

**BEFORE THE NATIONAL GREEN TRIBUNAL**

**PRINCIPAL BENCH, NEW DELHI**

**ORIGINAL APPLICATION NO. 451/2019**

**IN THE MATTER OF:**

**Air Marshal Anil Chopra (Retd.)**

(Report on environmental issues, waste management –Armed Forces, general issues of Cantonments and lists of major military stations and Cantonments of all the state)

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**THROUGH**

*Nidhi*

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**Date: 10.09.2020**

**Place: New Delhi**

Government of India

Ministry of Defence

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New Delhi, dated 03 July, 2020.

**Sub: Order dated 11.02.2020 passed in OA No. 451/2019 in the matter of Air Marshal Anil Chopra by National Green Tribunal, Principal Bench, New Delhi – Regarding.**

Reference is invited to Ministry of Defence's letter of even No. dated 28.02.2020 submitting Report on Environmental Issues and Waste Management vis-à-vis Armed Forces, Siachen Glacier Ecological Issues and Cantonment & Military Stations in compliance of National Green Tribunal (NGT) order dated 11.02.2020 passed in OA No. 451/2019 Air Marshal Anil.

2. It is submitted that Status report on "Environmental Issues and Waste Management - Armed Forces" is annexed as Annexure-A, B, & C in respect of Air Force, Army & Navy respectively.



(Nazli J Shayin)

Joint Secretary (Lands)

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18 Jun 20

OFFICE OF THE AIR OFFICER IN CHARGE ADMINISTRATION

WASTE MANAGEMENT AND ENVIRONMENTAL ISSUES  
ARMED FORCES

- Reference is made to IDS/WSOI/JS (Air)/Gen/C1 dated 28 Mar 20 and MoD ID No. 356/2020/D (Air-II) dated 12 Jun 20.
- Subject study report of Air Mshl Anil Chopra has been examined. Status report on the proposed action plan is appended below:-

Sl. No.	Proposed Action Plan as per Study Report	Status Report
(a)	<u>Directions from MoD to Service HQs.</u> For effective implementation and monitoring of the National Green Tribunal (NGT) initiatives, the directions must go from Ministry of Defence (MoD) to all the Services HQs, so that the watchdog commissions can interface at appropriate levels.	The instructions received from MOD from time to time are passed down to Command HQ for effective implementation.
(b)	<u>Sensitising Field Commanders.</u> The author has proposed the need to sensitise all field Commanders on the desired Green initiatives. Pamphlets and material on modern green initiatives and action plans may be sent by NGT to the Service HQs with direction to circulate till unit level.	This is already in vogue and all Green initiatives along with instructions on Cleanliness drive are aggressively followed up with Command HQ. Celebration of yearly 'Swachhta Pakhwada' or 'National Plogging Day' on 06 Dec 19 is the case in point.
(c)	<u>Monitoring by Command HQs.</u> It has been proposed that Armed Forces to institute special environment initiatives monitoring cells at the Command HQ level initially, and later at lower levels.	Command HQ have already been directed to monitor the environment initiatives and the same is being followed up by SOA branch.

19/6/2020  
SOA/PK

OFFICE OF THE AIR OFFICER IN CHARGE ADMINISTRATION

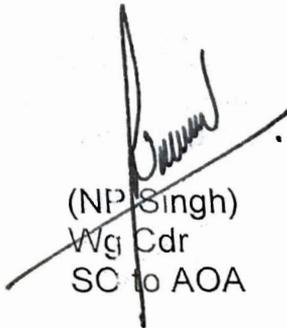
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(d)	<b><u>Trophies and Awards.</u></b> It has been proposed Armed Forces to institute special trophies and awards for 'Green' initiatives.	Though no such specific trophy has been instituted, yet Command HQ/Stations have been asked to recognise the Best Station/Unit contributing towards 'Swachhta' mission.
(e)	<b><u>Waste Management Plants.</u></b> Each major Cantonment should have an automated waste management plant.	This is an ongoing process. All Command HQ have been instructed to implement Solid Waste Management Plants and issues are being followed up at appropriate level.
(f)	<b><u>Waste Segregation.</u></b> Each station must set up special teams for waste segregation before forwarding to nearby waste management agencies.	This is already in practice and all Conservancy Contracts are based on the guidelines of Solid Waste management.
(g)	<b><u>Display Boards</u></b> All military residential areas should have display boards educating the personnel and their families.	Appropriate Boards are displayed in the residential areas, however, <b>some more thrust</b> may be given on this issue. Command HQ will be advised towards this.
(h)	<b><u>Disposal with 'Green' Norms.</u></b> Operational and military specific waste must be segregated and disposed of as per 'Green' norms. This includes the chemicals, oils and lubricants. All items auctioned as scrap must have an inbuilt contract specification for its further disposal as per 'Green' norms. This is also very relevant to 'Electronic' waste.	'Green' norms are already in place, particularly in Works Services. MES would be once again intimated to ensure the same.
(j)	<b><u>Environmental Care for Military Waste.</u></b> Military must handle with environmental care the armament related waste such as shells and unexploded munitions.	Environment friendly procedures are being adhered to while dealing with UXBs and ammunitions at Station level under guidance of Command HQ
(k)	<b><u>Monitoring of TA.</u></b> Territorial Army is meant to have 'Eco' battalions, their working and output needs to be reviewed and monitored.	This is beyond the purview and may be considered by Army.

(l)	<u>Aviation related Pollution.</u> Airbases must look at aviation related pollution, including noise and air pollution.	This is under the purview of Dte of Aerospace safety and eco-friendly measures are already in place vis- s-vis op constraints.
(m)	<u>Subject in War Colleges.</u> Warfare taxonomy and ecology must be a subject in all War Colleges.	This is a Tri-service issue and may be addressed at appropriate level.
(n)	<u>Setting Examples.</u> Lastly military must set an example for local communities and take nearby villages in their fold to educate and help sustain ecological environment.	Needless to say Indian Armed Forces lead by example and adopting villages & communities for social growth has been a tradition since long.

3. This has the approval of AOA.

  
(NP Singh)  
Wg Cdr  
SC to AOA

✓ D (Air-II)

Copy to:

SO to VCAS: Wrt to VCAS diary UM/1178/2020

1. Indian Army has been deployed in the Glacier since 1984 and have been the proud guardian of the Frozen Frontiers. In addition to the duties entrusted on the Indian Army it is pertinent that initiatives towards perception management to be undertaken so as to project the right image of the Army in front of civilians and the Nation. To sensitise the tourists visiting the area, boards about 'Swachh Siachen Abhiyan' and relevant instructions to preserve the ecology have been placed at locations frequented by the visitors. Boards requesting the visitors not to use polythene bags as this area is a 'NO Polythene Zone' have also been suitably placed.

