoing activities in the area to avoid interference and potential hazardous situations.

4.5.2 Safety Program

The most important safety measure is to ensure that all personnel are healthy and capable of performing all tasks required during the course of the day's activities. This is particularly important for divers. Congested sinuses or chest are counter-indicative for diving operations. Occurrence of either of these conditions may require a delay of the dive or reassignment of duties for the dive team. Congested sinuses may preclude pressure equalization of the middle ear during a dive, leading to damage to the ear and possible loss of hearing. Chest congestion may lead to pneumothorax and a cephalic embolism, if the person dives.

Each day, prior to leaving for the dive site, the Divemaster will check the safety equipment to ensure the necessary equipment is present and operational. If equipment is missing or not working, the Divemaster and On-site Health and Safety Coordinator will evaluate the importance of the equipment to the safety of the personnel for the day's activities and decide whether the activities will proceed or have to be postponed.

A safety check of gear will be made before entering the water for each dive. This includes all buckles and straps, regulator function, the integrity of the masks and all hoses, and seals and zippers on the diving suits. Each diver is responsible for inspecting their own gear. The Divemaster will inspect all company-owned gear.

The “buddy system” will be used during the performance of site activities for the project. No one will be allowed to work alone or without surveillance. The buddy system requires the field personnel to:

- Provide his/her co-worker with assistance;
- Observe his/her co-worker for signs of chemical, heat or cold exposure;
- Periodically check the integrity of his/her co-worker equipment; and
- Notify supervisor or others if emergency help is needed.

5.0 HAZARD ASSESSMENT OF FIELD OPERATIONS

The field operations will occur at four San Diego County coastal lagoons. Most activities are boat oriented, with diving conducted a vessel. Some locations will be accessed on foot. Once on site, the weather (especially lightning storms or strong winds), strong currents (above one-half to one knot, depending on the diver), wave action (surge strong enough to make footing dangerous while entering or leaving the water), water clarity (unknown hazards), and ship traffic will be monitored. If any of these appear to be a problem initially or increase to problematic levels, the H&S Supervisor and/or Divemaster, after discussing the safety and feasibility of the operation with the participating divers, will decide whether the operation will or will not proceed, or if activities need to be altered to ensure diver safety.

5.1 PHYSICAL HAZARDS AND CONTROL MEASURES

The primary physical hazards that may be encountered are changes in sea conditions, heavy lifting, slips, trips, and falls (resulting in cuts, scrapes, and bruises), sunburn, hypothermia, dehydration, contact with dangerous marine life, interference from other activities, contact with boats or ships, and cables from the survey equipment. To minimize these hazards, the following will be done.

- Divers will monitor the conditions around them. If sea conditions, water clarity, or currents become worse and create situations that compromise diver safety, the divers will be directed to leave the water.

- Divers will enter and leave the water at safe speeds. This is particularly important, as they will be wearing heavy and awkward equipment.

- Lifting of any heavy equipment (greater than 50 lbs) will require two individuals.

- All field personnel should apply sunscreen several times each day to protect themselves from sunburn.

- Divers will monitor themselves and others for symptoms of hypothermia. Symptoms include slowing of pace, drowsiness, fatigue, stumbling, thickness of speech, amnesia, poor judgment, hallucinations, blueness of skin (cyanosis), dilation (enlargement) of pupils, and decreased heart and respiration rate.

- Cold water and Gatorade will be available at all times. Twelve to 16 ounces of cool fluids should be consumed during each break or surface interval. All field personnel, but especially divers, will be encouraged to maintain a sufficient intake of fluids prior to diving to counter the effects of sweating and fluid loss through the lungs whenever using SCUBA. This is particularly important to divers as inadequate consumption of fluids is an important factor in the development or severity of decompression sickness (Bends or DCS).

- Dive flags and the presence of a boat, if used, will help to eliminate interactions with other boats. If a boat enters the work area, divers should remain on the bottom until the boat stops or leaves the area. Divers will surface to assess the situation and decide if it is safe to continue diving activities.

- No divers will fly in an airplane within 24 hours of diving at any of the above sites.

