

October 12, 2003

Mr. Russ Rector  
Dolphin Freedom Foundation  
824 South West 14<sup>th</sup> Street  
Fort Lauderdale, FL 33315

***Re: Miami Seaquarium Life Safety and Electrical Installations Review Findings***

Dear Mr. Rector:

This report is a summary of observations noted during my October 10 – 11, 2003 walkthrough of the Miami Seaquarium located at 4400 Rickenbacker Causeway, Miami Florida 33149.

**Scope of Review:** My review primarily consisted of the following two areas:

*Life Safety:* I reviewed the ability for visitors to safely evacuate show exhibits such as the Top Deck Dolphin Show; Golden Dome Sea Lion Show; Flipper Show; Killer Whale Show; and Tropical Fish Aquariums. The existing life safety features were compared to the requirements specified in NFPA 101 Life Safety Code – 2000 Edition, which is enforced by The Authority Having Jurisdiction – The Miami-Dade County Fire Marshall's Office.

*Electrical Installations:* During my walkthrough, I reviewed electrical installations as per the requirements of NFPA 70 – National Electrical Code 2002 Edition. My review emphasized flexible electrical cord usage.

**Limitations of Review:** The observations noted in this report were discovered during my walkthrough as a general visitor of the Miami Seaquarium. It is important to note that due to the secretive nature of my review, it was not possible for me to interview Miami Seaquarium employees to clarify specific questions that I had during my review. Also, I was not permitted to inspect "employee only" areas. However, based upon my review of the 22 minute inspection video of the Miami Seaquarium, I believe that had I been permitted to walkthrough the "employee only" areas, I would have found numerous serious electrical installation violations.

**Overall Assessment:** Several significant safety concerns exist at the Miami Seaquarium, particularly with respect to life safety at the Golden Dome Sea Lion Show; Flipper Show; and Killer Whale Show. Apparently, the maximum occupant load has not been established for each of these assembly areas. Also, each of these assembly areas is equipped with only two exits; four exits are required as per the NFPA Life Safety Code.

During my walkthrough, I was informed that in response to a recent complaint, the Miami-Dade County Fire Marshall's office has recently performed a life safety inspection of the Miami Seaquarium and several violations were discovered. It is a significant concern that these violations were never cited by the Miami-Dade County Fire Marshall's office during previous routine scheduled inspections.

In addition to the life safety violations, there were numerous electrical installation practices that are in violation of the National Electrical Code.

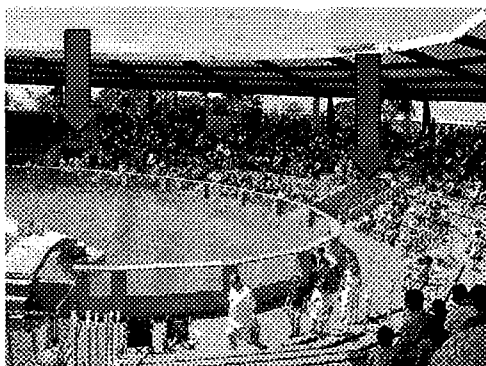
### Life Safety Code – Specific Findings

*Occupant Load:* NFPA 101 requires assembly occupancies to determine the maximum number of people permitted to safely occupy an occupancy: NFPA 101 – 2000: 13.1.7.1: *“The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2...”* I did not observe any assembly areas with posted occupant load signs.

*Number of Means of Egress:* Based upon the occupant load, a sufficient number of exits are required to ensure the safe and orderly evacuation of visitors. Based upon information provided by the Dolphin Freedom Foundation as well as my personal observations, the Golden Dome Sea Lion Show; Flipper Show; and Killer Whale Show all appear capable of accommodating over 1,000 spectators. NFPA 101 – 2000: 7.4.1.2 (2) states that when the occupant load is more than 1,000 – not less than four (4) means of egress (exit) shall be provided. However, each of these shows only contain two means of egress. Listed below are specific findings associated with each show.

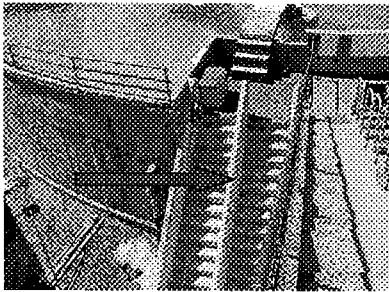
The Authority Having Jurisdiction – The Miami-Dade County Fire Marshall’s office – has the ultimate authority to allow exceptions to NFPA 101 Life Safety Code. However, in my professional opinion, exceptions should only be made in cases where a review has been performed and it has been determined that exits are sufficient in number and design to safely allow spectators to exit in an emergency.