### Siachen Glacier of Ecological Issues.

2. **Waste Dumping.** In High Altitude Areas of North and East, Indian Army has undertaken large number of initiatives to manage the waste generated at various altitudes. Some of initiatives in Leh and Ladakh undertaken by local formations are as under :-

- (a) Realistic appreciation of waste accumulation at various posts/ bases.
- (b) Segregation of waste into three different categories.
- (c) In situ disposal of waste at posts.
- (d) In situ disposal of waste through conversion of unserviceable barrels into incinerator and bio digesters where feasible/ disposal of waste at designated mother central collection point. As trial measures, Bio-Digesters for disposal of human excreta have been installed in selected posts in Siachen Glacier and Transit Camp at Leh, Patseo, Karu, Sarchoo, Pang and Partapur. Same are now being replicated at all posts.
- (f) Retrieval of maximum non biodegradable waste and backload through Animal transport, porters, civil ponies and troops being de inducted.
- (g) Infusion of latest technologies like:-
  - (i) **Packaging.** The use of extra strong jute packaging material instead of plastic and provision of tetra and refill packs for rations have reduced and restricted accumulation of plastic. The replacement of metallic barrels and jericans with reinforced HDPE barrels/ jericans has helped in retrieval of waste since these packing materials are lighter in weight.
  - (ii) **Bio Digestors.** DRDE, Gwalior has developed an innovative technology for disposal of human waste in ecofriendly manner at locations where temperature drops to  $-40^{\circ}$  C or lower. Presently 60 such units are operational at various locations. More such bio digesters with better efficiency are being issued to all posts in HAA.

3. **Siachen Cleaning Initiatives.** To put the activities under one umbrella, an initiative named 'Swachh Siachen Abhiyan (SSA)' has been undertaken by the Army wef February 2018. The initiative aims at decreasing the waste generation and a gradual and phased extrication of the accumulated waste from Siachen. The action plan and activities undertaken under SSA are enumerated in the succeeding paragraphs.

## Action Plan

4. Phases of Action Plan : The action plan was charted out in the phases as given below:-

- (a) **Phase 1.** Sensitisation of troops with respect to identification, collection and classification of waste and the need for the initiative.
- (b) **Phase 2.**
  - (i) Identification of methods to decrease waste entering the glacier.
  - (ii) Making a consolidated list of such items and identifying methods to introduce environment friendly items.
  - (iii) Use of shredders to dispose waste instead of burning waste in glaciers.
- (c) **Phase 3.** To identify suitable garbage and waste collection/ extinction points.
- (d) **Phase 4.** Identify methods for disposal of the waste.

## Actions Initiated

5. **Phase 1.**

- (a) **Formulation of Task Force.** To streamline the activities under SSA, two task Forces were constituted under the overall control of Deputy Commander, Siachen Sector.
- (b) **Earmarking of Responsibility.**
  - (i) **Task Force Commander.**
    - (aa) Overall planning, control and coordination of activities in respective areas.
    - (ab) Projection of requirements of resources/stores/equipment for Siachen Sector.
    - (ac) Maintenance of record of all activities.
  - (ii) **Nodal Officer**
    - (aa) Compilation of data at Headquarters Siachen Sector.
    - (ab) Projection of consolidated demand for various equipment and requirement to higher Headquarters.
    - (ac) Monitoring, collection and release of various items for SSA.
- (c) Sensitising the Environment on Waste Management. It was felt that to make the initiative a success involvement of the troops in all the activities was of paramount importance. Massive drive was undertaken to educate the troops,

(d) **Segregation of Waste.** The segregation of waste is being carried out as under:-

(i) **Biodegradable garbage** for moving it to the designated Garbage Pits for decomposition.

(ii) **Non-biodegradable (non-metallic) waste** for moving them to the designated waste yards for proper disposal through civil administration.

(iii) **Non-biodegradable (metallic) scrap** for moving it into designated scrap yards and disposed of through e-auction as per laid down procedures.

## 6. Phase 2 & 3.

(a) **Reduction in Waste Generation.** There is a sizeable amount of waste lying all along the glacier dumped for the last 35 years. Some of the recommended solutions for which actions have already been initiated are as under:-

(i) **Biodegradable Packing Materials.** The introduction of biodegradable packing materials will go along way in reduction of generation of waste. The provision of Tetra packs and refill packs for special ration will restrict the use of plastics and glass jars. The limitation of plastics wrappers, polythene covers and extra strong jute packing materials.

(ii) **Replacement of Metallic Packing Materials.** The replacement of metallic barrels and jerricans presently use for storage of kerosene with reinforced HDPE barrels/jerricans, which are lighter in weight, will assist in retrieval of waste.

(iii) **Provision of Non-Conventional Energy Sources.** The provision of non-conventional energy sources at posts will decrease dependency on kerosene oil. A detailed study on the subject has been carried out including use of solar energy, Solar-wind hybrid power plant, Fuel cell based energy sources, Hydel energy, Wind energy, waste to energy plants, Nuclear/atomic energy etc.

(iv) **Salvage/ Garbage Bags for Collection of Waste.** Troops deployed at the forward posts are collecting the waste in sand bags and gunny bags for further extrication out of glaciers. Bio-degradable bags have also been procured centrally and distributed to the battalions for collection of waste.

(b) **Establishment of Waste Extrication Points (WEPs).** Once the waste has been collected and segregated at the post, it was pertinent that it be extricated to suitable WEPs for further disposal. For this purpose, WEPs were identified at suitable locations from where the waste is being extricated rearwards. Central Waste Extrication Pt has been earmarked along each Axis. The waste from these locations is being extricated to Central WEPs before being sent for further disposal.

(d) **Standardisation of Barrels and WEPs.** A standardised format for the barrels for segregation of waste was formalized and promulgated in the Sector. For ease of functioning and efficient functioning of the WEPs, a standard format for the WEPs to be established at various location were also formulated.

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(e) **Use of Helicopters.** It has been planned to effectively employ the helicopters returning after carrying out logistics drops for the post for the purpose of waste extrication from the glacier. Towards this, massive efforts was channelized and construction/ expansion of helipad at various posts was executed.

(f) **Extrication of waste.** The waste is being extricated in two stages as under:-

(i) **Forward Posts to WEPs.** The forward posts, on a regular basis, de-induct the non-biodegradable waste/ scrap to the WEPs. Further segregation of non-biodegradable waste/scrap is carried out at the respective WEPs. The waste generated is brought to WEP with the help of porters and snowmobiles.

(ii) **WEPs to Base Camp/Road Head.** From WEPs the waste is extricated by air/ porter/ snowmobile. Once the waste reaches the WEP, it is further extricated to central WEP.

(g) **Extrication of Human Waste.** Human waste contributes to a major share of waste being accumulated in the glaciers. Apropos, open defecation has been stopped in the Brigade Area of Responsibility. Extrication of Human Waste posed greatest challenge in terms of collection, storage and further disposal. To overcome the problem, all field latrines have been fitted with suitably mod barrels for defecation and latrine seats have been fitted with suitably mod barrels for defecation and latrine seats have been modified to separate solid and liquid waste. The filled barrels either be back loaded to bases or waste will be incinerated in electric incinerators.

(h) **Identification of Landfill Sites.** Coordination with the civil administrator has been carried out to identify suitable landfill site of the dumping of the waste without adversely affecting the ecology.

