

NARRATIVE SUMMARY

Establishment Name SEA WORLD	Inspection Number 307035774
Management Contacted: Buddy Burton Alan Garver	Title Director of Safety Curator, Animal Training

Information on Injured Covered by Worker's Compensation Yes No

EE #	Name, Address and Phone Number	Occupation
1	Kenneth "Petey" Peters [REDACTED]	Animal Trainer/Assistant Curator

Witness Names(s) and Title * Check box preceding name if confidentiality is given.

EE #	Names and Title(s)	Address	Phone No.	Signed Statement? Y/N
2	Tucker Petrzelka Supervisor/Trainer	[REDACTED]	[REDACTED]	N
3	Lindy Fordem Whale Trainer	[REDACTED]	[REDACTED]	N
4	Matt Fripp Senior Trainer	[REDACTED]	[REDACTED]	N
5	John Stewart Senior Trainer	[REDACTED]	[REDACTED]	N
6	Brian Rokeach Senior Trainer	[REDACTED]	[REDACTED]	N

Summary:

On Wednesday, November 29, 2006 at approximately 4:45 PM, a 39 year-old animal trainer working at a marine animal park in San Diego suffered serious injury when he was bit and dragged underwater by a killer whale during a regular performance. The regular employee of the employer suffered puncture wounds to both feet and a broken metatarsal in his left foot. The Division was notified of the accident by the employer on 11/30/06 at 8:53 AM. I was assigned by the District Manager to investigate the accident on 11/30/06 at 9 AM. The opening conference was held with the employer on 11/30/06, at approximately 10 AM and an inspection of the facility was conducted at that time. The accident site and relevant equipment were inspected, photos taken and records were reviewed. Witnesses were interviewed, and the employer's video of the attack was also viewed. Additional amateur video and broadcast news reports of the accident were also available on the internet. The accident victim was interviewed at his residence on 12/5/06. Other visits were made on 12/7 and 12/20 for additional information gathering purposes. Two other interviews were made by phone on 2/13/07.

There was a single employee seriously injured in the accident. The accident victim was admitted to UCSD Medical center where he underwent surgery to repair the broken foot and antibiotics to forestall infection of the bite wounds. The employee was hospitalized for three days, and was released at around 11 AM on 12/1/06.

ABOUT THE EMPLOYER AND THE WORKSITE

The worksite where the accident occurred is a marine animal amusement park that has live shows and exhibits with killer whales, dolphins, sea lions and other ocean animals, as well as thrill rides, other live shows, gift stores and concessions. The employees (specifically animal trainers) in the Shamu Stadium show normally start the work day around 9 am and work until 6 pm, but all of the trainers also work different shifts depending on the seasons and the shows. The number of shows with the killer whales in the summer is 6 to 7 shows per day, and in the winter it is reduced to as few as two shows per day. In addition to the regular shows the whales and their trainers are also called upon to do special events such as the "Dine with Shamu" and "Photo with Shamu" with park visitors, for fellow park employees as incentives, and VIP guests. There are 25 male and female trainers working with the killer whales. All but two of the trainers are approved for "water work" where they are allowed to be in the water with the killer whales. There are also different levels of water work that require additional training and approvals, with more advanced tricks or "behaviors" requiring higher levels of expertise from the trainers. Behaviors that the killer whales perform with a trainer in the water are called "wet" versus "dry" behaviors that are performed with the trainer on the stage or slide-outs. Wet behaviors are supposed to only be performed in the presence of one or more "spotters".

The killer whale pool area consists of four regular holding pools and a smaller medical pool. Pool "A" is the main performance pool and is part of Shamu Stadium (See Facility Layout). Shamu Stadium includes the main stage area, a slide-out directly across the pool from the stage, and outdoor stadium type seating that circles the pool. A slide-out is a part of the pool that has a shallow, gently sloped area where the whales can come up out of the water, but is only a foot or so deep in the water. The slide-out area on the bleacher side of the main pool also has an emergency net which can be deployed into the pool by the trainers if needed. The bleachers have a capacity of approximately 5,500 seats and are closed to the public except during the show.

The main pool "A" is a half circle pool approximately 120 feet long by 80 feet wide (from the stage to the slide-out) and it is 36 feet deep. All of the pools are kept at a water temperature of 57 to 58 degrees F. The main stage also has a slide-out area for the whales to come up on stage, and a back-stage area where the trainers not performing in the show can watch and monitor the show without being seen by the public. The main stage has two large cooler containers for buckets of fish (used for positive reinforcement rewards for the whales) and other props used in the show. Back stage there is an emergency call back device, which sends out an audible underwater signal designed to bring the whale back to the main stage as a back-up to the other signals used by the trainers on stage at the time. The call back device includes both a portable, hand-held module as well as a fixed keypad which serves the same function. One trainer is required to be on the call back device at all times during water work. They also have an emergency phone, emergency alarm button, and a scuba locker. The scuba locker contains regular underwater scuba gear, and two emergency packs called "scubacuzzi" which are portable packs with an emergency air supply that can be thrown to someone in trouble in the pool. The scubacuzzi is bright fluorescent green and floats on top of the water when thrown out to a distressed swimmer. There is also a timer back stage and a monitor which shows the stage view and the pool from one of the permanent cameras in the stadium. The stage also includes several big screen monitors which

display the show and other special effects to the audience during the show. There are a total of six cameras in the stadium, including an overhead view, stage view, and three underwater cameras. During the show the cameras are controlled by operators in a media booth.

The other pools (designated Pool B, C, and E) are used for holding the whales that are not performing. Pools B and C are the primary holding pools and are not accessible to the public at any time. However there is an elevated enclosed deck above pool B that allows the public to view the whales. Pool B also has a slide out area at one end. The trainers can view and interact with the whales in these pools while they are back stage during a show, assessing their condition and readiness prior to sending them to pool A to perform in a show. Pool E is a public viewing pool that is also used for interactions with the public during the "Dine with Shamu". Pool E also has some viewing areas where the public can view the whales while inside the park. Pool D is the medical pool and has a movable floor that rises and lowers, allowing the whale to swim in but be safely contained for medical examinations when the floor is raised. The volume of water in all of the pools is 5 million gallons.

All of the pools have gates and channels which allow the trainers to move the whales from one pool to another. There are bridges and ramps which allow the trainers to walk over the channels and gates to access one side of the pool or the other. All of the trainers wear full length wet suits and a type of bootie or sock over their feet when they are working with the whales, whether or not they are going to get into the water. They have whistles used as training aids and they are not allowed to have dangling hair or any accessories on their bodies that the whales might be able to grab when they are around the pool. Any tools or other materials used in the shows or for animal enrichment activities are kept stowed in lockers or cupboards around the perimeter of the pools and out of reach of the whales when not in use. There are emergency oxygen bottles on each side of the main pool (one in the trainer's room, and one in the fish room), and there are emergency call buttons on the outside of each pool. Additional emergency equipment such as scuba gear and an emergency call phone is located at the fish room. Other emergency equipment at various locations around all of the pools includes throw bags and shepherd's hooks.