- When conducting the survey and while the towfish is deployed, an individual will monitor the cable that is remaining on the deck of the vessel, as well as, the cable in the water to ensure that no other individual becomes entangled in the cable and that the cable remains clear of the vessel propeller.

5.2 BIOLOGICAL HAZARDS

Few potential biological hazards are present within the lagoons. Jellyfish and venomous fishes inhabit the marine habitat adjacent to the lagoons, as well as, possible sewage input. The following section provides some general guidelines to be followed in the event of encounters with these creatures or stiuations. Dive suits will provide protection from many of the possible biological threats. They will not, however, protect from fish spines or teeth. Responses in case of contact are reviewed in Section 6.0.

5.2.1 Jellyfish Stings

The marine environment adjacent to the lagoons is known to be inhabited by jellyfish (mainly brown or black jelly fish [*Chrysaora* spp.] and purple jellyfish [*Pelagia noctiluca*]). Jellyfish stings are first distinguished by a pain or prickly sensation, followed by an itchy rash blistering, and finally swelling from histamine release. Jellyfish stings from these species are not fatal, but may result in allergic reactions in some individuals.

5.2.2 Venomous Fishes

Venomous fishes (including stingrays and scorpionfish) are known to inhabit the waters within the lagoons. Stingrays have spines along the dorsal edge of their tail. They cause tissue damage by whipping their tail into a vertical position. Victims typically receive horizontal stab wounds in the foot or lower leg when the tail is whipped forward and up into a vertical position. The resulting wounds are prone to infection. Scorpionfish, have spines in the fore dorsal, ventral, and anal fins that, similar to the stingrays, have a venom that can be injected when the spines penetrate the diver's skin. First aid for all of these animal injuries is similar. Puncture wounds from these spines are painful but seldom life-threatening.

6.0 PROTOCOL FOR HAZARD EMERGENCIES AND INCIDENTS

6.1 DECOMPRESSION SICKNESS (BENDS)

Signs and symptoms of decompression sickness (DCS) can be skin rashes, extreme fatigue, joint pain, visual disturbances, balance disturbances, breathing difficulties, lack of strength, numbness, paralysis, unconsciousness and death. Symptoms associated with impairment of the central nervous system indicate a serious injury. There can be joint pain, typically in the elbow or knee.

Recompression is the only effective treatment for severe DCS, although rest and oxygen (increasing the percentage of oxygen in the air being breathed via an oxygen mask) applied to lighter cases can be effective. Normally this is carried out in a recompression chamber. In diving, a high-risk alternative is in-water recompression.

6.2 HYPOTHERMIA

Should a diver develop signs or symptoms of hypothermia, measures need to be implemented immediately to reduce heat loss, and includes shelter victim from wind and weather; insulate victim from the ground; change wet clothing; put on windproof, waterproof gear; increase exercise, if possible; put victim in pre-warmed sleeping bag or blankets; give hot drinks, followed by candy or other high-sugar foods; and apply heat (warm water bottles, heat packs) to neck, armpits, and groin.

6.3 JELLYFISH STINGS

In the event someone is stung, the following should be done.

- Quickly determine whether the victim is experiencing a serious reaction to the jellyfish sting.

- If the victim is showing no severe local reaction, has no general symptoms, and has no history of allergic reaction, rinse the affected area with seawater - do not use fresh water, because in some cases it stimulates firing of additional nematocysts. Soak the injury with vinegar or cover with meat tenderizer (MSG) or baking soda, and remove any large tentacles with forceps - don't try to remove them with bare hands. Next rinse the area well with salt water. If pain persists, when possible, apply shaving cream and gently shave the affected area. This helps to remove any remaining nematocyst cells. Soak the area again in vinegar, and then apply a thin coating of hydrocortisone lotion or cream. Keep the area clean and dry. Watch for allergic symptoms or signs of infection. If either appears, seek medical care immediately.

- If the victim has a severe local reaction, or a history of allergic reactions, give an antihistamine such as Benadryl or use an epinephrine inhaler. Then rinse the area with seawater to remove any residual tentacles.

- Do not give anything by mouth if the victim is unconscious.

