HELCOM Recommendation 42-43/12

Adopted 15 January 2026,
having regard to Article 20, Paragraph 1b)
of the Helsinki Convention

BAT/BEP TO MINIMIZE NUTRIENT LOSSES FROM DRY BULK FERTILIZER STORAGE AND HANDLING IN PORTS IN THE BALTIC SEA REGION

THE COMMISSION,

RECALLING Article 6 of the Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1992 (Helsinki Convention), in which the Contracting Parties undertake to prevent and eliminate pollution of the Baltic Sea Area from land-based sources,

HAVING REGARD also to Article 3(1) of the Helsinki Convention, in which the Contracting Parties shall individually or jointly take all appropriate legislative, administrative or other relevant measures to prevent and abate pollution in order to promote the ecological restoration of the Baltic Sea Area,

RECOGNIZING that in order to prevent and eliminate pollution of the Baltic Sea Area the Contracting Parties shall promote the use of Best Environmental Practice (BEP) and Best Available Technology (BAT) as laid down in Article 3(3) and the criteria for which are specified in Annex II of the Helsinki Convention,

RECOGNIZING ALSO that the updated Baltic Sea Action Plan (BSAP) adopted at the HELCOM Ministerial Meeting 2021 calls for development and introduction of best technologies, techniques and practices (BAT/BEP) to minimize nutrient losses from dry bulk fertilizer storage and handling in ports in the Baltic Sea region by 2024 (action S21),

ACKNOWLEDGING existing national and international legislation and competences and, for those Contracting Parties being EU Member States, also other relevant national regulations, by-laws and codes of conduct, aiming at preventing further degradation of the marine and freshwater environments and at achieving a healthy sea in good environmental / ecological / chemical status,

URGES that the Contracting Parties encourage ports and environmental authorities to utilize the reporting format in Annex 1 to the extent applicable to help and unify ports' environmental control in the Baltic Sea Region,

RECOMMENDS to the Governments of the Contracting Parties to the Helsinki Convention to apply HELCOM BAT / BEP to minimize nutrient losses from dry bulk fertilizer storage and handling in ports in the Baltic Sea Region (2024), based on Annex II of the Convention.

Annex 1 Reporting format for application of BAT/BEP to minimize nutrient losses from dry bulk fertilizer storage and handling in ports in the Baltic Sea Region

1. General				
Country:		Year:		
Facilities	Facility X	Facility Y	Facility Z…	Facility N…
1. Facility name and harbour/port				
2. Annual capacity, metric tonnes				
– Storage, tonnes				
– Handling, tonnes (export, import)				
3. Fertilizer type handled, tonnes				
– Nitrogen (N), tonnes				
– Phosphorus (P), tonnes				
– Potassium (K), tonnes				
– NPK, tonnes				
4. Environmental permit				
– Validity (from – to)				
– Limit values (emissions, discharges)				
○ *Dust,*				
○ *N (NNO2, NNO3, NNH3, NTOT)*				
○ *P (PPO4, PTOT)*				
○ *Other relevant?*				
5. BAT/BEP applied (Yes, No)				