## 7. **Phase 4 (Disposal of Waste).**

(a) **Disposal of Bio Degradable Garbage.** Biodegradable garbage is being brought down to the post and is being turned into compost. The biodegradable garbage is collected in a pit and allowed to decompose for 75-90 days. Multiple Garbage pits are being used for the purpose. The product so generated is being used as manure for arboriculture and to improve the productivity in the Green Houses in the sector.

(b) **Disposal of Metallic Scrap.** Metallic Scrap is being extricated rearwards and e-auctioning through MSTC (Metal Scrap Trading Corporation) is being undertaken.

(c) **Disposal of Tetra Pak (TPM).** Tetra Pak are being extricated rearwards for recycling. Liaison has been carried out with M/S Tetra Pak at Gurugram, who have agreed to provide TBM compacting and recycling machine which will

turn the used TPMs into Bales. The bales will then be transported to Gurugram where these will be converted into paper.

(d) **Disposal of Non Metallic Waste.** Non-metallic waste is being disposed off in the landfills, sites of which have been allotted by the Civil Administration. Locations of these have been suitably selected to avoid polluting the water. This waste will also be recycled in future when resources are available.

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(e) **Resource Management.** Considering the herculean effort at hand and the task envisaged, it was felt that available resources may not be sufficient to undertake the task in a time bound manner. It was thus decided that assistance from corporate entities who are interested to assist the Army in the cause be taken under CSR (Corporate Social responsibility). As projects to assist Army can be undertaken under CSR, corporate houses are being approached to assist us in the initiative. A consolidated list of items for waste management have been projected through Army Commander's Special Financial Powers (ACSFP) also.

(f) **Disposal of Waste.** Due to the massive drive undertaken under SSA, following waste has been collected/ disposed:-

S/No	Type of Waste	Total Waste (Kgs)
(i)	Biodegradable Garbage	21,944
(ii)	Non-Biodegradable (Non-metallic) Waste	23,559
(iii)	Non- Biodegradable (metallic) Scrap	25,374
Grand Total		74,307

8. **Involvement of DRDO.** DRDO has been actively involved with Armed Forces to protect our environment and waste management. The ecology of the area needs to be maintained and Indian Army has large presence in the area needs to play a minor role in preserving the ecology and spreading greenery in the area. Following actions have been taken in this regard:-

(a) **Green houses.** All the Green houses/Poly houses/Local Ladakhi style poly houses in the Sector are optimally employed and multi-tier farming is resorted to so that the vegetable produce can increase many folds. Numerous varieties of sapling have been procured by the units from various nurseries and from Defense Institute of High Altitude Research (DIHAR). Manure from compost generated within the battalion is optimally being utilized in the Green House to increase the product.

(b) **Arboriculture.** Large quantity of Willow, Popular trees and local trees and bushes have been planted in the Sector. The sapling once grown will enhance the greenery in the battalions and have found to be very successful.

(c) **Trench Farming.** Taking clue from the locals, during winters, trench farming is being carried out by the battalions and is found to be very successful.

(d) **Assistance from Experts.** Assistance from DIHAR is being taken for expert advice on arboriculture and to ensure increase in Green house products.

### **Environment Improvements.**

9. **Waste Managements Perspective for Military.** The waste is generated in the region through the stores that are inducted into the Siachen Sector by various

transportation means such as air, vehicles, porters and ponies. These loads are essential for operational purposes and for the survival of troops in such harsh conditions. The basic loads being inducted are:-

(a) **Rations.** These include dry, tinned and special rations. These work out to a total of 465 Tons per annum out of which 4,383 Tons (approx) is the packing material.

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(b) **Engineer Stores.** A large number of engineer stores like Fiber Glass Huts (FGH), Defence Stores, Generator etc that are inducted and have a longer life, remain in serviceable state for considerable period before they turn into waste. Due to their size it becomes difficult and uneconomical to de-induct them from the posts.

(c) **Ordnance Stores.** This would include all type of stores of ordnance origin to include signal stores, tentage etc. All items becoming unserviceable form part of this waste.

(d) **Miscellaneous Stores.** These consist of all other stores that have not been included in any of the above category but are being inducted into the glacier. These would include items of Sector stores and various induction stores carried by newly inducted battalions.

10. **Domestic Waste Management.** The regulations for waste disposal laid out by Ministry of Urban Development has been promulgated by Indian Army to all implementing agencies and being implemented meticulously in all stations. The ongoing initiatives in Military Stations are as under:-

(a) **Garbage Management in Military stations.** Waste Segregation System, incorporating separation and collection of recyclable plastics, metal and paper & composting of organic waste has been in practice in most of Military stations.

(b) **Modern Technology to Create Energy out of Waste.** A pilot project of creating electricity from waste is under implementation by Delhi Cantt Board under Dept of Defence Estate. This will facilitate quick disposal of waste and also generation of electricity.

(c) **Waste Converted Into Vermi Compost.** At various Military Stations biodegradable waste collected is being converted into vermi compost.

11. **Organisational Orientation and Initiative – Military Stations.**

(a) **Swachhhta Pakhwada.** It is to mention that Swachhhta Pakhwada under Swachh Bharat Abhiyan is being organized regularly by Indian Army on regular basis across all military stations and in at forward posts, wherein the inhabitants of the area are being educated to inculcate a habit of self-discipline in maintaining the surroundings. Military stations are the cleanest parts of any town and constant efforts are being made to maintain these. As a policy and routine, it is enforced in all military stations that least amount of waste is generated and organised efforts are made to ensure hygiene, sanitation, cleanliness and effective waste management.

(b) **Energy Efficiency.** Use of renewable energy like Solar, Hydel and Wind energy projects have been initiated in most of the military stations. Solar water

heaters, Solar Street lights are very commonly used in all military stations. In all stations, extensive usage of LEDs has also led to reduction of electricity losses which resulted due to incandescent bulbs and CFLs. 11

(c) **Increase of Tree cover.** The Tree plantations drive in military stations has helped in increasing the bio mass and additional carbon sinks. Tree plantation activities in Ladakh region have already won BNHS Green Governance awards twice.

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(d) **Sewage Treatment Plants.** A major emphasis is being given in all Military Stations with regards to disposal of Sewage. Modern STPs have been included in a large number of Stations in a phased manner every year as per guideline of the Ministry of environment.

(e) **Rain Water Harvesting.** Awareness exists in Armed Forces fraternity regarding rapid depletion of drinking water resources. To address the same and to increase the water table, rain water harvesting projects are being included in the entire new infrastructures coming up in the Military Stations.

12. **Automatic waste Segregation and Recycling.** All the Major Ordinance Depots are having salvage cells where all salvage stores are being cannibalized/recycled/ auctioned. Used engine oil is auctioned for reuse and to avoid environmental hazard.

13. **Institutes Special Environment Initiatives Monitoring Cell at Comd HQ Level.** The Waste Management Cell (WMC) has been established in every station under the aegis of Station HQ, with rep from each major unit of the station.