- Check breathing and pulse often. If either stops, administer artificial respiration or CPR. Tie a piece of cloth 2 to 5 inches above the sting site, if possible, and apply a cold compress. Transport the victim to the nearest medical clinic immediately. Keep the victim quiet and calm. Attempt to keep the sting site below the level of the heart. Loosen the cloth band for 15 seconds every 10 minutes. Remove the cloth band after 30 minutes. Continue to monitor breathing and pulse.

6.4 VENOMOUS FISHES

Should a diver be injured by a stingray, scorpionfish, or other fish with poisonous spines, keep the victim quiet (activity helps to circulate the venom) and flush the wound with clean, fresh water. Next, soak the wound in non-scalding hot water (temperature should not exceed 113°F) for 30 to 60 minutes. Venom proteins are unstable compounds and are easily denatured by heat. After soaking the wound, attempt to remove any barbs or spines remaining, provided they are not in the chest or neck, and they are easily removable. Note: retropointed barbs may tear on the way out, but the victim will feel more comfortable in the long run if the barb is removed. Never tape or sew the wound shut unless it is absolutely necessary to stop bleeding. Transport the victim to the nearest medical clinic as soon as possible.

6.5 WATER-BORNE DISEASE ORGANISMS

Divers exposed to sewage contamination should thoroughly wash all exposed areas with soap and clean fresh water as soon as possible. If any symptoms (e.g., flu, lethargy, etc.) occur, a physician should be consulted immediately.

7.0 EMERGENCY PROCEDURES

If a possible medical emergency occurs, the field operation will be stopped to determine the nature and most probable cause of the emergency. If it is determined that an emergency exists, one person will be designated to handle communications. Unless otherwise indicated, this will be the Divemaster. Contact with emergency medical personnel will be made by telephone or radio using numbers presented in Table 2. The choice of first contact will depend on the type and severity of the accident. **If the accident is related directly to diving (i. e., decompression sickness [DCS or bends] or an embolism), the first contact will be with the Diver's Alert Network (DAN).** If DAN cannot be reached immediately, the Catalina Island recompression chamber will be contacted. **If the accident involves drowning, severe bleeding, or other life-threatening situation, the first call will be to the U. S. Coast Guard.**

At the same time, the dive team will implement **onsite emergency measures**. These include the standard list of procedures taught in basic CPR and First Aid.

- Determine the needs of the victim
- Maintain breathing and heart function of the victim
- Make the victim as comfortable as possible until help arrives

If the victim is transferred from the site, the list of allergies, medications, and emergency contact phone numbers will be placed in a waterproof bag along with information on the victim's diving activities (dive depth, underwater times, surface intervals, etc.) and other important information (e.g., DAN Travel Assist card, etc.) and taped to the victim, preferably on the chest.

As time permits, the Divemaster will notify the M&A Corporate Office in San Diego (the telephone number is listed in Table 2) that an emergency has occurred and provide a description of the emergency procedures being followed.

The telephone numbers for these individuals and for additional individuals who must be apprised of the emergency are listed in Table 2.

Summary of Physical and Operational Safety Hazards

Table 1 summarizes physical and operational safety hazards and provides safe work practices.