THE KILLER WHALES AT SEA WORLD SAN DIEGO

There are currently seven killer whales (*Orcinus Orca* or simply Orca) at Shamu Stadium in San Diego. They are best identified by name. "Corky" is the oldest whale, a female, she is around 37 years old and was captured from the waters off of Canada when she was about 3 years old. Corky has not successfully born any calves, and she has been at several different marine parks in her lifetime. Corky is about 20 feet long and weighs 8200 lbs. "Kasatka" is the dominant female of the group; she is about 28 years old and was captured off of Iceland when she was 1 year old. She has had three successful calves at Sea World and she is about 17 feet long and weighs 7000 lbs. "Ulises" is an adult male, aged 26 years and was also captured from Iceland. Ulises was 3 years old when captured, and he was originally displayed in Spain. He is 20 feet long and weighs about 9400 lbs. Ulises has not sired any calves and may be sterile according to the head curator. "Orkid" is an adult female and is about 18 years old; she was born in captivity from mother "Kandu" (now deceased). Orkid has not been successfully bred. Orkid is 19 feet long and weighs 5900 lbs. "Sumar" is an adult male about 8 years old, born in captivity from his mother "Taima" at Sea World in Florida. Sumar was separated from his mother due to aggression between them, and Sumar has been at Sea World San Diego since 1999. Sumar is 15 feet long and weighs about 3200 lbs. "Nakai" is a young male and was born in captivity in 1999, and is the son of Kasatka. Nakai is about 5 years old, 13 feet long and weighs about 2500 lbs. Nakai was also the first successful birth at any Sea World park as conceived by artificial insemination. "Kalia" is the youngest

of the group; she was also born in captivity of Kasatka, and is about 2 years old. Her size and weight are not known (all lengths and weights are from data as of Feb 2004).

The killer whales are generally kept in one of the four pools paired up with at least one of the other whales. Sometimes the gates between the pools are left open at night so that the killer whales can freely move between the pools and socialize with each other. Sometimes the gates are closed and the whales are separated as decided by the trainers based on their compatibility or moods and behaviors observed during the day. The mother whale is usually paired with her youngest calf overnight and during the day, but sometimes they might be separated for short periods in order to give the mother some time away from the calf. The young calves are always paired with another whale that they are compatible with and are not left alone during their early years. Calves are not separated from their dams until they are no longer nursing, usually between 9 months to 1 year old. The trainers vary the social interactions and living arrangements in order to prevent the whales from becoming accustomed to a routine which can result in boredom.

KILLER WHALE BIOLOGY, A BRIEF SUMMARY

The orca is a marine mammal, the largest species of the dolphin family, and is found in all of the world's oceans. The orca is the apex predator of the oceans by most accounts, known to attack and kill even the great white shark. They are versatile predators, and will feed on a variety of fish (primarily salmon and herring), tuna, squid, sharks, and rays. But certain groups of orca also feed on other marine mammals including seals, sea lions and dolphins, and they have even been known to prey upon whales as large as the gray, blue and sperm whales. Orcas have distinctive black and white markings that can be used for identification, and the males have a unique triangular shaped dorsal fin that can reach a height of six feet. Males can be up to 31 feet long and weigh as much as 6 tons. They can swim as fast as 35 mph and packs of orcas, called "pods" have been known to travel several hundreds of miles in search of food. Pods are generally composed of closely related orcas with a matriarchal female and her descendents. Some pods may be all male bachelor groups, and some pods may not always stay together. Pods can be anywhere from 2 to 60 animals and may include a stable population for many years, including four or five generations of the same line.

Orcas are also known to be intelligent creatures capable of a variety of learned behaviors. Many of the behaviors seen in captivity are variants on behaviors seen naturally in the wild, such as breaching (*jumping out of the water*), spy hopping (*holding their heads above the surface of the water*), and tail slapping. They can also learn behaviors that are not seen in the wild. A captive orca was observed regurgitating fish onto the surface to attract sea gulls and other passing birds, then capturing and eating them (or sometimes just playing with the bird in its mouth). Other orcas have learned this behavior by example. Several orcas at Sea World San Diego have also been observed using this technique to bait and capture birds around their holding tank, sometimes in a playful manner, or possibly out of boredom (the trainers have attempted to discourage this behavior by various means to keep the birds out of the whale tanks). Orcas have displayed a great capacity for play as part of their social activity (which includes sexual play, common in other dolphin species) and manipulation of objects in their environment. Orcas in the wild use complex hunting strategies to find and subdue their prey, including using bubbles blown from their blowholes to corral and confuse schools of fish before eating them, or stunning them with tail slaps. They will occasionally throw seals through the air in order to stun and kill them, or perhaps as a kind of hunting practice or prey play. Often they will disable their prey before killing and eating it. This may involve throwing it in the air, slapping it with their tails, ramming it, or breaching and landing on it. With other marine mammals such as baby whales they also have been

known to act cooperatively within the pod, preventing the whale from surfacing for air thereby drowning it. This cooperative hunting has been likened to that used by wolf packs.

The orcas are highly socialized, and some of their display behaviors may be part of their social interactions. They often establish dominance by physical displays, such as charging with open mouth or even raking a rival with their teeth. They also may rub against one another as a means of social bonding. They produce a variety of clicks and whistles that are used for communication and echolocation, a type of sonar which is used to orient them to their surroundings and the location of prey. Orcas that prey on other marine mammals use less vocalization so as to not warn their prey of their presence. The vocalization types vary with activity and certain pods have distinct dialects. Some studies suggest that the language is taught to the calves by their mothers, starting out with a very simple language scheme that becomes more complex as they mature. Females become sexually mature at around 15 years of age, and their lifespan is anywhere from 50 to as long as 80 or 90 years. Males are also sexually mature at age 15 and have a usual life span of 45 years, or longer in exceptional cases.

A BRIEF HISTORY OF KILLER WHALES IN CAPTIVITY

Orcas are the largest animal kept in captivity, larger than or as large as most elephants that are kept in captivity. They are far and away the largest captive carnivore. Orcas have been kept and displayed in captivity since 1964. Their lifespan in captivity is generally less than in the wild, although advances in husbandry techniques and increased pool sizes have helped to shrink that gap over the last ten years. Successful pregnancies were initially few with many still births, and calf mortality in captivity was high. Difficulties in nursing calves in small sized tanks led to many calves dying within days of birth. Poor socialization among captive orcas may have also resulted in failed pregnancies, unsuccessful births and nursing problems. The first successful captive born orca was "Kalina" in 1985 at Sea World in Florida. That whale has since given birth to "Keet", a male in 1993 (Keet is also the father of Kasatka's youngest calf, Kalia). The orcas in captivity continue to have difficulty in successful reproduction, of the 17 captive born females still living only 3 have had calves that still survive. The Sea World Parks in California, Florida, and Texas have been the most successful at maintaining a viable orca population capable of successful reproduction among their captive born and captured orcas. Kasatka has had three calves, in addition to Nakai and Kalia; Takara was born in 1991 and has had two calves of her own.