14. The Status report covering all issues raised/mentioned by Air Marshal Anil Chopra in his report on "Environment issues and Waste management in Armed forces" are as under :-

Points given by Petitioner	Status report
(a) For effective implementations and monitoring of the National Green Tribunal (NGT) initiatives the directions must go from Ministry of Defence (MoD) to all the Services HQ, so that watch-dog commissions can interface at appropriate levels.	The directions are being fwd from time to time for strict adherence of National Green Tribunal (NGT) initiatives and same are being followed at all levels. However MoD may circulate additional guidelines/ pamphlets and same will be distributed to the environment.
(b) Need to sanitize all field commanders on the desired green initiatives, send pamphlets and materials on modern green initiatives and action plans to the Services HQ with directions to circulate till unit level.	The Fd Cdrs are being sensitised on the green initiatives regularly and the directions received from Ministry are being circulated to the lowest unit level.
(c) Armed Forces to institute special environmental initiatives monitoring cells at the Command HQ level initially, and later at lower levels. Armed Forces to institute special trophies and awards for 'green' initiatives.	<b><u>ECO cells.</u></b> In Army, Eco cells have been formed right from Army HQ to Station HQ in all stations for carrying out environmental activities.
(d) Each major Cantonment should have an automated waste management plant.	Issues of Cantts are handled by DGDE. Input may be taken from them.

(e) Each station must set up special teams for waste segregations before forwarding to nearby waste management agencies. Being done/ out sourced by Pvt Labour.

Collection and disposal of waste in every station has been out sourced to the Pvt labour/agencies. The waste is segregated appropriately prior to disposal. Same is being monitored at the Station level. 12

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(f) All military residential areas should have display boards educating the personnel and their families. Being done regularly.	In majority of Military Stations educative boards, both fix boards and electronic Boards, are displayed spreading about cleanliness and other environment issues
(g) Operational and military specific waste must be segregated and disposed of as per 'Green' norms. This includes the chemicals, oil and lubricants.	Separate agencies deal with segregation of military specific waste. These are disposed off separately as per guidelines to prevent any poisoning of the environment.
(h) All items auctioned as scrap must have an inbuilt contract specification for its further disposal as per 'Green' norms. This is also very relevant to 'Electronics' waste.	Separate agencies deal with segregation of military specific waste. These are disposed off separately as per guidelines to prevent any poisoning of the environment.
(j) Military must handle with environmental care the armament related waste such as shells and unexploded munitions.	Separate agencies deal with segregation of military specific waste. These are disposed off separately as per guidelines to prevent any poisoning of the environment.
(k) Territorial Army is meant to have 'Eco' Battalions, their working and output need to be reviewed and monitored. must look at aviation related	Territorial Army/Eco Battalions working and monitoring does not fall under the preview of the LWE dte.
(l) Airbases must look at aviation related pollution, including noise and air pollution.	Inputs may be taken from IAF.
(m) Warfare taxonomy and ecology must be a subject in all war colleges.	War Colleges impart knowledge of Art of Warfare. Destruction is associated with any type of warfare. Notwithstanding the same a lot of emphasis is laid as part of training to preserve our surroundings. To that extent the Armed Forces is one of the only institution which maintains the surroundings in every station, preserves fauna and flora. Military stations are one of the most green, clean and purest environments within the country.
(n) Lastly military must set example for local communities and take nearby village in	It is to mention that military stations are the best maintained areas of the country

their fold to educate and help sustain  
ecological environment.

and act as role models for the others to  
follow.

**'ENVIRONMENTAL ISSUES AND WASTE MANAGEMENT'**  
**INITIATIVES BY INDIAN NAVY**

**Preamble**

1. **Introduction.** Environmental Protection, Waste Management and 'Green Initiative' are one of the Key Result Areas of the Indian Navy. Being a responsible service *IN* has been at the forefront on awareness of environmental issues and implementation of available solutions. Towards this, *IN* has voluntarily adopted measures to implement international norms and ensured phasing out of Refrigerant R-12 as well as adherence to MARPOL Protocols. In as early as 2008, *IN* has implemented nodal agencies at both Naval Headquarters as well as Command HQs to deal with 'Environmental Protection' as well as 'Green Initiatives'. In 2014, Navy had taken a lead and implemented Chief of Naval Staff (CNS) Thrust Area with an aim to have a clean and Green Navy having Zero Carbon footprint and a theme of '**Green Footprint to Blue Water Operations**' was implemented and accordingly an Indian Navy Environment Conservation Roadmap was implemented in 2014.
2. A CNS Trophy for Best Green Practices has also been implemented by the Navy towards enhanced competition between *IN* units for effective promotion of 'Green Initiatives'. Navy has also implemented policy directives with respect to the Solar Power Generation at Naval Units, Fuel Conservation onboard *IN* ships, directives on handling Hazardous and plastic waste. In addition, waste management has also been given due impetus in existing Naval Stations and for all new 'Naval Projects' related to marine infrastructure, green measures have been incorporated in the 'Design Stage' itself. Training of personnel as well as 'Coastline Clean-Ship Drives' are now conducted regularly to bring awareness amongst the community at large.
3. The initiatives taken by the Navy in the field of environment protection, waste management and green initiatives are summarized in the succeeding paragraphs along with point wise reply to the recommendations/ way ahead proposed by the petitioner, Air Marshal Anil Chopra (Retd). All supporting documents are placed at Appendices to this report for ready reference.

**Initiatives Taken by Navy**

4. **Indian Navy Environment Conservation Roadmap (INECR).** Indian Navy has formulated and implemented a roadmap towards effective management of 'Green Initiatives/ Environmental Issues'. A copy of the INECR is placed at **Appendix 'A'** and it lays down the role and responsibility of each stakeholder towards 'Green Initiatives/ Environmental Issues'. The INECR which was formulated in 2014 is presently under revision.
5. **Policy on Hazardous/ Other Wastes and Plastic Waste Management.** A policy guideline with respect to hazardous/ other waste and plastic waste Management in Naval Units was issued by the Navy in 2017. A copy of same is placed at **Appendix 'B'**.