Table 1. Summary of physical and operational safety hazards

OPERATIONAL SAFETY HAZARDS	CONTROL OR PROTECTIVE MEASURES
Physical hazards associated with heavy equipment	• Equipment will be inspected on a daily basis by the owner/operator; daily logs will be maintained. All discrepancies shall be corrected prior to placing the equipment in service. • Core barrels shall not be left balancing, leaning, or otherwise unsecured. • Increase communication effectiveness with operators using hand signals, radios (as appropriate), and line-of-sight confirmation.
Entanglement in rotating or moving equipment	• Equipment shall not be operated without guards. • Loose-fitting or dangling clothes, hair, and jewelry are prohibited. • Stay clear of rotating equipment and pinch points, such as cables and pulleys. • Do not reach into any rotating machinery. • The SHSC will be aware of the location and proper operation of emergency shut-down equipment (kill-switches, etc.), and procedures. • Site staff will not stabilize moving equipment with hands.
Back injuries due to improper lifting	• Workers will use proper lifting techniques, lifting with the legs and not the back, providing this posture brings the load closure to the body. Loads >50 lbs. require a second person or mechanical device. • Whenever possible, mechanical devices such as drum dollies, hand trucks, winches, and tool hoists should be used to lift or move heavy loads.
Slips, trips, and falls	• Clear work area of obstructions and debris prior to commencement of site work. • Keep stairs and immediate work areas clear; do not allow oil/grease and excessive mud or water to accumulate in these areas. • Approved fall protection with shock absorbing lines shall be provided and its use required for each employee working >6 ft. above the platform or main work deck. Work at this height is prohibited unless equipped with an appropriate ladder intended for use on such equipment. • Wherever possible, slip, trip, and fall hazards will be eliminated or clearly identified with caution tape, barricades, or equivalent means.
Noise	• Hearing protection shall be worn during operation of heavy equipment, pneumatic power tools, steam cleaners, and other equipment generating >85 dBA. • See also Hearing Conservation Program SOP in Volume VI of the Corporate H&S Manual.

Table 1. Summary of physical and operational safety hazards (continued)

OPERATIONAL SAFETY HAZARDS	CONTROL OR PROTECTIVE MEASURES
Biological agents	• Workers will not be exposed to infectious agents or wastes with the current scope of work; however, responders to first-aid incidents may contact bloodborne pathogens and will follow the Bloodborne Pathogen Exposure Control Plan in this HSP. • Personnel with known reactions to insect bites or stings should be identified during the "kickoff" meeting so that the appropriate emergency treatment can be made available onsite. Locations of any known bite or sting medication in the employee's possession will be identified daily.
Electrocution	• Lock-out and tag-out controls that are to be deactivated for maintenance/work on energized or de-energized equipment or circuits. • Extension cords, power/electric tools, pumps, floodlights, and generators that are not doubly insulated must have functional grounding conductors. • Ground fault circuit interrupters (GFCIs) must be used on all 120-volt, 120-amp circuits. • The minimum distance required between heavy equipment and overhead power lines <50 kv is 15 ft., unless the lines have been de-energized and visibly grounded at the point of work, or equipped with insulated barriers to prevent physical contact. • Site work will cease in the event of imminent lightning storms.
Fire and explosion	• ABC fire extinguishers must be accessible in the work area. • Flammables must be stored in UL- and OSHA- approved safety cans with spark arrestors. Plastic containers are prohibited. • Flammable containers must be stored >50 ft. from heavy equipment; portable (flammable) tanks must be >100 ft. from heavy equipment. • The exhausts of equipment powered by internal combustion engines will be located well away from flammables and combustibles. • Operations that pose fire hazards should be conspicuously marked: "No Smoking or Open Flames." • Compressed gases must be stored and used in a safe manner. • Equipment, e.g., generators, shall not be refueled while in operation, or while hot enough to ignite fuel vapors. Such equipment will be adequately bonded and grounded.

APPROVALS

Principal: Keith Merkel, Merkel & Associates, Inc.

Signature:_____ **Date:**_____

Project Manager: Lawrence Honma, Merkel & Associates, Inc.

Signature:_____ **Date:**_____

Diving Safety Official: James Schacher, Merkel & Associates, Inc.

Signature:_____ **Date:**_____

Table 2. Recommended First Aid Supplies

OXYGEN AND RELATED ITEMS

1. Oxygen supply adequate for open circuit use from the dive site to the chamber location. For calculation, the quantity per diver required is fifty cubic feet per hour of travel to the chamber.
2. Pressure powered resuscitator.
3. Ambu bag with reservoir, oral nasal mask - pocket mask or equivalent.
4. Oral airways in adult sizes 4 and 5.