2. Self-assessment checklist for Facility X, Y, Z… N	
Describe the BAT/BEP applied on the site. (Please tick relevant boxes or add a description)	
(1) Handling and storage of dry bulk fertilizers	
1.1 General handling and storage	
☐	Buckets have a line marked 20 cm below the edge to show the allowable limits of fertilizer carried to prevent spillage during handling.
☐	Wind speed limits implemented that prevent operation above certain wind speeds (often 10-15 m/s).
☐	Transport distance between the ship and the storage destination minimized to ensure a continuous handling process while minimizing nutrient losses.
☐	Dusting during loading of cargo diminished by placing the base of the chute next to the cargo or using height adjustable fill pipes/fill tubes/cascade tubes.
☐	Closed conveyor belt systems are used to prevent dusting.
☐	Conveyor belt system is designed with optimal parameters that help in minimizing nutrient losses.
☐	Conveyor belts are dry and warm before the cargo is handled to prevent the fertilizer from sticking and leaving residues on the belt. One way to ensure this is by running the belts well before loading.
☐	Regular maintenance checks performed before and after operations to prevent spillages during the handling of cargo. All equipment is working smoothly and dust filters installed in the conveyor belts are still effective.
☐	Bulk cargo is handled in closed containers (mainly suitable for small volumes in cases where the cargo does not need to be stored for long).
☐	Cargo is transported in bags in order to minimize dust formation during cargo handling.
☐	Modern vibrating screens equipped with a dust collector are used during screening to minimize dust spillage.
☐	Dust suppressing techniques are used where possible in the handling equipment (e.g. baghouses, filters, screw conveyors and vacuum systems) .
☐	Conveyor belt system with internal speed-dampening mechanisms is used to minimize dusting, e.g. baffles can be used in fill pipes, cascades in tubes or hoppers or a loading head can be used to regulate output speed of cargo.
☐	Scraper blades are used during fertilizer storage and removal from storage, which transport the fertilizers by pushing them upwards, to prevent dust formation by minimizing the free fall of the cargo.
1.2 Ship-to-shore loading and unloading of dry bulk fertilizers	
☐	Regular maintenance checks performed on the clamshell buckets before and after operations to prevent spillages during loading and unloading of cargo. During maintenance, check whether the grab still closes tightly.