6. **MARPOL Compliance.** *IN* has voluntarily implemented all six schedules of MARPOL regulations adopted by International Maritime Organisation (IMO). All Ships, Submarines, Yard Craft and other afloat platforms of *IN* are MARPOL regulations compliant and have been fitted with MARPOL approved pollution control equipment such as Oily water separators (OWS) and Sewage Treatment Plants (STP) for treating the waste generated onboard.
7. **Bio-diesel Programme.** Indian Navy has also initiated a Biodiesel Programme under which successful trials of indigenously developed Biodiesels have been undertaken. Time bound trials of B20 blend of Jatropha based biodiesel developed by DRDO have been undertaken on MT Vehicles, DG sets onboard Fuel Barge, shore generator and Fast Interceptor Crafts (FICs). After Sustained effort, in Dec 2019, approval has been accorded for use of B5 blended High Speed Diesel in all MT vehicles at Vizag. Use of this fuel will further be extended to all MT vehicles and tugs/ barges in the Navy over the next couple of years.
8. **Solar Power Generation.** In order to utilize 'Renewable Energy Sources' as an alternative to traditional electricity, Navy vide **Appendix 'C'** implemented guidelines towards earmarking of 1 to 1.5 % of the ceiling amount for Solar Photo Voltaic (SPV) based Renewable Energy. At present, *IN* is progressing 16 MW land based SPV projects and 2.52 MW Roof Top SPV projects.
9. **Fuel Conservation Measures Onboard *IN* Ships.** Indian Navy implemented measures for Fuel Conservation onboard *IN*ships (**Appendix 'D'** refers). Towards this, an Engine Exploitation Factor (EEF) has been implemented which limits the number of power plants that can be used by the ships in harbor/ at Sea in normal cruising. All Ships in Navy, have to forward the EEF as part of monthly return to Command and Naval Headquarters (**Appendix 'E'** refers).
10. **Electric Vehicles.** Electric vehicles like e-trolley, e-cart, e-bicycles etc have been introduced at Yards and Establishments for transportation of men and material. In the last five years, approximately 700 battery operated vehicles have been introduced in the Navy.
11. **Biogas Plants.** Use of Biogas is also being promoted in Naval Stations, which offers two pronged benefits viz, reduction in use of LPG and an environmentally safe method of waste disposal. In last five years 21 biogas plants have been setup/ commissioned within various *IN* units/ establishments.
12. **Waste Management Initiatives at Naval Stations.** Waste Management and Green Initiatives by the Navy are given focused attention and implemented on ground. Accordingly, a number of Naval Stations have been upgrading procedures and methodologies of waste management to improve the processes. A few cases in this effect are as under:-
  - (a) **Creation of Waste Management Project at *IN*Ship Shivaji.** Naval Base Shivaji, is located at the Lonavala, Maharashtra. The Base generates around 600 Kgs of wet waste and around 1000 Kgs of dry waste on a daily

basis. Till 2018, complete unsegregated waste was dumped at Municipality dumping yard Varsoli. However, the Base has implemented a 'Waste Management System' in 2018. Wherein, the waste has been classified into seven different category (Wet, Sanitary, Dry, E-Waste, Garden Waste, Debris and Hazardous Waste). The Segregated waste is collected on different days of the week and all residents are being provided with two colored bags to segregate the waste. The bio-waste collected from the residents is composted at the waste management Site inside the Base, Sanitary and Paper waste is burnt in the incinerator which meets the pollution norms, the dry and e-waste is disposed off for recycling. The construction waste/ debris by the contractors is also being ensured and cement/ stone rubble is being used in landfills within the establishment to level out areas. The electric waste such as cables, cable trays/ light fittings etc are being disposed off to municipality for recycling. In effect, the station has been able to comply with the SWM-2019 rules and also to the energy and environment management policies. Detailed report in this regard is placed at **Appendix 'F'**.

(b) **Waste Management at INS Hansa**. The unit has undertaken various initiatives towards effective waste management. These include:-

- (i) Procurement of two Organic Waste Converters (OWC) which convert organic waste to manure in 24 hrs.
- (ii) Implementation of a solar power fencing across entire perimeter wall of base.
- (iii) Procurement of one solar trolley and six e-carts to reduce the carbon footprint and fuel consumption.
- (iv) Implementation of timer based street lights.
- (v) Overall reduction of electricity bill around 4.17 %.

13. **Waste Management in New Naval Projects**. In all major Naval Projects involving construction of large marine and shore support infrastructure 'Green Measures' have been incorporated in the 'Design Stage' itself. These inter-alia include use of renewable energy, aligning of structures/ buildings for maximum natural light and cross breeze, creating green spaces, reducing reliance on fossil fuels by planning compost stations with reduced distance between residential and office spaces, etc. Management of Waste has also been given due '**Priority**'. Accordingly, the Waste Management System comprise of procedure for waste collection, segregation and disposal. The Waste Management System (type of waste handled and facility created for processing) at Naval Base Karwar is as under:-

(a) **Based on Types of Waste to be Handled:-**

- (i) **Municipal Solid Waste**. Treatment, recycle and Disposal onsite/ offsite.

(ii) **Industrial Solid Waste**. Scrap sold to MSTC approved recyclers.

(iii) **Industrial Hazardous Wastes**. Sold to approved recyclers/ sent to TSDF site (TSDF with only Secured Landfill Facility at Dabaspeta, Karnataka).

(iv) **'E' Waste**. Sold to approved recyclers.

(v) **Battery Wastes**. Sold to approved recyclers/ sent to TSDF site.

(vi) **STP Sludges**. Used as Manure for green belt.

(vii) **Garden Waste**. Used as a manure for green belt through vermicomposting.

(viii) **Beach waste**. Treatment, recycle and disposal onsite/ offsite.

(b) **Integrated Solid Waste Management Facility (ISWMF)**. ISWMF is a shaded facility comprising of Mechanical Waste segregation and sorting plant for dry waste, Organic Waste Converter, Black hole for domestic waste, Weigh Bridge and Battery operated fork-lift and charging points.

14. **Segregated Waste Collection Centre (SWCC)**. In 2018, as part of Swachh Bharat Abhiyan, SWCC was established in *IN* at Port Blair (Minnie Bay Residential Area) incorporating modern method of waste collection and management system. In this system, the wet garbage collected from the residential areas are segregated and processed in composter. The initiative was awarded **National Award for 'Swachhata Hi Sewa'** in 2018.

15. **Energy Recovery Plant**. An energy Recovery Plant has been set up in Eastern Naval Command to convert un-segregated solid waste into hydrocarbons yielding liquid bio-fuel, synthetic gas and smokeless coal as technology demonstrator for improving waste management.

16. **Designation of Nodal Agencies**. For focused monitoring and implementation of 'Green Initiatives' dedicated agencies have been nominated within the Navy at each organisational level vide VCNS Ty Memo placed at **Appendix 'G'**.

17. **Institution of CNS Trophy for Best 'Green Practices'**. Beside holding awareness drives / programmes at periodic intervals, a 'CNS rolling trophy' to incentivise unit level pursuit of 'Green Practices' in *IN* was implemented in 2014 vide **Appendix 'H'**. The Trophy is aimed at reducing the carbon footprint of the Navy and to encourage the efforts at energy efficiency and 'Environment Protection'.

### Response to Petitioners Recommendations

18. Comments on 'Way Ahead/ Recommendations' (as applicable to the Indian Navy) for issues highlighted in the report on "Environmental Issues and Waste Management in Armed Forces" by the petitioner Air Marshal Anil Chopra (Retd) is tabulated below:-

Ser	Way Ahead/ Recommendations	Action Taken/ Remarks
(a)	For effective implementation and monitoring of NGT initiatives, the directives must go from MoD to all service HQs, so that the watch dog commissions can interface at appropriate levels"	<p>All environmental norms promulgated by the GoI are disseminated to Command HQs by Naval Headquarters through regular and appropriate directives. Green Initiatives are one of the Key Result Areas of the IN. The Nodal Agencies designated by the Navy towards implementation of these initiatives are as under:-</p> <p>(i) <b>Naval Headquarters.</b> Directorate of Marine Engineering has been designated as a Nodal Directorate at Naval HQs to deal with all 'Green Initiatives' that include 'Environmental Issues' and 'Waste Management'. The directorate is also mandated to implement new technologies as also evolve/ refine extant systems and procedures to protect our environment.</p> <p>(ii) <b>Command Headquarters.</b> Command Met Officer/ Command Engineer Officer have been designated as nodal authority for interfacing with Naval HQs as well as other units.</p>
(b)	Need to sanitise all field commanders on the desired green initiatives. Send pamphlets and materials on modern green initiatives and action plans to the Service HQ with directions to circulate	A comprehensive roadmap document, namely the "Indian Navy Environment Conservation Roadmap "(INECR) was promulgated in 2014. The INECR covers all aspects of operation, maintenance, administration and infrastructure/ community living in the Indian Navy. The roadmap envisages measures to be incorporated towards MARPOL compliance, alternate energy and power, green fuels, water treatment, improving carbon credits,