CUT AND BURN ITEMS

1.	Inflatable splints	2 sizes
2.	Triangular bandages	2 each
3.	Sterile 4x4 bandages	1 dozen
4.	Gauze wrap, 2 inches wide	4 each
5.	Ace bandage, 3 inches wide	6 each
6.	Bandaids, standard and large size Assorted	
7.	Butterfly bandages	1 dozen
8.	Betadine, iodine, or other disinfecting treatment solution	1 - bottle
9.	Gel burn dressings	4 each
10.	ABD pads, 5" x 9"	4 each
11.	Elastic tourniquets	4 each

BITE, STING AND PAIN ITEMS

1.	Bee sting kit	2 applications
2.	Benadryl, 25 mg	50 each
3.	Darvocet N-100 or Tylenol with Codeine 30mg	25 each
4.	Aspirin (not aspirin substitute)	50 each
5.	Sudafed, 10mg	50 each

MISC. ITEMS

1.	Lidocaine, 1% prepackaged in Tubex injection sets	1 dozen
2.	Sterile forceps	1 each
3.	Sterile 12 gauge needles	1 dozen
4.	Sterile eye wash	2 applications
5.	Floatable backboard	1 each

The Dive Safety Officer will ensure that the First Aid kit is adequately supplied for all diving operations.

Table 3. Emergency Aid and Evacuation Contacts

<table>
<tr><td colspan="3">EMERGENCY RESPONSE NETWORK NUMBER - 911
Project Name: Carlsbad Lagoons TMDL Project Dive Location: San Diego County Dates of Operation: October 2007 to October 2008</td></tr>
<tr><td>HOSPITALS:

Tri-City Medical Center
4002 Vista Way
Oceanside, CA
760-724-8411

Scripps Memorial Hospital
354 Santa Fe Dr
Encinitas, CA
760-753-6501</td><td>EMERGENCY RESPONSE DIVE UNIT:

DIVERS ALERT NETWORK (DAN)
(919) 684-8111 Emergencies Only
(919) 684-2948 Business/Information</td><td>RECOMPRESSION CHAMBERS:
PRIMARY:
UCSD Medical Center (619) 543-6737

SECONDARY:
Ballast Point (619) 553-1011</td></tr>
<tr><td>U.S. COAST GUARD RESCUE ASSISTANCE:

PRIMARY: 911

SECONDARY: Coast Guard (619) 295-3121

VHF FREQUENCY: Ch 16 VHF FM/ 2182 KHz AM</td><td>DIVE TEAM EMERGENCY CONTACTS:

Diver: Contact: Telephone:

Lawrence Honma Lisa Honma (858) 693-1534
Robert Mooney Joanna Mooney (858) 352-4337
Seth Jones Howard Jones (541) 753-7609
Geoff Daly Pam Daly (805) 527-9558
Keith Merkel Barbara Merkel (619) 445-6297
Rachel Woodfield Jeff Woodfield (760) 439-3900
James Schacher Bruce Tait (760)-433-1166</td><td>M&A DIVE PHYSICIAN:

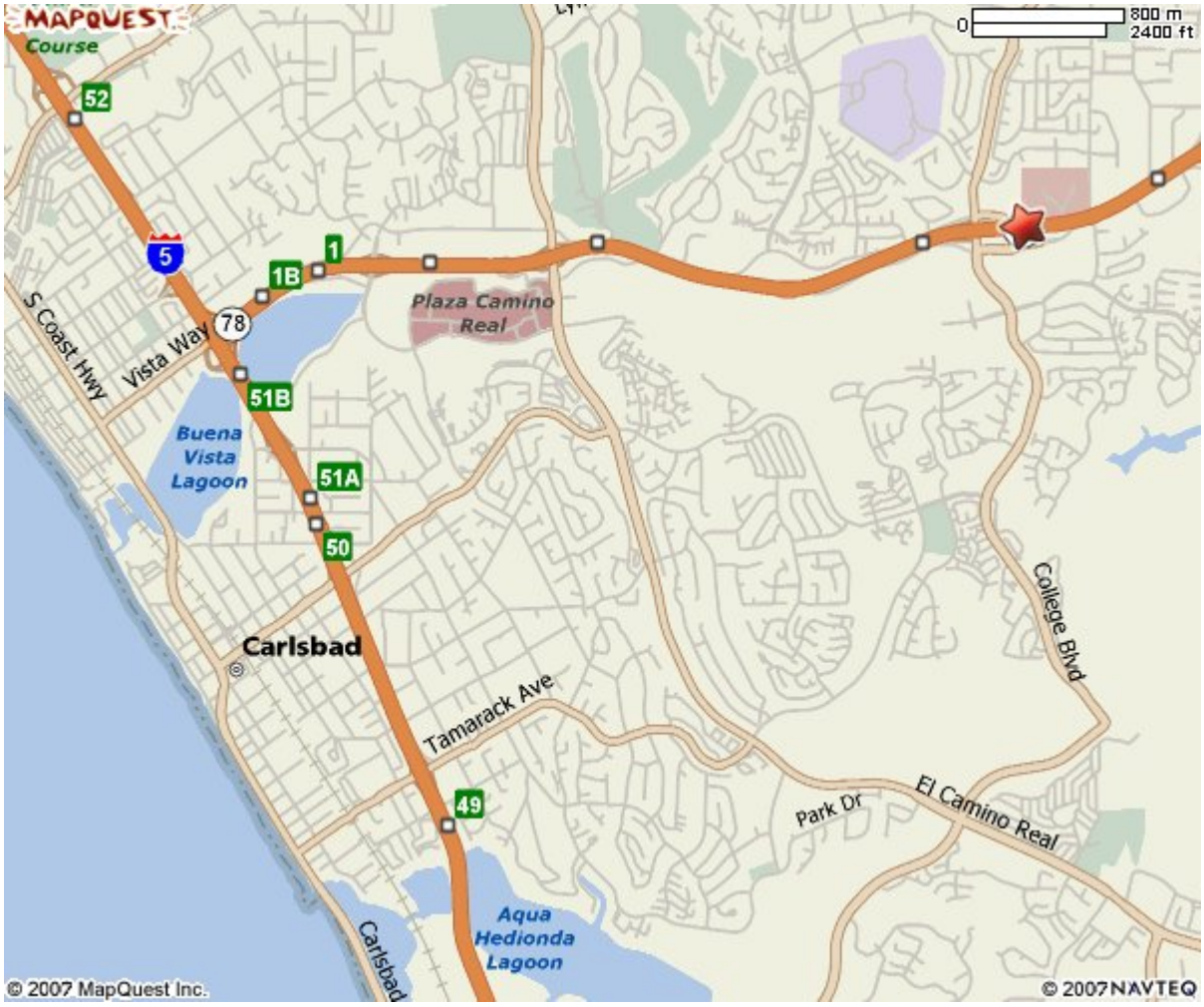
Dr. Pohl
Dr. Young
Mission Valley Medical Clinic
5333 Mission Center Road, Suite 100
San Diego, CA 92108
(619) 295-3355</td></tr>
<tr><td>RADIO COMMUNICATIONS:

Cellular: 858-229-1444

VHF Channel Number: 16</td><td colspan="2">OTHER :
M&A Office: (858) 560-5465</td></tr>
</table>

