

Response to PATI Request by Royal Gazette on 18th June 2025.

REQUEST: Information on the five environmental incidents over the three fiscal years 2021-22, 2022-23 and 2023-24 which were the most costly for your department in terms of the remediation measures they led to which your department paid for, or records containing that information. We are looking for the total cost per incident of the remediation measures and any report you prepared on each incident.

Item #	Date of Incident	Incident Title	Description of Incident	Description of Response by DENR	Remediation	Personnel Hours Committed	Estimated Total Cost Per Incident [†]	Fine Imposed
1	21-Feb-24	Oil Spill Dockyard	Repairs to Crisson Construction Ltd barge near South Basin, Dockyard led to oil in the ballast of the barge to be pumped into the sea.	DENR and Coast Guard visited Dockyard to identify the source of the spill and to inform Crisson to cease operations and to cleanup waste oils on their barge. DENR retruned the next day to realise that requirements had not been fully followed.	DENR informed DolphinQuest who deployed their boom at the entrance gate to prevent oil entering the dolphin enclosures. DENR provided instruction to Crisson to deploy their oil adbsorbent boom to clean up the spill. Upon realising that some fo the oil source had not been addressed by the next day DENR started to collect Witness Statements from DENR, Coast Guard Unit, Pier 41 Harbour Master and Dolphin Quest. DENR liaised with the Department of Public Prosecutions to prosecute Crisson Construction Ltd under Section 34(1) of the Water Resources Act 1975 (i.e. Pollution to Seawater). Initial plea 'Not Guilty' 31 May 2024. Subsequent plea of Guilty on 3rd July 2024. Fine \$5,000.	Estimated hours for DENR personnel: 80 hours		\$5,000
2	24-Apr-23	Unlawful cutting of protected species: Mangrove Trees	Mid Ocean Club (MOC) had allowed their landscape gardeners to extensively cut mangrove trees located on their property at Trott's Pond, Hamilton Parish.	DENR inspected the site and decided to prosecute MOC under Section 9(2)(a) of the Protected Species Act 2003.	Initial plea Not Guilty on 31 May 2024 and MOC pled 'Guilty' on subsequent court date on 20th Jun 2024. Fined \$5,000. DENR is currently discussing with MOC a variety of landscaping options that will allow their golf course to be restored to the status it was in many decades ago while also being mindful and supportive of terrestrial conservation (i.e. removing invasive plants and planting more endemics). MOC are due to employ an additional four (4) groundsmen/arborists to achieve this goal.	Estimated hours for DENR personnel to date: 100 hours.		\$5,000
3	23-Sep-22	Oil spill from wrecked vessel 'MV Cortina' from Hurricane Fiona at Port island, Paradise Lakes.	Vessel had been placed on incorrect mooring (i.e. not a storm mooring) off Port Island. Fuel/oil was seen as a sheen around the wreck of the vessel.	DENR manages the National Oil Spill Contingency Plan and Equipment of Bermuda with M&PS. Instruction was given to use some of the national oil adsorbent boom stock (5 rolls of 5-inch diameter polypropylene = ~200ft of boom) to surround the vessel to help contain and adsorb the oil sheen. The deployment was performed with the Coast Guard Unit and DENR personnel. Boom was subsequently removed months later after the sheen was not visible.	DENR / Coast Guard Unit deployed 200ft of adsorbent boom to address oil spill/sheen and recovered spent boom once risk had passed. DENR coordinated replacement of same type of boom from the owner of MV Cortina, which was used to re-stock the National Oil Spill Response Equipment. DENR understands that the owner is trying to get the insurer to cover costs of the salvage but because it had inadvertently been put on the incorrect mooring just before the storm the insurer considers that its cover is not applicable. DENR is consdiering whether this can be added to the Abandoned & Derelict Vessel (ADV) list for the next survey to be completed under the Govt-KBB MOU.	Estimated hours for DENR personnel: 30 hours.		N/A