☐	Crane operators apply a so-called 'dusting off move' before the bucket starts to move to/from the berth for (un)loading. This decreases the chances of fertilizers dropping during the transportation, as the 'dusting off move' clears fertilizers from the bucket that could potentially fall.
☐	The bucket is closed the moment after fertilizer is released and the bucket is brought back to pick up the next batch of fertilizer. The BAT can be applied during loading and unloading of fertilizers. This is especially important for cranes handling lower quality grains which are more sticky, leaving residues of fertilizer in the bucket. In case the bucket is not closed the residues could be released onto the berth.
☐	Area between ship and berth is covered to prevent the grabber from moving over the open water (causing direct spillages in the harbour). An example of a cover is a durable tarpaulin, which is a versatile cover suitable in less windy ports. A more robust prevention cover that can withstand heavier weather conditions is a prevention cover made of wood and steel.
☐	As much as possible closed systems are used. This reduces dust formation and cleaning (which in turn reduces costs), but also increases the productivity since operations are made weather-independent. Examples of closed systems are conveyors, chutes, telescopic arm unloaders, telescopic trim chutes and screw unloaders.
☐	Hatch covers on the ship's cargo hold openings are used. The closed-off holes minimize dust spillages and enables unloading independent of the weather conditions. However, this is only suitable for ships with feeder hole openings on their cargo holds.
☐	Unloading cargo under a roof or a covered berth is used. This is currently seldom implemented. However, it could decrease downtime in operations in case of rainfall. In this way, terminal operators could allocate more time to cargo handling, making sure the process is done with more attention to minimizing nutrient losses.
☐	Bulk containers and bulk container spreaders are used. Bulk container spreaders enable the unloading of fertilizer (stored in containers) into the cargo hold by tilting the container and can be used to minimize dust formation.
☐	Dust generation reduced by using wind protection covers. Examples of such covers could be wind barriers or special dust control systems attached to hoppers.
1.3 Onshore vehicles (trains, trucks, cars)	
☐	Loading and unloading of trains takes place in covered areas. This practice prevents dust spreading.
☐	Hard surfaces to the roads are applied. Examples include concrete or asphalt which can be easily cleaned if fertilizers are spilled.
☐	Different vehicles are applied inside and outside the storage buildings to prevent fertilizer residues from being transported out of storage areas with vehicles.
1.4 Storage of cargo	
☐	Fertilizers are best stored in a closed and dry environment to shelter from wind and minimize dust formation. Examples of storage facilities are silos, bunkers, hoppers and containers. The same applies for storing of cleaned cargo residues.
☐	When hoppers are being used to store cargo, electrically closable hoppers are recommended. This is very useful because in the case of quick degradation of weather conditions the system can be shut off rapidly, reducing losses of fertilizer and preventing fertilizer from being damaged.
(2) Cleaning equipment and routines	
2.1 Cleaning of berths and surrounding areas	
☐	Berth is cleaned immediately after each loading and unloading operation, ideally on a more frequent basis throughout the day (e.g. in the breaks between the (un)loading operations). The berth should also always be cleaned before it starts raining or snowing, requiring careful monitoring of the weather forecasts.
☐	A clean-up checklist is applied to control minimizing fertilizer spills in the (un)loading and storage area. The checklist specifies the steps that prevent spillages and ensure proper cleaning. This applies to operations performed at the ports and terminals, on board the ship and at the production location. The checklist includes guidelines to follow once spillages occur (specific to all weather conditions). It also serves to keep cleaning standards high in ports where employees rotate frequently.
☐	Cleaning berth and surrounding areas by using (mechanical) sweeping brushes or cleaning equipment with a vacuum function to guarantee better cleaning.
☐	Port and terminal areas cleaned with water only under the condition that this wastewater is collected and treated in a wastewater treatment plant.
☐	Collected fertilizer spills are managed according to environmental standards and protocols defined by environmental authorities. The spillage material is properly returned to the manufacturer, reused or properly disposed of.
☐	Cleaning of vehicle tyres is performed, since fertilizers can be spread by vehicles stationed in the port and terminal areas. The spreading of fertilizer can be prevented by vehicle tyre cleaning systems. The wastewater from vehicle washing should be collected and treated in a wastewater treatment plant.
2.2 Cleaning of ships	
☐	Cargo residues from ship holds are dry cleaned before they are washed with water. This significantly reduces the amount of nutrients ending up in the cargo hold wash water. Some vessels are only responsible for transporting fertilizers and then sometimes dry cleaning suffices which omits the issue of wastewater discharging at the port of arrival.
☐	Vessels are not allowed to proceed to the next port until all fertilizer spills have been removed from the deck and the gangways by brushes (dry cleaning).
☐	It is ensured that ships can deliver their wash water to the port/terminal and that this can be done in an efficient manner (for example collection trucks are readily available at a given time and terminal). This prevents discharge of nutrient carrying wastewater at sea.
☐	Ships can be cleaned with water only under the condition that this wastewater is collected and treated in a wastewater treatment plant. It is currently quite common for ships to go to sea to clean the hold.
☐	The cleaning process of the ship's cargo holds with water is done under high pressure rather than using high volumes of water. This practice reduces the costs of delivering wastewaters and puts less strain on the port reception facilities for holding wash waters. Due to dry cleaning beforehand and high-pressure washing often only being possible in the lower areas of the cargo hold, the reduction of wash water is relatively limited.
(3) Management of stormwater and snow	
☐	Outlets, wells and drainage systems are covered with blind covers before operations to contain the fertilizer on the quay and to ease the cleaning process before the fertilizer enters drainage systems and flows directly into the sea.
☐	Stormwater is captured and treated before it is discharged into the sea. In some ports, where fertilizer plants are on the port grounds, the stormwater can be drained and treated at the wastewater plant.