Ser	Way Ahead/ Recommendations	Action Taken/ Remarks
	till unit level.	water & energy conservation and efficiency, renewable energy, green buildings. Guidelines have been promulgated to all command HQs to formulate short, medium and long terms objectives and a half yearly feedback / progress monitoring review has been institutionalised. Further, once a year all green initiatives undertaken by units across the <i>IN</i> are assessed and the key initiatives are promulgated officially to the Command HQs for further circulation.
(c)	Armed Forces to institute special environmental initiatives monitoring cells at Command HQs level initially and later at lower levels.	Directorate of Marine Engineering (DME) at NHQ is the nodal directorate for coordinating/implementation of Green Initiatives. Further, at the Command HQ level the Command Met Officer/ Command Engineering Officer is the nodal coordinating department for implementation of green initiatives. Also every establishment has a designated environment officer to monitor at the unit level.
(d)	Armed Forces to institute special trophies and awards for 'Green Initiatives'	As part of the INECR, an annual "CNS Rolling Trophy for Green Initiatives" has been instituted in 2014 with an aim to acknowledge and encourage the efforts undertaken by units towards energy conservation and environment remediation. The award is adjudged in two categories namely, Industrial and Non-Industrial and the units are assessed on basis of adherence / adoption of the environmental guidelines.
(e)	Each Cantonment should have an automated waste management plant.	In the <i>IN</i> , waste management is undertaken Command/ Station wise. All the Naval stations/units have a robust waste collection/segregation and disposable system in place. Vermiculture and composting of bio-degradable waste into manure /compost is undertaken by almost all the units. Besides this, Naval units also make efficient and ample use of infrastructure available with the local administration towards waste segregation and

Ser	Way Ahead/ Recommendations	Action Taken/ Remarks
		<p>disposal. Further, the IN is also experimenting in improving the system. Towards this, a Energy Recovery plant is being set up in ENC to convert un-segregated solid waste into hydrocarbons yielding liquid bio-fuel, synthetic gas and smokeless coal as technology demonstrator for improving waste management. Further, a thorough waste management methodology has been planned for the upcoming Naval Base which is being setup at Karwar. An Integrated Solid Waste Management Facility (ISWMF) is planned to be built inside Naval premises for handling the Solid Waste generated within the base. The facility would include centralised waste segregation plant, Organic Waste Converter (OWC) for wet waste, 'Blackhole' facility (using magnetic pyrolysis technology) to handle dry/ unsegregated domestic waste. Also, separate landfill area has also been earmarked inside the Naval premises for handling of the inert waste such as steel, glass etc.</p>
(f)	<p>Each station must set up special team for waste segregation before forwarding to nearby waste management agencies.</p>	<p>All Naval stations / units have a system for waste collection through specific coloured bins for bio-degradable, medical, metal, non-biodegradable prior being forwarded / disposed of to the local administration. Residential areas have a segregated waste collection centers prior being disposed off. Further, almost all Naval stations have a clause, for waste segregation, in the conservancy contract prior disposal of waste to civil authorities.</p>
(g)	<p>All military residential areas should have display boards educating the personnel and their families.</p>	<p>Besides display boards and digital information boards, awareness among residents is also being brought about through periodic tree plantation drives, poster / essay competitions, lectures and awareness rallies. Also mass Shramdan, Cleanship drives and workshops are part of the environment education.</p>

<b>Ser</b>	<b>Way Ahead/ Recommendations</b>	<b>Action Taken/ Remarks</b>
(h)	Operational and Military specific waste must be segregated and disposed of as per Green norms. This includes the chemicals, oils and lubricants.	<p>(i) IN has voluntarily implemented all six schedules of MARPOL regulations adopted by International Maritime Organisation (IMO). All ships, submarines, yard craft and other afloat platforms of IN are MARPOL regulations compliant and have been fitted with MARPOL approved pollution control equipment such as Oily water separators (OWS) and Sewage Treatment Plants (STP) for treating the waste generated onboard.</p> <p>(ii) In shore establishments, used or waste POL is surveyed to Material Organisations in bulk, which in turn is disposed off through e-auction through Metal Scrap Trading Corporation (MSTC), a Mini Ratna Category-I PSU, using an online portal where only companies/ firms with Govt Pollution Control Board certification (for handling the particular scrap category) are allowed to participate and bid.</p>
(j)	All items auctioned as scrap must have an inbuilt contract specification for its further disposal as per 'Green' norms. This is also very relevant to 'Electronic' waste.	The scrap generated inside Naval premises are segregated category wise viz. rubber, oil, oil drums, electronic, paints, metal etc. and disposed off through e-auction through the Metal Scrap Trading Corporation (MSTC). The category wise quantity of scrap is uploaded on to the MSTC website. Thereafter, the items are auctioned to firms authorised / certified by Govt Pollution Control Boards for participation in these auctions. The system ensures for safe disposal of waste generated to only Pollution Control Board authorised firms.

Ser	Way Ahead/ Recommendations	Action Taken/ Remarks
(k)	Military must handle with environmental care the armament related waste such as shells and unexploded munitions	Presently, unserviceable Naval Armament(NA) stores are being disposed iaw NO 10/09 by means of dumping at sea / burning in open grounds for small quantities of stores with small amount of explosive/pyrotechnic fillings. However, to cater to the environmental norms, the Directorate of Naval Armament of the Indian Navy is in deliberation with M/s Solar Industries India Ltd(SIIL), Nagpur who are undertaking feasibility studies wrt setting up facilities to dispose of unserviceable ammunition / explosives. Further, a case for development of a Laser Ordnance Disposal System (LORDS) through DRDO is also being progressed by the Directorate of Naval Armament. Formulation of NSQRs for the envisaged system is at an advanced stage.
(l)	Airbases must look at aviation related pollution, including noise and air pollution	The defence /military aircrafts and airbases have been exempted from the scope of noise regulations vide Ministry of Environment, Forest and Climate Change (MOEFCC) Gazette no GSR 568(E) dated 18 Jun 18. These guidelines lays down the norms regarding the noise levels to be maintained in airports. However, though conformity to the noise levels is not mandatory for military air bases, initiatives have been taken up by units factoring ergonomics and personnel welfare. As a norm, sound proofing of all ATCs (Air Traffic Control), office spaces in vicinity to runway/ tarmac etc. Some of air pollution mitigation measures include reduction in overall energy/fuel consumption through extensive use of BOTs (battery operated vehicles) for transportation of personnel/ material, minimise use of personal vehicles within the bases and in some case through observing 'No Vehicle Day'.
(m)	Warfare taxonomy and ecology must be a subject in all war	Regular courses on 'Renewable Energy Technology Expertise and Maintenance' conducted at National Institute of Solar