**Killer Whale Show:** The picture below shows the two exits (depicted by arrows) utilized by spectators for exiting the show. If the closest exit were to be blocked in an emergency, spectators on the near (North) side of the photo would have no alternate means of egress, a violation of NFPA 101 – 2000: 13.2.5.1: *“Exits shall be located remotely from each other and shall be arranged to minimize the possibility that they might be blocked in an emergency.”*

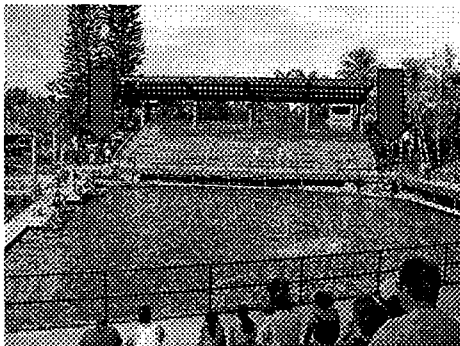


As stated previously, four (4) exits are required for this type of occupancy. An article in the October 11, 2003 edition of *The Miami Herald* states that the Miami-Dade County Fire Marshall’s office plans to allow this violation to be abated by only adding one (1)

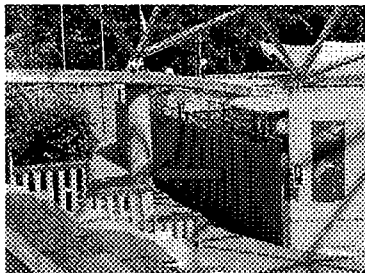
additional exit. This will result in a total of three (3) exits instead of the four (4) required per NFPA 101. I am not aware of where the additional exit will be added. There are presently two (2) employee only exits from the facility. However, the employee exit on the North side would require spectators to exit through the operating plant of the facility and might expose spectators to additional hazards by exiting through a more hazardous area. This would be a violation of NFPA 101 – 2000 13.2.5.2: *“Means of egress shall not be permitted through kitchens, storerooms, restrooms, closets, or hazardous areas as described in 13.3.2.”* Also, the employee only exit on the South side does not appear wide enough to sufficiently accommodate the required occupant load nor is it designed to accommodate children in strollers as well as spectators in wheelchairs. In addition, exit access would be partially restricted by the wheelchair designated area that is located just prior to the potential exit access route.



**Flipper Show:** Only two exits are provided, four are required for this type of occupancy. Also, if the far (North East) exit were to be blocked, spectators on the South side would have no alternate means of egress.



**Golden Dome:** Two exits are provided; four are required. Also, the picture below reveals the large support pillar located on the West side exit partially restricting egress.



**Top Deck Dolphin Show:** The Exit signs are posted but are turned sideways and not obvious to spectators. Exit signs should be repositioned to be more conspicuous.

**Tropical Fish Aquariums:** In several cases Exit signs are posted before the exit and it is not obvious if a visitor should go up or down a flight of stairs to safely exit the aquarium. To avoid confusion, exit access should be more conspicuously identified. In the picture shown below, the exit sign should be located closer to the descending stairs to clearly identify the proper exit path.



### Electrical Installations

*Misuse of flexible electrical cords:* There were numerous examples of flexible electrical cords attached to building structures via cable ties or other means. This practice represents a significant hazard to visitors and employees of the Miami Seaquarium – a fray in the flexible cord could potentially energize a metal structure. Article 400 – 8 (4) of the National Electrical Code prohibits flexible cords from being attached to building structures. Some of these cords are less than 50 volts and are therefore exempted from this requirement. However, there are numerous electrical cords  $\geq$  50 volts attached to conduit or other building structures. Listed below are some typical examples observed during my walkthrough.

Photo 1: Top of Reef Tank – Yellow electrical extension cord attached to chain link fence.



Photo 2: Top of Reef Tank: Flexible cord attached to conduit and being used in a permanent manner.