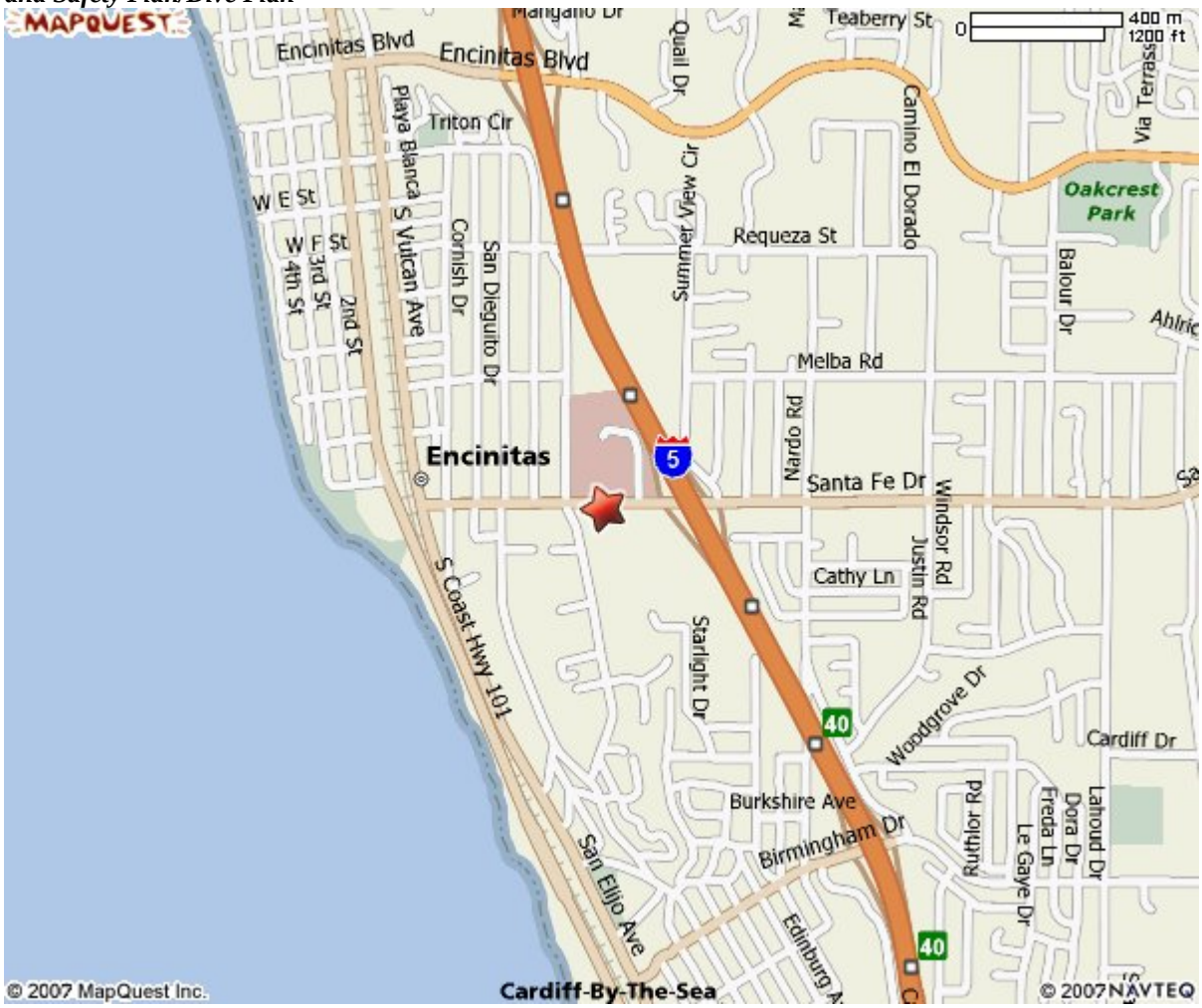
MAP TO HOSPITAL

Although we may be on a vessel, will be adjacent to land-based facilities, therefore we will contact local EMS (911) in the event of an emergency. We will rely on EMS for transport to a medical facility.