Ser	Way Ahead/ Recommendations	Action Taken/ Remarks
	colleges	Energy (NISE), Gurgaon are being subscribed to, with 60 officers having completed the course since 2014. The course aims at providing exposure to personnel on aspects of Green norms and renewable energy. 'Warfare taxonomy and ecology' as a subject in War Colleges would be deliberated for introduction.
(n)	Lastly, military must set an example for local communities and take nearby villages in their fold to educate and help sustain ecological environment.	<p>(i) The IN has always been proactively involving the local communities during various clean-ship drives as part of the Swachh Bharat Abhiyaan and more importantly during the Coastal Cleanship Drives. Also during the Navy Week activities awareness programmes are conducted at local communities and nearby villages through interactions and lectures.</p> <p>(ii) In addition, in order to set an example to local communities, <i>IN</i> has laid focus towards setting up of Green buildings in Naval premises. For example, in the upcoming Naval base at Karwar the buildings being planned/ executed are compliant with IGBC (Indian Green Building Council) norms. All residential buildings and township facilities are Gold rating certified whereas NOI building is Platinum rating certified. Also, to further sustain the ecological environment, measures have been implemented such as water reuse in buildings, plumbing fixtures to reduce water consumption, usage of construction material with recycled content, indoor environment quality design to allow optimum ambient day light, e-vehicle charging point, energy efficient appliances etc.</p>
(p)	Conceptualizing Army Cantonment	The upcoming Naval base in Karwar has been modelled taking environment aspects into consideration. The project comprises of an Integrated Waste Management Facility, Green buildings, site layout with proximity of facilities to minimise vehicle usage, setting up of SPV

Ser	Way Ahead/ Recommendations	Action Taken/ Remarks
		projects (05 MW), re-use of water etc which depicts <i>IN</i> 's focus towards sustainability and reducing environmental footprint.

19. **Conclusion.** As can be seen from the above, Indian Navy has been at the forefront of the 'Environmental Protection' and 'Green Initiatives' and 'Waste Management' are identified as the Key Result Area for the Navy. Noteworthy efforts have been put in to ensure that the service progress towards Zero Carbon footprint and a focus shift was achieved by adopting the theme of 'Green Footprint to Blue Water Operations'. Delegation of Nodal agencies towards undertaking the 'Green Initiatives', implementation of 'CNS Rolling Trophy' and laying down of the 'Indian Navy Environment Conservation Roadmap' in 2014 has lead to a paradigm shift within the Navy and various efforts like MARPOL Compliance by Navy, implementation of Bio-diesel programme, focus on Solar energy. implementation of fuel conservation measures onboard *IN* ships, procurement of energy efficient Electric Vehicles, implementation of Bio-Gas plants, effective waste management in existing bases and focused 'Green Initiatives' during design phase of new basis etc, have been achieved. The initiatives taken by the Navy covers all the recommendations raised by the petitioner. The efforts of the Navy with respect to the 'Environment Protection' are not only noteworthy but also of enduring nature. It is pertinent to mention that the Navy is in process of revising its 'Environment Conservation Roadmap' towards implementing the new technology as well initiating more structured measures towards environmental protection.

**INDIAN NAVY ENVIRONMENT CONSERVATION**  
**ROADMAP (INECR)**

**INDIAN NAVY ENVIRONMENT CONSERVATION**  
**ROADMAP (INECR)**

**OPERATIONS**

<b>Sub Goals</b>	<b>Action</b>	<b>Concerned APSO at IHQ</b>
Green Fuels	Hiring of CNG Vehicles in A1 Cities	ACNS (P&P)/ DOA
	Undertaking a Pilot Project on use of biodiesel (B20 blend) on shore generators	ACOM (MOD)/ DODY
	Undertaking a Pilot Project on use of biodiesel (B20 blend) on MT vehicles	ACOL/ DTP
	Undertaking a Pilot Project on use of biodiesel (B20 blend) on Yard Crafts	ACOM (MOD)/ DODY
	Conversion of vehicles of Naval Transport pool to CNG in A1 class cities	ACOL/ DTP
	Induction of a biodiesel based fuel system on a tug under construction	ACWP&A/ DSP
	Provisioning the use of battery operated vehicles in Naval bases and industrial establishments	ACOL/ DLS
	Undertake a pilot project on use of biodiesel (B20 blend) on a small, medium and capital ship	ACOM (D&R)/ DME
	Use of biodiesel powered tugs/ Yard Crafts/ Patrol Boats in Channels	DGNO/ DNO
	Use of biodiesel in shore generators in establishments	ACOM (D&R)/ DME
Demonstration sailing of Green Strike Group (biodiesel powered vessels) in local operations	DGNO/ DNO	

Sub Goals	Action	Concerned APSO at IHQ
MARPOL compliance	Issuing policy directives for onboard waste disposal (garbage and sewage) iaw MARPOL73/78 (Annexure IV and V)	DGNO/ DNO
	Issuing policy directives for use of incinerators/ vacuum toilets/ STPs onboard and for forwarding returns on operational availability/ usage on a monthly basis	ACOM (D&R)/ DNA
	Institutionalising monthly returns on MARPOL compliance for afloat/ ashore units	ACOM (D&R)/ DME
	Environmental policing by Harbour Environment Protection Force (HEPF) under the Command Environment Officer with strict penalties for non-adherence to MARPOL norms onboard and ashore	DGNO/ DNO
	Creation of comprehensive Shipboard Environment Protection Program (SEPP) to minimise pollution by air, water and noise.	ACOM (D&R)/ DME
	Introduction of MARPOL compliance as a necessary norm for all future inductions (ships/ submarines)	ACNS (P&P)/ DSR
	Conversion of Mumbai, Cochin and Vishakhapatnam harbours to MARPOL compliant harbours	DGNO/ DNO
	Alternative Energy and Power	Induction of electric and nuclear propulsion and fuel cells for future ships/ submarines

**MAINTENANCE**

<b>Sub Goals</b>	<b>Action</b>	<b>Concerned APSO at IHQ</b>
Recycling	Issuing policy directives for waste management in Dockyards and shore establishments	<b>ACOM (MOD)/ DODY</b>
	Appropriate management of effluents, sewage and solid waste generated as per GRIHA and CPCB norms in dockyards and industrial units	<b>ACNS (P&amp;P)/ DW</b>
	Commissioning of waste recycling plant in every Dockyard/ industrial establishment	<b>ACNS (P&amp;P)/ DW</b>
Water treatment	Issuing policy directives for onboard water treatment prior discharge into sea iaw MARPOL73/78 (Annexure I)	<b>ACOM(D&amp;R)/ DME</b>
	Audit of operational status of Oily Water Separators (OWS) on all existing platforms and induction of new equipment as ABER replacement	<b>ACOM(D&amp;R)/ DME</b>
	Introduction of MARPOL compliant OWS as a necessary equipment for all future inductions (ships/ submarines/ Yard crafts)	<b>ACOM(D&amp;R)/ DME</b>
Zero carbon footprint	Adherence to Engine Exploitation factor (EEF) to be re-emphasised and monitored with strict penalties for non- adherence	<b>DGNO/ DNO</b>
	Changeover to POLs with higher inter-change intervals	<b>ACOM(D&amp;R)/ DME</b>