In the wild, there have been no documented attacks on humans by killer whales. However, there have been unsubstantiated reports of pods of orcas driving surfers out of the water in Alaska, of an orca biting the flippers of a diver in Monterey, and in the 1970's a surfer at Point Sur in central California was bit and released by a killer whale that came up from behind him and grabbed onto his board. Despite their reputation as "killer" whales, there are no known human fatalities from killer whale attacks in the wild. There is even documentation that orcas may have hunted cooperatively with humans, herding migrating baleen whales into Two-Fold bay in south-east Australia near the port of Eden in the late 1800's and early 1900's.

TRAINING AND HUSBANDRY OF KILLER WHALES AT SEA WORLD

The first step in controlling orcas in captivity is to provide an enriching, stress free environment. Animals respond to stressors in their environment in a number of different ways, but many stress responses result in unwanted behavior. Common environmental stressors are food, territory or space, reproduction, and social interactions. Of great concern in any captive population is the lack of activity and a sterile, unchanging environment. These are stressors that can result in boredom and subsequent abnormal behaviors.

Generally in captivity the lack of food is not a factor of concern; the whales are well fed. To counteract boredom, the employer has taken steps to ensure that they have a variety of enrichment activities for the orcas outside of their work requirements. The show itself may be part of the enrichment and exercise activities for the orcas, but it alone is not part of what would be considered enrichment or play. Play behavior is less structured, for one, and sexual play (a normal part of their social play) within the show is not allowed. The employer uses the acronym, "HELPS" to describe their hierarchy of training for meeting the orcas needs. Husbandry is the training they use to prepare the animal for interactions that affect their health, such as examinations and medical procedures; Exercise is the training they do for fitness; Learning is training the animal for mental stimulation and includes reshaping existing behaviors; Play is time that the orcas have fun with the trainers, and includes visual stimulation, play with toys and the use of a variety of objects to manipulate; and Show incorporates all of their behaviors. Assuming that the trainers are given enough time with the animals to include a sufficient level of interaction along these lines, then boredom should not be an issue. However all of the trainers mentioned that the increased work load from special events and interactions outside of the show have been cutting into the time that they would be spending with the orcas in these enrichment activities.

These enrichment activities in addition to serving the whale, also serve to strengthen the associations the orcas have with their trainers. The employer has stated that the orcas do recognize individual trainers and seem to have preferences for their associations. How the trainers are viewed by the orcas in terms of their social hierarchy is unknown. For instance, with dogs the human owner is often treated like a member of their "pack", and the human can control the dog by acting like the leader of the pack and treating the subordinate dogs in a similar manner. The dogs respond to being subordinate in a predictable fashion, making it easier to correct unwanted behaviors. When you understand their body language, the dog and the owner can communicate effectively. With orcas and other dolphin species there is the barrier of their physical environment, and the nature of their own communication. We cannot duplicate the ways the orcas communicate with one another. Their physical environment is alien to humans, and the ways in which they display their emotions difficult to read. A terrestrial mammal displays fear and anger for instance in visual ways with cues that are generally easy to recognize: ears laid flat, teeth displayed, growling or similar vocalizations, head low, back arched, tail low, fur bristled, etc. An orca or a dolphin displaying anger may have a similar hunched back or stiffness of the body, but the display is far more subtle underwater and not as easy to see. They may respond to fear or anger with vocalizations or swimming motions that are agitated.

Space issues as a stressor are also of concern. Not enough individual space often results in conflicts within the social hierarchy. These animals have responded and adapted fairly well to their spatial limitations, but the extent to which it is a stressor cannot be entirely known. An animal capable of traveling hundreds of miles is going to have some physical and psychological issues with being confined to a swimming pool. The drooping dorsal fin of a captive male orca (as seen in *Ulysses*) has been attributed to a lack of long distance swimming and reduced muscle strength. Sickness is also often brought about by an unclean environment and stressors within the environment. This population appears to be healthy but only one of the females has had viable calves. Although there are some aggressive interactions within the population, they do not appear to be unusual or excessively disruptive. The matriarch of this population is *Kasatka*. She is the dominant whale and her natural behaviors are to keep the other orcas in line and to protect her calves. She expresses her dominance by ramming or butting other whales, and sometimes raking with her teeth if the aggression escalates.

Reproductive success is often an indicator in any population of animals of the level of stress that they are under in their environment. Currently only one animal in this population has had successful reproduction. However breeding in captivity and successful births and have been on a steady incline. Within the last 20 years the captive orca population nationwide has gone from 29% to 56% of births resulting in living calves. That does not account for pregnancies that terminated before birth or unsuccessful mating that did not result in pregnancy.

The calves can also be a stressor, both to the dams and to the other animals within the population. Calves put demands upon their dams for protection as well as food. They also disrupt the existing social hierarchy as they grow to adulthood. More than one trainer admitted that problems with the calves seem to cause 90% of the problems that they have with the orcas. The dam is always going to be protective of her calf, and that kind of behavior is instinctual and no amount of training is likely to supercede those instincts.

The second step in controlling orca behavior in captivity is through training. The employer uses exclusively positive reinforcement tools when training the orcas. Positive reinforcement includes use of food rewards, and touching or rubbing of their bodies. Although correct behaviors are rewarded, wrong behaviors are not punished. Their response to this type of behavior is not negative reinforcement, but redirecting and concentrating on rewarding the behaviors they want the orca to perform. In fact, they have no tools at their disposal to punish an orca that is misbehaving. There is little that they can do to punish an animal of this size anyway. Wrong behaviors are ignored so as to refrain from drawing attention to the wrong behavior. Taking away rewards can also be a disincentive. The problem with this is when the behavior itself is the reward to the animal. Such as the bird that becomes both a game and an unwilling plaything; or an object held in the mouth that is a tactile reward.

The employer has taken steps to specifically train the whales with regards to the trainers that are in the water with them. They call this desensitization training. All the whales are conditioned to ignore people or objects that may fall into the water. The water work animals are trained to ignore a trainer in the water and to respond to the underwater call back tone or a slap at the stage by calmly swimming to the stage. Water work animals are also trained to respond to a trainer falling off on a ride behavior by moving into a slow, controlled surface perimeter swim. The call back is supposed to override all other behavior and stimuli. All of the animals participating in water interactions must be approved by the employer's Behavioral Review Committee. Additionally, the employer has developed specific guidelines with regard to how and when a trainer places anything in or around the orca's mouth.

The trainers rely on being able to recognize behavioral precursors that tell them an orca is about to go off behavior. They use visual cues in order to evaluate the orca's mood and whether or not they should get in the water with the orca. They may also ask the orca to perform simple tasks to assess its readiness. Simple tasks usually precede more complex behaviors. As the tasks that they ask the orcas to perform get increasingly more complex, they also have to watch that they don't overburden the orca or allow it to become frustrated if it doesn't understand what it's being asked to do. They also are constantly reinforcing their main tool for control of the orca in the water, which is the call back to stage. They can call the orca to stage using a variety of methods, including a hand slap on the water, banging the bucket on the side of the pool, or using the call back under water tone. By constantly reinforcing this behavior they attempt to insure that they will always be able to maintain control of the orca and can call it to stage at any time

A SHORT HISTORY OF KILLER WHALE INCIDENTS IN CAPTIVITY

In captivity there have been a number of attacks on humans by killer whales, and two have been fatal. In 1991 at Sealand Park in Victoria, BC, a 20 year old trainer slipped into the pool where three orcas either drowned her or prevented her from leaving resulting in death by hypothermia. Those three orcas had not previously worked with trainers in the water. In 1999 at Sea World in Florida a man believed to be a transient with a history of mental illness slipped into one of the killer whale pools after the park had closed and was found dead the next morning.