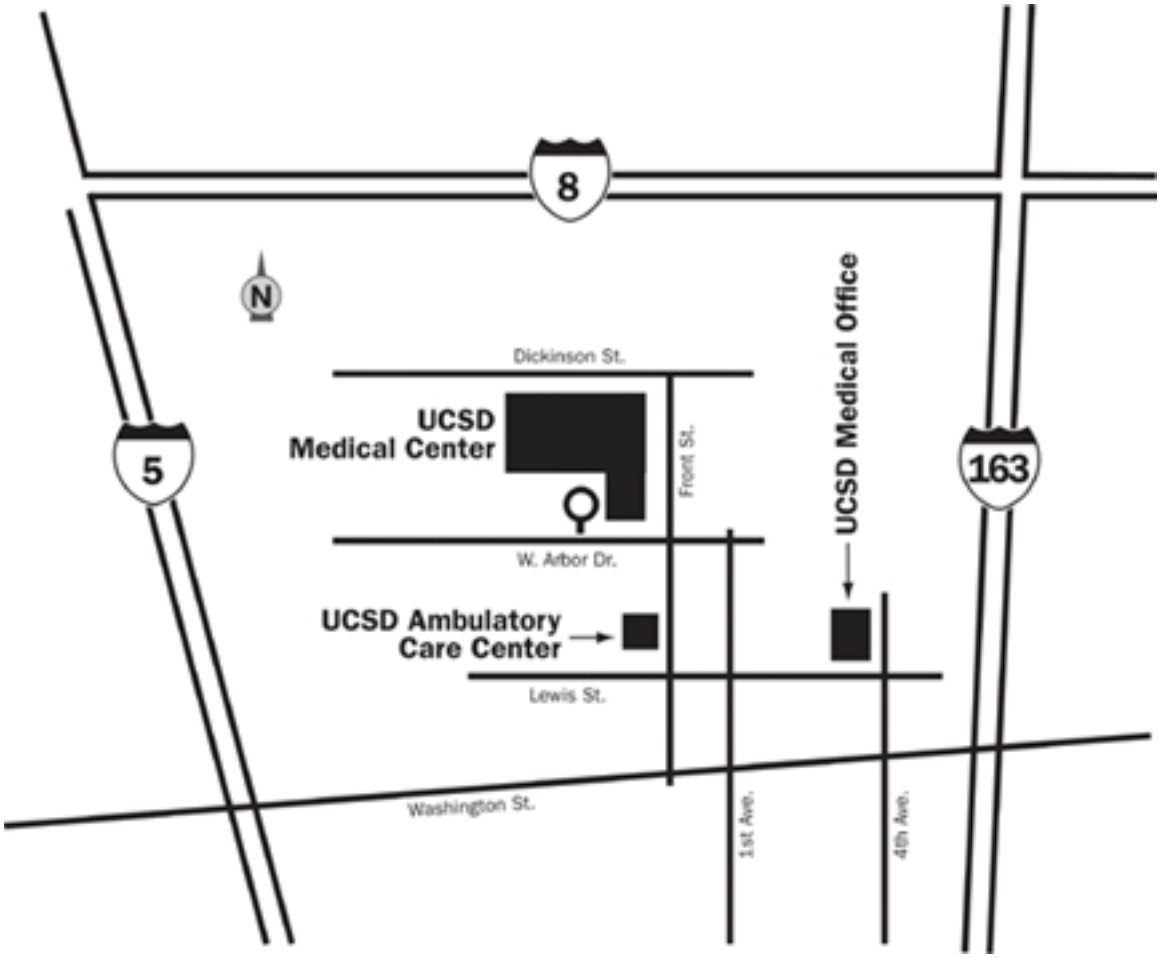


To Tri-City Medical Center:
From I-5, head east on highway 78, exit College Blvd, go north to Vista Way, turn right on Vista Way. Hospital located on north side of Vista Way

4002 Vista Way, Oceanside, CA
760-724-8411



To Scripps Memorial Hospital:
From I-5, exit Santa Fe exit, go west. Hospital located on north side of Santa Fe adjacent to I-5.
354 Santa Fe Dr, Encinitas, CA
760-753-6501



To Medical Center or Ambulatory Care Center (ACC)

From I-5: Exit on Washington Street and turn left (East). Turn left on First venue, then turn left on W. Arbor Drive. Drive past the Medical Center, directly into the parking garage at the end of W. Arbor Drive.

From SR-163: If you are coming Southbound, exit on Washington Street West. If you are coming Northbound, exit on Washington Street (which will take you eastward), and then make a U-turn so that you are headed West. Turn right on First Avenue, then turn left on W. Arbor Drive. Go past the Medical Center, directly into the parking garage at the end of W. Arbor Drive.

HEALTH AND SAFETY PLAN/ DIVE PLAN CERTIFICATION

CARLSBAD LAGOON TMDL MONITORING

This Health and Safety Plan/Dive Plan covers diving and other activities for monitoring San Diego County coastal lagoons. Sampling is scheduled from October 2007 to October 2008. I have had the opportunity to read and ask questions about this Health and Safety Plan/Dive Plan. My signature indicates that I understand the procedures and restrictions of this plan and agree to abide by them.

Signature	Printed Name	Company	Date