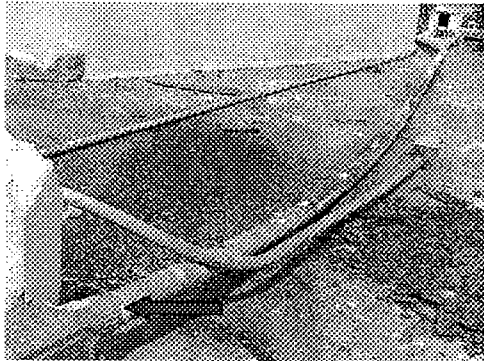


Photo 3: Flexible electrical cord attached to Top Deck Dolphin Show Tank:

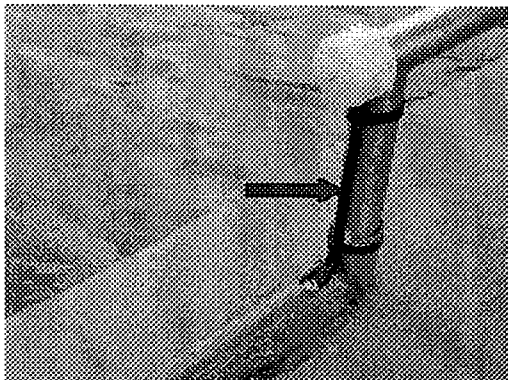
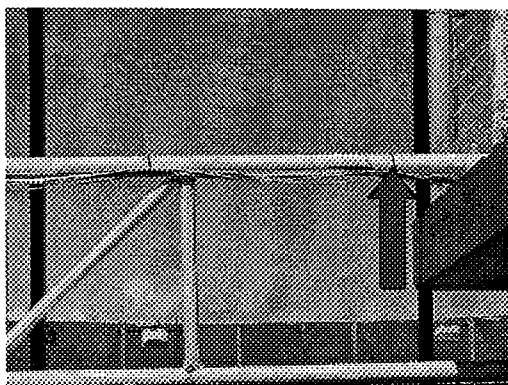
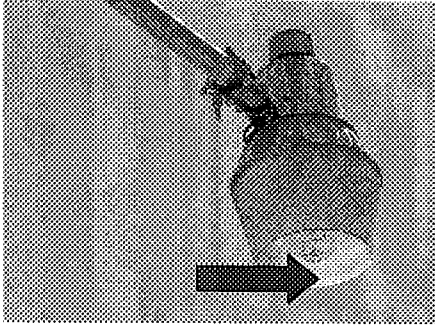


Photo 4: Flexible electrical cords attached to metal structure at top of Reef Tank.



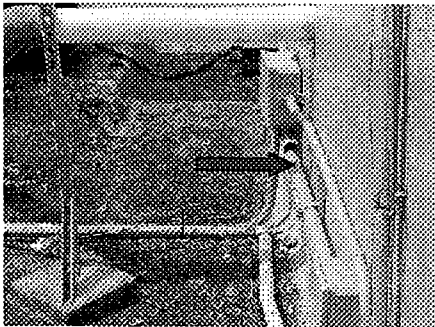
**Suitability of Light Fixtures for Outdoor Use:** During my walkthrough, I observed approximately fifteen (15) outdoor lighting fixtures that do not appear to be acceptable for use in a wet outdoor environment, a violation of Article 410-4. (a) of the National Electrical Code. An example of one of these lighting fixtures is shown in photo 5.

Photo 5: Lighting fixture at top of Reef Tank.



**Guarding of Live Parts:** Article 110-27. (a) of the National Electrical Code requires live electrical components operating at  $\geq 50$  volts to be guarded against accidental contact.

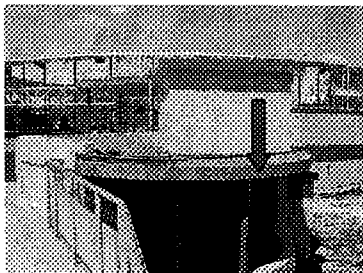
Photo 6: Conduit at top of Reef Tank – Damaged, potentially exposing live conductors to Miami Seaquarium employees.



### **Walking Working Surfaces**

Walking working surfaces was not emphasized during my walkthrough, however, I did note one potential hazard. An employee was sweeping off a roof with a broom near the top of the Reef Tank – potential fall hazard. OSHA 29 CFR 1910.23 (c)(1) requires fall protection, such as guardrails, when employees are exposed to fall hazards  $\geq 4$  feet.

Photo 7: Roof at top of Reef Tank





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Mr. Rector, thanks for providing me the opportunity of working with you on this project.

Please feel free to contact me if you have any questions at: 919.933.5548.

Sincerely,

W. Jon Wallace, CSP, MBA