Non-fatal incidents are more common. Most recently in Sea World Texas (July 27, 2004), a young male orca refused to perform a behavior with a trainer in the water during a routine show, and most spectacularly breached over the trainer's head and for several minutes continued that behavior and

prevented the trainer from exiting the pool to safety by pushing him away from the edge of the pool. The trainer was not seriously hurt. In 2001 a trainer at Sea World San Diego was working with two whales (Orkid and Sumar) by herself at the edge of a pool without the required spotter. The trainer was essentially training Orkid to grab her foot as she sat at the edge of the pool. This proceeded for awhile until Orkid pulled her into the pool by her foot and broke her arm before she was rescued from the pool.

Other attacks have occurred on trainers and others when something went wrong as the whales were supposed to be performing a behavior during a show. Trainers have been bitten, rammed, dragged to the bottom of the pool, and held underwater. In other incidents it was miscues or other trainer errors that resulted in trainer injury. One trainer was seriously injured when he was riding one whale, and another whale was cued to breach at the same time. The breaching whale landed on top of the other trainer, seriously injuring him. Another trainer seriously damaged her knee when she exited onto the stage from riding one of the orcas and was either going too fast or slipped. Orcas have also butted up against their trainers as they came up into the slide-outs, their momentum essentially carrying their bodies into the trainer's legs. Other trainers have been rammed in the water, a kind of displacement behavior, usually done by an animal to assert dominance over another animal.

There have been two incidents of note with Kasatka, both occurred to EE #1 in the water with the orca. One incident was in 1993 when she broke off of a behavior during a show and she swam around the pool two times before coming toward her trainer. This was shortly after the birth of her first calf, Takara, and EE #1 recalled that there had been some vocalizations between the mother and her calf in the other pool before she had broken off of the behavior. She came at him as if to grab him but broke off, and did not hurt him in that incident, but she had not responded to commands, either. In 1999 EE #1 also recalled another incident where Kasatka came at him in the water and showed him her teeth, but did not bite him. In both of these instances the trainer believed that there was a precursor, or another behavior that was a sign that the orca was about to go off of her prescribed behaviors.

Sea World has compiled a video of incidents with the killer whales at this park and other parks, which is used for training purposes and is studied to modify their procedures where necessary. They also have a Behavior Review Committee (BRC) as part of the Animal Training Departments, and the BRC has developed guidelines for water work behaviors and public interactions. The BRC includes regular safety reviews and an approval process for animals, trainers, and new behaviors. Additionally, HUBBs Sea World Research Institute is an independent, non-profit scientific research institute that conducts research in ecology, physiology, bioacoustics, and aquaculture. These are integrated with studies of animals in the Sea World collections, which provide opportunities for comparative research in controlled experimental settings. Research done by HUBBS is used in better understanding the biology and behavior of captive killer whales.

What are not as well documented are incidents where the orcas in captivity have showed aggression toward each other. Some of those incidents are part of the normal social behavior of orcas involving shows of dominance, territorial displays, or of a mother protecting a calf. "Raking" is a behavior that occurs when a whale doesn't bite an opponent but grazes its teeth against the side of another orca, causing mostly superficial wounds in the outer skin. They may also ram other orcas. Among the known incidents, the killer whale "Kandu" at Sea World in San Diego was fatally wounded when she attempted to ram Corky in 1989. Kandu broke her jaw and apparently severed an artery, bleeding to death in the pool. Kandu had been the dominant female orca at that time. Corky had been introduced into the population three years prior and had repeatedly been the subject of Kandu's dominance displays. Poor parenting behavior has also resulted in some calves being injured or the target of aggression by their dams, requiring them to be separated early. This is possibly the result of female orcas having calves at too young an age, before they are socially mature. Sumar was separated from his mother Taima at Sea World in Florida after the dam had repeated aggressions toward her calf. Sumar was relocated to Sea World in San Diego.

One other incident of note is an accident which happened two weeks prior to this accident. On Wednesday, November 15, 2006 a trainer at Sea World was seriously injured during a show, but did not require surgery or hospitalization. That trainer, EE #6, was working a show with EE #1 and two other trainers. He was in the water with two orcas, Sumar and Orkid, while the other three trainers were on stage. He had just finished a "fluke splash ride" on Orkid and was on the east side of the pool. He dove off the whale and Orkid came up beside him. Both of the orcas were called to the stage and they disappeared under the water. EE #6 took a few swim strokes toward the stage. Then Orkid came up behind him and grabbed him by his left ankle. She rolled and pushed him under water nearly to the bottom of the pool. Sumar submerged with them, but did not attack the trainer. On the stage, EE # 1 slapped the water to try to get the orcas to come back to stage. He ran back stage and grabbed the audio recall remote device (*apparently there was no trainer stationed at the device at the time*), and he called three or four times without success. EE #1 slapped the surface of the water one more time, and Orkid and Sumar came to the surface at the side of the stage. EE #6 surfaced shortly after, having been held underwater for approximately 26 seconds. When the trainers had control of the two orcas at the stage he was able to swim to the stage behind them and get out of the pool with the help of one of the other trainers. He was able to walk off stage with a limp, but he suffered a torn anterior talo-fibular ligament in his left ankle. He did not have surgery but was able to recover with physical therapy.

Both of the trainers explained that it didn't appear to be an aggressive attack from Orkid, but something where the orca was given the opportunity to grab EE #6 so she took it. Orkid was described by both trainers as having a tendency to be opportunistic: she will take advantage of the situation if she's given the opportunity. She was the same whale that the trainer in 2001 had trained to grab her foot, so Orkid has a known tendency to grab for the trainer's foot. (NOTE: *other whales have grabbed at trainer's feet as well, so there may be a natural predisposition to this tendency, perhaps like a cat that chases string because it resembles a mouse's tail; or it might be just because the feet and lower legs are easy to grab*). There were no precursors or other reasons given as to why Orkid would go off behavior in this manner. EE #6 admitted that his mistake was swimming toward the stage before the two orcas were under control at the stage, but he was concerned that they would be bringing in another whale from the back pool into the main pool by the gate where he was in the water. He could have gotten out of the water at the side instead of at the stage, but he had chosen not to. He has been a trainer with the killer whales for a little less than three years, but he had not done water work with Orkid prior to this instance. Initially he was supposed to have been doing the fluke ride with Sumar, and EE # 1 was going to do the fluke ride on Orkid, but they had changed it shortly before as a way of just changing up the routine. As a result of this incident, there was no water work being done with Orkid when the accident of November 29th happened.