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4	Nov 2021 to June 2024 (Complaint days per month ranged from 0 to 8, average 2). None since Jun 2024.	Fumes of oil/diesel from BELCO tanks located along St John's Road	Since the BELCO North Power Station (NPS) started operation there have been fumes of oil/fuel from the tanks located along St Johns Road impacting immediate neighbours.	DENR, through the Environmental Authority and the BELCO annual operating Licence (OL-114), required changes to equipment and operations at BELCO to address the fumes of oil/fuel (i.e. not exhaust fumes). A complaints logs was also maintained of these incidents. Site visits were performed to understand the complaint sources and to determine what remediation solution would be necessary.	Through the controls described the following changes were made by BELCO: (i) Bespoke stainless steel activated carbon filters were installed to many of the passive vents on this fuel/oil tanks located along St John's Road, (ii) Some operational activities in these tanks were diverted back to the central part of the BELCO site, and (iii) Some passive vents were re-directed through existing ductwork away from St John's Road and back to a more central location on the BELCO site. Complaints from neighbours associated with the fuel/oil odours from the passive vents of the tanks (i.e. not exhaust fumes) have declined considerably over this period. The last complaint was recorded in June 2024.	Estimated hours for DENR personnel over 2.5 years = 150 hours		N/A. Noting that the fumes did not fail any standard and were therefore considered as a nuisance.
5	Records started Oct 2021 and are ongoing through 2025	Large-particle Soot Fallout during startup of NPS engines after they have been offline for days.	Unburnt fuel oil condenses on the inside of NPS exhaust flue stack where it is baked to inorganic carbon (i.e. essentially carbon black). After the engine has been off for a few days the black layer cracks and upon the next engine start up erupts out of the exhaust . This eruption may only last a few minutes but the large-particulate soot deposits then fall onto many properties downwind of the NPS stacks.	DENR, through the Environmental Authority (EA) and the BELCO annual operating Licence (OL-114), required changes to equipment and operations at BELCO to address the large-particulate soot. [It is noted that this large particulate soot, at sizes of millimetres to centimeters in diameter, is very different to the fine-particulate soot that can be inhaled into the lung (i.e. PM10 = particles less than 10 micrometres and PM2.5 = particles less than 2.5 micrometres) which is monitored under the Clean Air Regulations 1993.] DENR/EA required BELCO to report all complaints to DENR as daily reports and monthly summaries. DENR/EA also required BELCO to provide details of the operational changes necessary to address these soot episodes. DENR also required BELCO to use a third party organisation (i.e. BIOS) to analyse water tanks against the UK Drinking Water Standards as well as the World Health Organisation (WHO) Guidelines. A total of 65 water tanks have been analysed to date with another five to assessed soon. None have failed the primary drinking water standards with regards to combustion product chemistry and the few that have failed secondary water standards (i.e. iron and aluminium - can affect the aesthetics of drinking water - not health) is similar to the frequency found in a previous island-wide study of Bermuda's water tanks.	Through the controls applied through DENR/EA, BELCO have tried a number of changes to the NPS engines including: (i) Inserting shims in the piston shafts to increase the combustion pressure in the cylinders, (ii) Changing the piston crowns to get a more even combustion within the cylinder, (iii) Installation of fuel dryers to help improve combustion efficiency, and (iv) Starting and ending each engine operation with road diesel instead of heavy fuel oil to help keep the fuel lines relatively clear. DENR is not aware of what changes remain for BELCO to trial on the NPS engines. It is noted from an emission perspective only that operation of the NPS engines on road diesel fuel (50ppm sulphur) would avoid this large particulate soot issues, as understood from similar MAN dual-fuel engines that are installed elsewhere in the world. It is also noted from an emission perspective only that operation of the NPS engines on LNG gas would be expected to reduce fine-particulate emissions (PM10/PM2.5) by 95%, sulphur dioxide emissions by 99% and nitrogen dioxide emission by 50-60%. LNG or road diesel fuel would also be expected to eliminate the large-particulate soot that is currently observed.	Estimated hours for DENR personnel over 3.5 years = 200 hours		N/A DENR has yet to be able to show failure of any air quality or drinking water standard as a result of large particualte soot. Damage to property under the Clean Air Act could be challenged but AGC consider that because BELCO clean many roofs and install water filtration systems that the judicial system may consider such impacts as being mitigated by the polluter. The Amendments to the Clean Air Act will introduce Statutory Nuisance thereby allowing consideration of the actions of complaining about soot impacts and coordianting time for BELCO crews to clean the roofs as being part of the nuisance claim. AGC consider this as a better likelihood of a successful prosecution but a nuisance fine may not be of high value.

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6	Records started Oct 2020 and are ongoing through 2025	Downrafting of exhaust fumes to some properties located on Ocean Lane and Whitney Avenue, Pembroke.	When the wind is from the SSW at a speed of greater than 15 knots then exhaust fumes from both BELCO NPS and East Power Station (EPS) stacks pass through a notch between Mount Hill and Langton Hill that causes impact via downrafting to approximately ten (10) properties located on Ocean Lane and Whitney Ave.	DENR, through the Environmental Authority (EA) and the BELCO annual operating Licence (OL-114), required BELCO to install and operate a portable Air Quality Monitoring Station located at the end of Ocean Lane on the private property of a resident. Its operation and data was also verified by BIOS under contract to DENR. The total contract value for BIOS to provide ambient air quality monitoring and maintenance of stations/sensors over Bermuda is \$230,000 PA. The station operated from October 2020 to June 2022 and had to be removed when the home owner wanted to free up approximately 2-3 parking spaces that were occupied by the station. Over this time it became understood that when the wind was from the SSW direction and greater than 15 knots that downrafting of strong exhaust fumes could impact neighbours at the end of Ocean Lane and in the middle of Whitney Ave. No other properties appear to have been consistently impacted by long-lived downrafting (i.e other properties nearer to BELCO experience periodic impacts).	The concentrations of chemical components in the downrafted exhaust were shown to be compliant to both Bermuda and UK statutes. However, levels of sulphur dioxide (SO2) were shown to exceed the UK Air Quality Target Level for SO2 (i.e. greater than 266 micrograms per cubic metre: 266 µg/m3). The Clean Air Regulation Amendments 2025 that will follow the Clean Air Act Amendments of 2024 will align Bermuda's Limit Values to the UK Target Levels thereby requiring compliance to such Limit Values in Bermuda law. It is noted that in the UK the Target Levels cannot be policed as they are largely aspirational. BELCO were able to demonstrate compliance to the proposed new limit for SO2 by switching fuel from some of the operational engines from 2% sulphur Heavy Fuel Oil to 50ppm sulphur road diesel fuel. BELCO are therefore able to abate the exhaust via fuel switching to become compliant to the proposed Clean Air Regulations. Furthermore DENR and BIOS are in the process of locating a smaller sensor at Whitney Avenue to provide air quality data.	Estimated hours for DENR personnel over 4.5 years = 250 hours		N/A Noting that the exhaust emissions measured at the end of Ocean Lane were compliant to Bermuda Clean Air Regulations 1993.