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22 November 2013

Mr Derek LO
Clerk to Legislative Council Panel on Economic Development
Legislative Council Complex
1 Legislative Council Road
Central, Hong Kong

Dear Mr LO,

Ocean Park's Hammerhead Sharks

Thank you for your letter dated 15 November 2013, referring to us the Hon Claudia Mo's concern on the death of six hammerhead sharks in the Ocean Park. Our reply is as follows.

Six hammerhead sharks kept at the Grand Aquarium of the Ocean Park died on 3 November 2013. The Ocean Park Corporation (OPC) immediately suspended the activities of snorkeling and scuba diving in the aquarium to facilitate the Park's thorough investigations into the incident. The investigations include analyses of the necropsy results on the hammerhead sharks, a review of the animals' living environment and life support system of the Grand Aquarium, as well as a search of the hammerhead sharks' husbandry records and medical histories. The OPC's investigation findings revealed that the aquarium used ozone to control its water quality, but a sensor regulating ozone output to the aquarium was affected by electrical interference and coincidentally the other sensor preventing excessive ozone output also malfunctioned. The malfunction of the two sensors resulted in sporadic higher-than-normal dosages of ozone in the aquarium and such level of ozone harmed the gills and brains of the six hammerhead sharks. According to the licensing conditions imposed by the Agriculture, Fisheries and Conservation Department (AFCD), the Park will submit a post-mortem report issued by a registered veterinary surgeon and a complete investigation report to AFCD to give an account for the cause of the death of the hammerhead sharks.

In response to the abovementioned findings, the OPC immediately carried out improvement measures to ensure that safe levels of ozone are always maintained at the aquarium. These include identifying and eliminating the source of the electrical interference, replacing the sensors, installing additional sensors to cross-check sensor readings on the ozone output as well as improving the operation protocol of the ozone system. The OPC is also conducting thorough inspections into the living environment of other animals within the Park to ensure that the animals receive proper care.

On the other hand, the OPC has provided the information on animals' acquisition, transfers, births and mortalities in its annual reports. This year, the Park appointed an independent auditor to conduct independent audit on the relevant information with a view to reinforcing public confidence.

Following the death of the hammerhead sharks on 6 November, the OPC immediately notified AFCD of the case. Upon completion of the investigation of such death, the OPC also presented the detailed findings to the public by issuing a press release. The press release issued by the OPC on 13 November is enclosed at Annex for Members' reference.



(Ms Emily Mo)
for Commissioner for Tourism

C.C.

Secretary for Food and Health (Attn: Miss Vinci CHAN)
Dr Allan ZEMAN, Chairman of the Board of the Ocean Park Corporation
Mr Tom MEHRMANN, Chief Executive of the Ocean Park Corporation
Mr Matthias LI, Deputy Chief Executive of the Ocean Park Corporation



Press – For Immediate Release

Ocean Park Announces Necropsy Results and Cause of Death for Hammerhead Sharks

(Hong Kong, 13 November 2013) Subsequent to the loss of six female hammerhead sharks on 3 November 2013, Ocean Park announces today the completion of the investigation and reveals the cause leading to the death of the animals.

Throughout the past week, Ocean Park conducted a series of thorough investigations, including but not limited to: analyses of necropsy results on the six hammerhead sharks, a review of the animals' living environment and the Grand Aquarium's life support system, as well as studying of the animals' husbandry and medical histories. As reported previously, initial necropsy results indicated that all six hammerhead sharks were in excellent body condition except they had suffered from significant brain lesions, while additional pathological tests showed no signs of poisoning, toxins or infections whether in the form of bacteria, fungus or parasites. Additional investigation of the gill tissue revealed slight microscopic damage at the cell level. Coupled with the brain lesions, results were suggestive of over-exposure to ozone by-product. This led to further investigations by Ocean Park, the Grand Aquarium's life support system designer and an independent expert regarding the Aquarium's water conditions and life support system.

Upon further inspection, it is confirmed that the sensor regulating ozone output to the Aquarium's protein skimmer was affected by weak electrical interference and precipitated the incident by allowing sporadic higher-than-normal dosages of ozone by-products to enter the Aquarium. The electrical interference from nearby electrical equipment produced a weak electrical current within the water pipe. Given water is a highly conductive medium, the small electrical currents entered the water and impacted the first sensor's readings and signals. Coincidentally, the system's built-in safety mechanism, a second sensor to prevent excessive ozone output, also experienced an independent malfunction, which measured lower-than-actual ozone by-product levels.