A couple of conclusions as to the cause of this accident would be that the trainer was not experienced with the orca and may not have kept in mind (or known about) Orkid's tendency to grab at feet. Another factor was he was perhaps rushing to get to stage during the performance, perhaps not wanting to delay the others in their tasks or to slow down the pace of the show. As a result of this accident, the employer implemented having one trainer on the call back device during water work, thereby increasing the number of trainers in the show from four to five.

THE ACCIDENT

On Wednesday, November 29, 2006 the injured employee began work at 8:30 AM. He arrived at the job site for a meeting and then went about normal duties for the day. The injured employee's job that day included performing with the killer whales and other duties related to the care and training of the killer whales. The injured employee, EE #1, has worked with all the killer whales and with Kasatka since 1993, and he has been an employee of Sea World since 1988. He was the most senior and most experienced orca trainer in the show, and he is approved for all water work activity with the orcas. He

has worked extensively with all of the orcas, and has also had two previous "incidents" with Kasatka, as described previously.

The show that is being performed at Shamu Stadium at this time is called "Believe". It is a multi-media show and was advertised as showcasing 52 newly identified orca behaviors and highlighting 100 separate behaviors in the show. According to the employer, each whale has a repertoire of anywhere from 3 to 300 separate behaviors. Behaviors may be something simple like a "spy hop", or more complex like a spy hop with a spin. In this way they add on additional behaviors by combining existing behaviors in different ways. The Believe show is divided into six acts: Discovery, Share the Joy, Ballet, Immersion, Pass the Torch, and Celebration. This version of the Shamu show premiered in May of 2006, but there has been a killer whale show at this facility since the mid 1960's. Each show is around 30 minutes long. The number of times that the trainers are in the water has also increased with this show. More than one trainer stated that they have gone from around 8 water behaviors to as many as 13 with the new show.

All seven orcas can perform certain parts in each show. Kalia, the youngest, only does minimal parts due to her young age and lack of training. Nakai does a few more parts but not as many as the adults. Ulises is limited to certain parts because of his size. Corky was on a kind of "light duty" that day because she had been raked by Kasatka recently, and the superficial wounds on her tail flukes were still healing. However she was doing water work in both shows held that day and the "Dine" also. Orkid was not doing water work because of the previous accident. Sumar and Kasatka are called upon to do all parts of the show as needed.

In the morning the employees had a meeting. After the meeting the trainers perform various tasks and animal husbandry with the orcas. During these tasks the trainers are assessing the orca's general health, mood, and responsiveness, as well as evaluating their social interactions. They may or may not call upon the orca to perform a specific behavior at this time. Fifteen minutes before each show the trainers gather to discuss the show and to decide which orca will perform which part. They decide which animals will be included in water work and which ones will only do dry behaviors. They also assign each trainer a responsibility for one orca and a segment of the show. Each orca is under the control of a trainer while it is in the main pool, although a trainer may "hand off" the whale to another trainer for a specific segment or behavior. After the show they evaluate the show and how the animals performed, and they may decide to change certain parts. There is a script posted backstage of the behaviors that are expected for each part of the show. This script was what was drafted at the start of the Believe program, but it has been modified somewhat over the months since then, so it is there primarily as a general outline. At anytime the trainers can decide to not do any water work based on the animal's temperament or other factors. They can do the whole show "dry" if their safety is a concern. Most of the time they have one trainer in the water with one orca, but they can also have more trainers and more whales in the water at any one time. They can have as many as three or four orcas in the water at any one time. The general safety rule for water work was to have at least four trainers suited up anytime a trainer was in the water, but that had just been changed to five trainers because of the previous accident.

There were two regular shows scheduled that day, and one "Dine with Shamu" interaction for park employees at midday. The first show was at 1 PM, the "Dine" was at 3:30 PM, and the final show was at 4:30 PM. The two whales in the "Dine" were Corky and Nakai. Kasatka and Kalia were not in the first show, and Orkid was not in the second show. During the first show and the "Dine" there were no concerns and no issues were noted with any of the orcas.

During the second show of the day, EE #1 called upon Kasatka to perform in the first act, "Discovery", and in the "Immersion" act with him. EE's # 2, 3, 4, and 5 were the other trainers in the show, and there was a sixth employee also present who was not interviewed. EE #2 was a supervisor for the show and was not doing water work because he had an ear infection. EE #2 has been a trainer since 1992. EE #3 was doing the "Ballet" segment of the show in the water with Corky. She has been a trainer for 6 years; she started out with dolphins and has worked with the orcas for three of those six.

EE #4 was doing support activities for the show, including moving the orcas from the back pools to the front and spending time on the call back device. He has been a trainer for 11 years and also started working with dolphins before moving to the orcas. EE #5 has only been with the employer for seven months, although he had been a trainer with dolphins for 4 years and orcas for two years at another marine park before coming to San Diego.

The show had proceeded without incident up to the point of the accident. There was a small audience, it was mid week in late November and so there were probably less than a 500 people in the bleachers. Kasatka performed in the first act of the show and was normal through that segment and performed all her behaviors perfectly. In a later segment of the show, EE # 5 was working with Kalia who he described as playful in the back and acting a little goofy during the show, but that this was also normal for the young calf. However, EE #2 described Kalia as a little out of control during her part of the show, for maybe about 3 minutes. EE #5 put Kalia back into pool C with her mother Kasatka after her part of the show. Both EE #3 and EE #4 noted that there were some interactions going on between Kalia and Kasatka in the back pool area at that time. EE #3 described Kasatka as "head bobbing" to the calf. This was not uncommon but she described it as a stern or even "angry mom" form of communication with the calf. EE #4 also witnessed a vocal interaction between the mom and calf, but it wasn't anything alarming to him.

When it was time for Kasatka's part in the show, EE #3 decided to walk Kasatka over to EE #1, meaning that she released Kasatka into the main pool but stayed with the orca by walking around the perimeter of the pool until she handed Kasatka off to EE #1. She told EE #1 that "Mom (Kasatka) was being very vocal with the calf." She didn't describe it as a warning or an alarm, just passing on information. EE #1 did not hear the warning, either because of the noise of the show or because he was focused on the task he was doing with the audience volunteer at the side of the stage. Either way, all he heard was "Kasatka", and EE #1 replied "ok".

EE #3 then started to walk back to pool C but stopped halfway to watch EE #1. Kasatka seemed to be responding normally at that time. EE #1 had her do a "surf ride" and a "Foot push/stage slide" in the water with her. He did a dry behavior from the stage, and Kasatka performed it all well. Then EE #1 dove into the pool for the climactic "Houdini" or "rocket hop" behavior. In this behavior, the trainer dives toward the bottom of the pool and the orca follows him down. The orca then connects with the trainer's feet and propels him through the water toward the surface. When the orca breaks the surface of the water its momentum pushes the trainer up into the air and the orca breaches the water. Kasatka was very familiar with this behavior and had performed it many times prior to this day. EE #1 had also performed this trick many times. As EE #1 disappeared under the water, the four other trainers came out onto stage clapping to the rhythm of the music. But they soon noted that something was wrong, as EE #1 was under water for much too long. They could not see what was happening at the bottom of the tank.