☐	In winter, snow is collected from berths in a dedicated area with appropriate stormwater management to prevent fertilizer spills from entering the sea when the snow melts.
(4) Monitoring of process improvement	
4.1 Monitoring of residues and discharges	
☐	Monitoring of residues in cargo hold wash water of ships mainly transporting fertilizers to measure their contents and use correct disposal methods. Some ports do not accept wash waters from vessels if the exact content is not known. Therefore, this is an important practice.
☐	Monitoring of phosphorus and nitrogen content of stormwater by sampling techniques to measure the amount of pollution discharged into the sea. This data could be further used to estimate the effects of nutrient discharges on the environment in terms of eutrophication.
☐	Monitoring of air quality at the ports' weather station to keep track of the dust particulates in the air. This could aid in monitoring dust formation due to fertilizer handling. Protocols regarding operations can be put in place when the dust levels exceed limits.
4.2 Monitoring the process	
☐	Continuous monitoring of the work, for example, by cameras and visual inspections. The terminal operator can, for example, monitor the crane driver performance. Port authorities and terminal operators can monitor the cleaning procedures. In this way, improper performance can be corrected and/or penalised and prevented in the future.
☐	Monitoring of equipment, for example, the dust filters in the machinery, the effectiveness of the closed systems/conveyor belts, the containers, etc. The terminal operators should conduct this monitoring process regularly, at least before and after handling the cargo loads.
☐	Monitoring and forecasting weather conditions can help estimate and determine potential interruptions during work and when cleaning is needed. The port authorities can monitor the weather and terminal operators are also responsible for organising their work and cleaning schedules around the weather forecast. The monitoring and forecasting of weather conditions is also very important for monitoring the concentrations of nutrient discharges in stormwater and can help to control the automatic sampler.
(5) Improving communication between different stakeholders	
☐	Rewarding schemes established for workers to achieve minimal nutrient losses, similar to what is done to reward safety regulations and practices in ports. Rewards can include certain prizes/lunch incentives or bonuses.
☐	BATs/BEPs are a standard component/requirement for shipment contracts to avoid major nutrient losses during transportation. In this way, handling and storage requirements can be guaranteed. Manufacturers can play a significant role in ensuring safe transportation by third parties.
☐	Agreements established between port/terminal and shipping company e.g. on specifications for feeder holes for closed loading.
☐	Experiences and good practices are shared with relevant stakeholders, e.g. through a platform to share good practices to boost cooperation.
☐	Good communication between port and terminal established, e.g. to monitor fertilizer losses at a terminal.
☐	Employees provided with regular feedback on their job performance to minimize nutrient losses (e.g. for crane operators).
☐	Monitoring details are shared with operators and authorities to raise awareness and encourage more action to decrease nutrient losses. Monthly goals of nutrient discharge levels can be created to stimulate employees.
☐	Individual conversations are established between port and companies operating in the port area about preventing environmental impacts.
(6) Developing skills through training and education	
☐	Cargo handling is kept at minimum or even stopped in bad/windy weather conditions. Crews are educated on operations to minimize nutrient losses in bad weather conditions. Operations should be limited if winds exceeds 10-15 m/s (depending on the port).
☐	Crane operators trained to close the bucket the moment after the bucket releases the fertilizer and it is brought back to pick up the next batch of fertilizers. This is especially important for cranes handling lower quality grains which are more sticky, leaving residues of fertilizer in the bucket that could be released onto the berth if the bucket is not closed in that moment.
☐	Experienced personnel, both on shore and on board, are ensured. Especially when using older/less innovative equipment that has a higher risk of spillage, training is crucial for careful handling. Combination of well-trained personnel and adequate equipment is ideal.
☐	When new and more efficient equipment is installed and used, personnel are trained in its proper application and maintenance.
☐	Awareness is raised amongst the employees and different stakeholders about the consequences of fertilizer losses, e.g. through workshops where the effects of nutrient losses are explained along with the BATs/BEPs put in place. During these workshops an open, safe space should be created to encourage stakeholders to look ahead and brainstorm together about possible solutions to the problem.
(7) Addressing policy makers and authorities.	
☐	Environmental permits encourage implementing BATs/BEPs to minimize fertilizer losses.
☐	Training materials are provided to ports, terminals, shipping companies, fertilizer manufacturers/owners and can be used during regular. audits.
☐	Port is provided with adequate reception facilities for the disposal of hold wash waters; they are enforced and controlled by authorities.
☐	Economic incentives introduced to make discharging wash water in ports more financially attractive, e.g. by introducing a no-special fee system.
☐	Regular audits conducted. Policy makers and authorities support ports and terminals by controlling correctness of such routines.