The elevated levels of ozone by-product still fell within the acceptable range according to international aquarium practices and would not pose a threat to most fish and shark species. Unfortunately, the hammerhead sharks, in particular the larger-sized female hammerhead sharks, which are exquisitely sensitive to ozone and its by-products, more so than any other fish or shark species in the Aquarium, were affected by the ozone by-product exposure when they swam by the ozone-treated water's point of entry into the aquarium. With the sensors providing readings that were within normal ranges, the sporadic higher-than-normal dosages of ozone by-products and the

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海洋公園力求成為一個世界級具領導地位的主題公園，為遊人帶來一個既開心又難忘的旅程，將遊人與大自然緊密連繫起來。

Ocean Park aspires to be a world leader in providing excellent guest experiences in a theme park environment connecting people with nature.

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highly localized point of entry into the aquarium, it made detection of slightly higher ozone by-products almost impossible by the normal in-aquarium sensor and the routine measurement practices employed throughout the exhibit.

Ozone and its associated by-products are commonly used to improve water quality and are widely used in swimming pools, waste water treatment and in large, modern aquariums around the world for disinfection, high water quality, and good water clarity. When exposed to excessive dosages of ozone by-products, animals' gills and metabolic rates may become compromised, and lesions may be caused to the animal's brain. In the case of the hammerhead sharks, it caused a detrimental impact to their gills and brain. Whilst quick action was taken to turn off the ozone output immediately and flush the Aquarium water, the collaborative expert efforts by the Park's staff were able to minimize the effect of the ozone by-products for the remaining hammerhead sharks, but it could not save the six female hammerhead sharks.

Since the problem has been determined, actions have been taken to remedy the situation, including identifying and eliminating the source of the electrical interference, replacing the sensors and installing additional independent sensors to cross-check sensor readings. Moreover, the operation protocol of the ozone system has been adjusted such that on the occasion that the ozone level reaches certain required safe levels, the ozone machine will be turned off automatically, and can only be switched back on manually after the equipment is checked and confirmed to be normal. This ensures that safe levels are always maintained.

Ms. Suzanne Gendron, Executive Director of Zoological Operations and Education, said, "We are deeply saddened by this unfortunate incident. We have conducted a thorough review in order to reinforce our current facilities and ensure a safe and healthy living environment is always provided for our animals. The health and wellbeing of our animals remain the utmost priority for us at Ocean Park. There are over 100 aquariums with life support systems similar to ours in the world, including five which have hammerhead sharks. We will share the investigation results of our ozone incident with all related facilities so as to avoid the recurrence of similar incidents in the future."

The Hong Kong Agriculture, Fisheries and Conservation Department was notified of the necropsy results, and the investigation result will also be sent to them shortly.

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About Ocean Park

Ocean Park is Hong Kong's unique home grown theme park with a heritage of delivering family fun and fond memories. Since its opening in January 1977 as a non-profit organisation, Ocean Park has developed itself to be a world-class attraction connecting people with nature, and recognised for its animal husbandry, research and relationship with the community. Close to 120 million people have visited Hong Kong's premier park since its inception, and Ocean Park has remained committed to offering adults and children experiences that blend entertainment with education and conservation. Part of the proceeds from Ocean Park admission tickets and some retail items will go to Ocean Park Conservation Foundation, Hong Kong to support its wildlife conservation projects. Ocean Park is the 2012 recipient of the highly coveted and prestigious APPLAUSE AWARD, presented by Liseberg Amusement Park. Recognised by the attractions industry worldwide, the award is presented at the International Association of Amusement Parks and Attractions (IAAPA) Attractions Expo every other year in honour of a theme park for its excellence in management, operations, and creativity. Ocean Park is the first theme park in Asia to win this international award since its inception in 1980.

Ocean Park – Giving Back to the Community

As Hong Kong People's Park, Ocean Park has launched different community initiatives to enable Hong Kong people from all walks of life to enjoy the Park's offerings. These initiatives include: 1) concessionary admission for Hong Kong residents on their birthdays, Hong Kong residents aged 65 years and above, and holders of Registration Card for People with Disabilities; and 2) sponsored admission to individuals and members of families receiving assistance from the Comprehensive Social Security Assistance Scheme (CSSA), and Social Welfare Department member organizations. The Park also gives donation-in-kind to charitable organizations, offers special rates for school tours, and spearheads many other community caring projects. During the fiscal year of 2011-2012, Ocean Park maintained a total of 13 social care programmes, with over 606,000 beneficiaries and an aggregate value to the community equivalent to HK\$143.5 million.

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