Under the water, EE #1 was prepared for the trick and he felt Kasatka touch his foot. He was about ten or fifteen feet down when he heard an orca vocalization, which he later learned was Kalia vocalizing from the other pool. He described it as a distress vocalization or cry. At that moment Kasatka broke contact, and the next thing he knew she had both of his feet in her jaws. The orca held him under water for several seconds. On stage, the other employees didn't know anything was wrong at first, and then realized that the trainer had been under water for too long. On the video tape from the underwater camera we can see Kasatka rag-dolling EE #1 violently back and forth under the surface of the pool. Kasatka had held on to him underwater for nearly a minute before she slowly started to bring him to the surface, spiraling upward, blowing bubbles as she came up. When she brought EE #1 to the surface EE #2 at the stage knew that something was wrong, and he heard EE #1 call for help. EE #2 slapped the water, trying to call Kasatka back to the stage. EE #4 used the call back device. Other trainers slapped the water by the stage. EE #5 grabbed the bucket to bang against the side of the pool, trying to get Kasatka to respond. Kasatka took EE #1 underwater again, just below the surface. EE # 3 ran to the

slide-out and someone yelled "Get the net". She got one of the park operations employees to help her pull the net out, and EE #5 and the sixth trainer came around to help her as well. The net has floats on top and weights on the bottom, and is designed to distract the orcas because it's something they don't normally see. Kasatka came back to the surface with EE #1 in her mouth when the net hit the water but still did not respond to the call backs.

Kasatka began to slowly swim on the surface near the center of the pool with one of the trainer's feet in her mouth. Kasatka dunked EE #1 briefly under the water a couple of times, but continued to ignore the calls to stage. EE #4 came out onto the stage with the remote call device in his hand and pushed the button five or six times without result. Finally EE #1 told the others to stop, because it seemed to him that every time they slapped the water that Kasatka would only bite down harder. She also would bite him harder if he tried to pull his foot out of her mouth. Kasatka was keeping him out of reach of the other trainers and away from the sides of the pool. EE #1 was holding his head above water alongside the orca, calmly stroking her sides and trying to calm her down. EE #4 was sent to make some calls, and he notified the head animal curator who was in his office and paged the other assistant curator as well. For awhile it seemed like Kasatka was calming down, and when the one of the employees threw out the scubacuzzi, the orca slowly swam over to it to look at it, but she kept her body between the scubacuzzi and the trainer in her mouth. As she was holding on to him, EE #1 kept trying to stroke her and calm her down, but Kasatka would not release him. An emergency call to 911 for an ambulance was made, but they still did not pursue any other means by which to rescue the trainer.

The other employees continued to pull the net out trying to pull it across the pool. The audience was evacuated from the stadium by park operations employees. At one point Kasatka let go of EE #1's foot, but she did not leave him. EE #1 was near the center of the pool, treading water with Kasatka swimming directly underneath him. As he was treading water he was trying to keep her from grabbing him by kicking at her, but he had to put his head under water to see where she was before he could kick at her. He realized that Kasatka was going to grab him no matter what he did so he decided to get a good breath of air before she could take hold again. Kasatka grabbed him again by the feet and pulled him under; she thrashed him a bit, and then took him all the way to the bottom of the pool where she laid against him on the bottom of the pool. EE #1 went limp, and she held him there for maybe a minute. EE #1 felt his breath going out and he thought about his boy and wondered if she was going to let him up. Finally Kasatka brought him to the surface again, and as soon as EE #1 had got a breath he went back to rubbing her head and sides, trying to calm the orca into releasing him. She kept swimming slowly again at the surface of the pool. Finally she released him and she started to swim slowly toward the stage. By this time the other employees had managed to get the net about a third of the way across the pool, from slide-out to stage. When Kasatka finally seemed to be done with him, EE #1 was about three feet from the net, and closer to the slide-out than to the stage. EE #2 slapped the water at the stage to call her back to the stage, and she seemed to be responding. EE #1 backed away from Kasatka, then turned around and was able to swim over the net. A few swim strokes got him onto the slide-out. Then Kasatka turned away from the stage and swam over the net and started to follow him. Someone yelled, "She's coming over the net!" EE #1 tried to stand up but his feet were numb and damaged and he fell. He was also very cold and felt like he was going to pass out. But EE #3 and the others were there to help him up and to the side of the pool where rescue personnel were waiting. Kasatka approached the slide out but turned and swam away. For awhile afterward she was seen swimming with one of his socks in her mouth, and she was making some small vocalizations, but she did nothing more.

As he came out of the water, EE #1 was heard to say that "She didn't show me any precursors. She didn't tell me, she didn't show me." From his point of view the aggression came to him as a complete surprise without any signals that the orca was angry about something or was about to go off behavior. Only in retrospect did he recall the vocalization he had heard while underwater. He recognized that Kasatka could become agitated by the distress vocalization of her calf, causing her to go off behavior. EE #1 knows that the orcas are not 100% predictable, particularly if they cannot control what their

calves are doing. He also stated that even though this was not her normal behavior, he would not swim with Kasatka again.

EMPLOYER'S RESPONSIBILITY FOR SAFETY AND HEALTH

Every employer is responsible for providing the employees with a workplace free from safety and health hazards. Hazards that cannot be eliminated can be controlled by administrative controls, engineering controls, or personal protective equipment. PPE and engineering controls are not relevant to this risk, so the hazard has to be controlled to the extent possible by administrative controls (such as but not limited to safety policies and action plans).

There are four main issues that put the employees in this situation at risk. The first is that the Orca is the largest captive animal that is kept at any zoo or park. They are a danger to humans by virtue of their size alone. Second, they are a carnivore. They are armed with an impressive arsenal of teeth, capable of tearing bone and flesh. They are the largest carnivore kept at any zoo or park. Carnivores are also generally of greater intelligence than their prey, and because they are predators they behave with what might *anthropomorphically* be called cunning and forethought. This makes them even more dangerous, and the more intelligent they are the more likely that they will learn the behaviors that reward their needs. Third, they live in an element that is foreign to us. The best swimmer, the fittest athlete, is no match for an orca in the water. The swimmer's only recourse is to escape from the water. Even that is not enough for seals that are snatched from the shoreline by orcas in certain parts of the world. Additionally the orcas in this facility are trained to come up onto the slide-outs, and they use this technique for capturing birds at the edge of their pool, so standing in the slide out isn't safe either. Finally, despite our close associations with these creatures, they are not domesticated in any sense of the word. They have forty years of captivity, compared to centuries for other common animals. Horses, dogs, cattle, sheep, cats, have all had hundreds of years of selective breeding and genetic manipulation to remove as much as possible those wild, unpredictable behaviors that put humans at risk when in close association with these animals. Orcas are still wild, whether they were captured in the wild or bred in captivity, and as wild animals they can be completely unpredictable and unpredictable is dangerous. It is true that dangerous wild animals are often kept in zoos all over the world, but their keepers aren't at risk of being attacked because they don't perform, interact or get in a cage with the animals in a zoo. The performance aspect makes this place of employment closer to a circus than a zoo, and yet even a six ton tiger might not be as fearsome if you didn't have to swim with it. The humans that swim with and perform with orcas in this setting are putting their lives in danger every time they jump into the pool.

However, the employer has been training and performing with orcas since the mid-1960's and is at the top of their field in terms of training captive orcas, including training orcas to swim with human trainers. They specifically train the orcas to desensitize them to the presence of people and objects in the water. For the forty or so years that they have been performing, there have statistically only been a very small percentage of their interactions where the orcas have gone "off behavior" and endangered or attacked their trainers. However these two incidents in one month alone are somewhat alarming, and in combination with the attack in Texas in 2001 might be indicative of an alarming trend, possibly related to the demands of the new show and increased water interactions. The trainers make every attempt to reinforce that the orcas have gentle interactions with their human trainers and others, and to discourage behaviors that are not gentle.

Their human trainers are well trained themselves, physically fit and most are very experienced with training and observing both orcas and similar animals like the dolphins. The trainers have to have at least three or more years of experience training other marine mammals (usually within the park system)

before they are brought up to work with the orcas. The trainers at this facility are at the top of their field and have to be very competitive just to get this job, which is probably the most sought after position in the park. The trainers are one part animal behaviorist/trainer/caretaker, and one part performer. The performance aspect of their job requires that they maintain peak physical fitness (necessary in order to look good in a skin tight wetsuit) as well as have an energetic, outgoing personality. They are mostly young and they are in this position largely because they want to perform with and work with killer whales in and out of the water. The job is still work, but it has a "coolness" factor that is undeniable. The trainers are always given the option of not getting into the water with the killer whales, depending on their assessment of the orcas at the time. This happens only rarely or on occasion.

This brings up the performance element of the employer's business. This is a marine park with a goal of conservation and education, but it is also in the business of entertaining. Shamu the killer whale has always been at the forefront of their marketing and advertising and is probably the main reason why people visit the park. The Shamu show, in all of its different forms, has been and continues to be the premier, most desired show at the park. In order to maintain interest in the Shamu show, the employer has to make sure that they are doing something that the audience hasn't seen before. So each year is bigger, brighter, more spectacular, etc. Part of that is marketing but they have also increased their demands on both the orcas and the trainers to bring in something new and exciting each year in order to keep audiences coming back year after year. They have also increased the amount of time and number of interactions that the trainers are in the water with the killer whales.

The employer has a well devised safety plan (IIPP) that meets all the requirements of the standard. The employer has developed emergency procedures, has provided a wide array of emergency devices and responses, and has trained their employees on following these procedures. By all accounts the trainers at the pool followed most of these procedures during this accident, although some deficiencies were noted. All trainers maintain an annual CPR, first aid, and water rescue certification. All of the trainers are certified in the use of SCUBA equipment.

What is the employer's responsibility to the trainers/employees?

There are no specific rules or laws in the Labor Code or Title 8 that pertain to animal handlers either terrestrial or marine. Under the requirements of the Injury and Illness Prevention Program (8 CCR 3203), the employer is responsible for establishing, implementing and maintaining a written injury and illness prevention program that as a minimum includes the seven elements of this standard.

1. *Identify someone with authority and responsibility for implementing the Program.* They have done this both park wide and for employees in the Animal Training department. Animal trainers are aware of who is ultimately responsible for safety within the department.
2. *Include a system for ensuring that employees comply with safe and healthy work practice.* They have developed a system of progressive discipline. Animal trainers were aware of their responsibility to follow the safety rules and have been disciplined for not doing so.
3. *Include a system for communicating with employees on matters relating to occupational safety and health.* In regards to the animal trainers they have regular meetings and employees can voice their safety concerns. Animal trainers did not have any issues or fears regarding posting their safety concerns, although in the past they had expressed some frustration in having their concerns adequately acted upon, particularly in regards to work loads on themselves and the animals.
4. *Identify and evaluate work place hazards including scheduled periodic inspections to identify unsafe conditions and work practices.* They have identified the hazards of working with orcas in captivity, and have developed specific guidelines to protect animal trainers. Periodic inspections are being done. The BRC reviews and develops guidelines for any new behaviors or tasks the trainers might be exposed to and provides for approvals for any new trainers given new tasks as well.

5. *Include a procedure to investigate occupational injury or occupational illness.* This is done by the Sea World Safety office as well as reports and investigations of incidents within the animal training department.
6. *Include methods and/or procedures for correcting unsafe or unhealthy conditions, work practices and work procedures.* Although they have corrected unsafe conditions to the extent of providing work practices and procedures which are designed to keep the animal trainers safe, a question remains as to whether there is more they could have or should have been doing. If their procedures for correcting the hazards are ineffective, then this could be a violation of this section.
7. *Provide training and instruction on safety and health hazards to which employees may be exposed.* The trainers in the department are very well trained on the hazards and on the control measures the employer has developed. The deficiencies noted in the actual emergency response may have been a lack of training and practice with those protocols, or because they were under direction of the lead trainer (who was in the jaws of the orca). Their written program allows that those actions are discretionary and may not be necessary in every case. Also since the VP of Animal Training/Zoology arrived at the scene during the incident, the other trainers were following his directions about halfway through the event.

So the only regulatory issue remaining is whether or not the employer has performed, diligently and thoroughly, to protect the health and safety of the trainers that are swimming with orcas as part of their assigned duties by correcting the hazards insofar as is practical. There are two elements to this, one is making sure the trainers are safe when they are in the water, and two is making sure that they have developed to the fullest extent possible an emergency plan to rescue and recover a trainer who is in danger from, or "in the jaws of" a killer whale.

1. Has the employer met their burden for ensuring that killer whale behavior will not result in employee injury when the employees are in the water, through employee training, education and control of the killer whales through training and reducing their environmental stressors?

Training of the employees has been addressed as effective. The trainers understand that there is a risk involved with swimming with the orcas and that the orcas are not entirely predictable.

The procedures for training the whales, involving desensitization to the presence of people in the water has not been completely effective at protecting the employees. It appears from the previous incidents that once the animal goes "off behavior" they are essentially out of control of the trainers until as one trainer stated, "they are done" being off behavior. Also there is the added problem presented by stressors in the environment which can cause an animal to act outside its normal realm of behavior and override their previous training. The presence of calves in the population can be a stressor to the whales, although removing the calves from the mother is also a negative stressor to the dam. The employer might address these stressors by having a separate, non-performing population that they use for their reproductive population.

Additionally, the added burden of additional shows and interactions places demands on the trainers and the whales outside of their normal routine. According to the trainers, these interactions have cut into the time that they used to spend with the orcas. Although the number of shows had been reduced since the end of summer, the trainers were still involved in the extra interactions. Also the trainers were concerned that the number of orcas available to them is not optimal given the number of interactions and shows. Having more orcas within the population to choose from for various interactions would reduce the stress on the animals and help to keep the trainers from having to rely on one or two animals for the majority of their performance tasks.

2. Has the employer met their burden for emergency rescue and recovery of an employee in danger of injury by a killer whale in the water or in the jaws of a killer whale in the water?

Within the employer's emergency action plan, they have a number of tools to use for water rescue and animal control. The first tool is to use their recall techniques. If the recall doesn't work, they are to move on to additional steps as directed by the senior ranking trainer. These include designating the trainers present to certain tasks and various distractions such as food, rescue equipment (i.e. throwing out the scubbacuzzi), etc. They are to continue to try to control the animal. The net can be used for animal control or to separate the human and animal. It can also be used to remove or distract the animal, or to rescue the victim.

In this case the net was not effective at either, the animal was not sufficiently distracted by the net to stop the aggression, and when the trainer went over the net the animal quite easily followed. Kasatka has had experience with the net prior to this instance, which would account for her relative ease at going over. The net also takes a long time to deploy, so where it might have been a distraction at first it is less so the longer it is in the water. Even with three employees at the net it took a long time for them to pull it out and stretch it across the width of the pool. It took them about 30 seconds to get the net fully into the water. At one point the VP of Animal Training told them to stop deploying the net because "Mom (Kasataka) is calm and (EE #1) was breathing." His direction was to wait and see if EE #1 could continue to calm the orca and pull free on his own, and they didn't want to crowd her too aggressively when she was under water with EE #1. They also continued to use their call back devices and other distractions such as food to try to control the animal. None of these were effective. It is possible that because the orcas have been trained to ignore objects in the water, that these attempts to distract them have failed.

There are other tools such as the shepherd's hooks and target poles that weren't used. They might have used a shepherd's hook to help pull EE #1 to safety when he was nearer to the stage and Kasatka was swimming underneath him trying to grab his foot a second time. It could also have been used to pull him out at the slide-out, but there were no shepherd's hooks at the slide-out side of the stadium for employees at the time of the accident. They also did not have one or more of the trainers put on the scuba gear for possible rescue, as is also identified in their emergency plan. There is no clear direction to take with either hooks or scuba in the written plan, however the employer stated that they would not send a diver in scuba gear into the pool with an out of control orca. They also do not want to use the shepherd's hook in a situation where they might be in a tug-of-war with the victim in the orca's mouth. However if a diver in scuba has the use of a tool such as a prod or stick (a fish stick for non-lethal or a bang-stick for lethal force) it is possible that they could entice the orca to let go of a victim yet still be able to protect themselves from harm. They could also possibly approach close enough to engage in buddy breathing underwater with the victim. There is the danger that the orca would flee and not let the scuba divers get close, perhaps endangering the victim further. The orcas have been trained to the presence of scuba divers in the tank and sometimes perform interactions with their trainers in scuba gear, so they are not unfamiliar with divers in the water. Currently the employer's use of scuba in these situations is limited to recovery, not rescue, and the employer does not have any lethal tools to use against the orca.

What were effective were the trainer's attempts to calm the animal by stroking it and relaxing himself. Not everyone would be able to have such an extraordinary presence of mind while in the jaws of an animal that is capable of killing him. We cannot disallow our own primal fears (that is, the fear of being eaten) to entirely rely on the actions of the victim to free himself. His training and sense of calm are to be commended and probably the reason why he was finally released. The employee himself acknowledged that his adrenaline was really pumping during the ordeal. In the wild, people in the jaws of sharks have had some success beating on the noses or gouging at the eyes of the shark, perhaps increasing their chances to escape. It's unknown however how many have used this technique and not been successful. It is also unknown whether this might work with an orca, or if it would only cause an increase in its aggression.

The trainer/victim in this accident acknowledged at some point that he would be unable to free himself until she was "done." Essentially the orca had expressed itself aggressively, and at some point in time it would be done with that behavior and she would return to her normal docile behavior. By waiting it out they could hope at least that the orca would return to the point where she would respond to her training. However, it may be that this is wishful thinking if the orca is getting some pleasure out of holding the trainer in her mouth. This tactile, object sensation may be more rewarding than anything the trainers on land could offer. This would explain why the whale carried the trainer's sock in her mouth for nearly an hour after he'd left the water.

More nets were suggested as a potential solution, but given the amount of time that it takes to deploy the nets and their apparent lack of effectiveness, this doesn't seem to be a viable solution. If the nets could be deployed quicker, and if they could be effective at isolating the whale at someplace within the pool where the other trainers could restrain her or be able to reach the victim, that would probably increase their effectiveness. This would only work if they could keep the orca from swimming over the net. Also mentioned would be some way to completely empty the tank, but given the volume of water in the tank that would either take too much time and if it was fast enough to matter it would probably be more dangerous than effective. Lethal force was also mentioned. The problem with that is that the animal trainers believe that they know the animal, and they also believe that they can control the animal. This is an emotional response to their close association, bonding and training with the animal. It is clear that they have not considered use of lethal force as an option. However, at some point they may have to make a choice between a dead human or a live animal. Even so, with an animal of this size effective lethal force would not be easy, although bang sticks of sufficient caliber could be used by a scuba diver if he could get close enough. It would naturally be the choice of last resort, assuming that they continue to swim with orcas, because the best solution is to not get in the water.

CONCLUSIONS

The contributing factors to the accident, in the simplest of terms, is that swimming with captive orcas is inherently dangerous and if someone hasn't been killed already it is only a matter of time before it does happen. The trainers recognize this risk and train not for if an attack will happen but when. The orca is capable of tearing off an arm, a leg, or a head, and if that is against its nature it could easily drown a human or trap it in the cold waters of the tank until the human expires from hypothermia. Even if the animal does not have the intent to kill, the bulk and weight of its body is enough to smash a person against the sides of the pool, knocking them unconscious or crushing them to death.

Unfortunately, even with the best procedures and the best trained staff, there was little that the employees in this case could do to rescue their co-worker when the tools they had at their disposal failed to sufficiently distract the orca or cause it to return to normal behavior. Their own emergency plan acknowledges this in the statement: "Due to the nature of the facilities and the unpredictability of the animals it is not possible to establish a definite list of procedures to be followed in all events." The two basic and fundamental behaviors that they train the orcas on, to be gentle and their fail safe "return to stage" behaviors, are probably two of the most important tools at their disposal to keep the trainers from harm should an orca go "off behavior". However in both instances in November these basic and fundamental commands failed. Orkid did return to stage after about 30 seconds, but in Kasatka's case the return to stage call essentially was never obeyed. Both orcas were probably gentler in these cases than they would be in the wild, but even their "gentle" bites still managed to do considerable damage to frail human flesh. Any less gentle and these injuries would have been much worse. If the orca's shaking the trainers underwater had caused the trainer's heads to be smacked against the sides of the pool, they might not have even survived. And again, the other hazard of drowning is also of significant concern.

REGULATORY ACTION – NO ACCIDENT RELATED VIOLATIONS

A Serious accident related violation of 3203(a)(6) could not be established at this time.
There is insufficient evidence to support a violation because the employer has taken reasonable and responsible steps to correct the hazard in accordance with industry practices. However, additional suggestions and potential methods for modification of existing emergency procedures and training responses were identified, warranting an information memorandum.

An INFORMATION MEMORANDUM of 3203(a)(6) was issued.

Other violations were found including 342(a): failure to report serious injury (late reporting), and 3214(a) for stairs without handrails on the stage.

		Signature	Date
	CSE, IH		
Reviewed by:	DM/SR., IH		
	Prepared by:		

Cal/OSHA 170A (08/01/94)