Sub Goals	Action	Concerned APSO at IHQ
	Issuing policy directives for discontinuation of open blasting	ACOM(D&R)/ DNA
	Commencement of afforestation drive in all shore establishments	ALL CONCERNED
	Use of personal vehicles to be reduced by observing 'No Vehicle Day' twice a week	ALL CONCERNED
	Strict guidelines on use of electrical appliances and switching off of non essential equipment during off working hours	ALL CONCERNED
	Establishing Baseline emission signatures as per MARPOL guidelines (Annexure VI) class of ship wise	ACOM(D&R)/ DME
	Reduction of emission through IMO Tier III compliant engines	ACOM(D&R)/ DME
	Emission monitoring program to be established under DGNATAA for ratification and compliance	ACOM(D&R)/ DME
	Emission checks and management to be included as part of FOST Work Up	DGNO/ DNO
	Carbon footprint calculations for Dockyards, industrial units and shore establishments by a specialized agency to explore means of reducing and offsetting carbon footprint	ACNS (P&P)/ DW

Sub Goals	Action	Concerned APSO at IHQ
Energy conservation and efficiency	Conduct of energy audit of all buildings with connected load above 500 kW	ACNS (P&P)/ DW
	Organising energy conservation awareness drives in Dockyards, schools and establishments	ACOP (HRD)/ DNE
	Constitution of an Environment Trophy (Command wise) in the industrial and non industrial (shore) and ship categories	CPS/ DPS
	Incorporation of Energy Management Systems (EMS) and demand reduction techniques (Smart Demand Controller, PFI Panels etc.) in industrial units	ACOM (MOD)/ DODY
	Monitoring and accounting of electricity consumption and launching a metering drive by ships/ shore establishments	ACOM (IT&S)/ DEE ACNS (P&P)/ DW
	Benchmarking of fuel consumption (class of ship wise) and issuing policy directives on monitoring of fuel consumption data	ACOM (IT&S)/ DEE
	Establishing Baseline Energy Consumption Pattern (ECP) for ships/ submarines, benchmarking of energy consumption (class of ship wise) and issuing policy directives on monitoring of energy consumption data	ACOM (IT&S)/ DEE
	Implementation of Energy Auditor's recommendations for all buildings with connected load above 500 kW	ACNS (P&P)/ DW

<b>Sub Goals</b>	<b>Action</b>	<b>Concerned APSO at IHQ</b>
	Specific fuel consumption (SFC) to be made an important criterion whilst selecting prime movers for new inductions	<b>ACOM(D&amp;R)/ DME DGND (SSG) DGND(SDG)</b>
	Selection of 'Energy Efficiency' as key parameters in Design Spiral	<b>DGND (SSG) DGND(SDG)</b>
	Incorporation of 'Hydrodynamic Performance Improvement Techniques' for all new construction ships	<b>ACOM(D&amp;R)/ DME DGND (SSG) DGND(SDG)</b>
	Introduction of Life Cycle Costing (including energy use) in Ship Design	<b>DGND (SSG) DGND(SDG)</b>

<b>Sub Goals</b>	<b>Action</b>	<b>Concerned APSO at IHQ</b>
Renewable Energy	Provision of solar water heating in existing and new buildings	ACNS (P&P)/ DW
	Using Renewable Energy for providing services such as street lighting (solar) and cooking (solar and biogas)	ACNS (P&P)/ DW
	Generation of Renewable Energy for providing stand alone services and battery charging stations	ACNS (P&P)/ DW
	Micro generation of electricity and installation of Micro Grid and Smart Grid Systems for shore establishments (non critical services)	ACNS (P&P)/ DW
	Use of Building Integrated Photovoltaics (BIPV) for all new buildings under construction for lighting loads	ACNS (P&P)/ DW
	Use of Renewable Energy power generation (1.5 % of Contracted Demand each year for next ten years)	ACNS (P&P)/ DW
Green Buildings	Construction of one 'Green Building' in each Command under AMWP with cost benefit analysis done vis-à-vis conventional building	ACNS (P&P)/ DW
	All new AMWP construction to be as per GRIHA and LEED norms	ACNS (P&P)/ DW
Waste Recycling and management	Issuing policy directives for waste management in officer's and sailor's accommodation areas	ACNS (P&P)/ DW
	Appropriate management of effluents, sewage and solid waste generated as per GRIHA and CPCB norms in accommodation areas	ACNS (P&P)/ DW

<b>Sub Goals</b>	<b>Action</b>	<b>Concerned APSO at IHQ</b>
	Commissioning of waste recycling plant in every Command for use in accommodation areas	<b>ACNS (P&amp;P)/ DW</b>
	Commissioning of Biogas plant in every Command Mess for use of waste to produce biogas (already implemented in WNC Mess)	<b>ACNS (P&amp;P)/ DW</b>
<b>Water supply and distribution</b>	Integration of water conservation through efficient plumbing fixtures and rain water harvesting	<b>ACNS (P&amp;P)/ DW</b>
	Metering of bulk receipt/ supply of water through electronic meters	<b>ACNS (P&amp;P)/ DW</b>
<b>Environmental remediation</b>	Use of biocide free anti fouling paints	<b>ACOM(D&amp;R)/ DNA</b>
	Long term plan for phasing out of Ozone Depleting substances (ODS) to be devised	<b>ACOM(D&amp;R)/ DME</b>
<b>Zero carbon footprint</b>	Replacement of incandescent bulbs with solid state lighting and CFLs	<b>ACNS (P&amp;P)/ DW</b>
	Use of BEE star rated appliances for all electric appliances	<b>ACNS (P&amp;P)/ DW</b>
	Installation of electric metering to record demand (kVA), energy (kWh) and power factor (as per Energy Conservation Building Code (ECBC) 2007 (Clause 8.2.4)	<b>ACNS (P&amp;P)/ DW</b>
	Use of chillers with high CoP in HVAC, as per Energy Conservation Building Code (ECBC) 2007	<b>ACNS (P&amp;P)/ DW</b>

**ADMINISTRATION**

Sub Goals	Action	Concerned APSO at IHQ
Carbon Credits	Study on Clean Development Mechanism (CDM) projects to be undertaken in <b>IN</b> in consultation with Ministry of New and Renewable Energy (MNRE)	ACNS (P&P)/ DW
	Mechanism of Carbon Credits Exchange for <b>IN</b> to be evolved for use of CDM Projects	ACNS (P&P)/ DW
Energy Conservation and Efficiency	Conduct of Guest Lectures and CEPs on energy efficiency and environment protection	ACOP (HRD)/ DNT
	Deputing <b>IN</b> officers for courses in Energy Studies and Management at various levels	ACOP (HRD)/ DNT/ DOP
	Undertaking M Tech and research projects on relevant energy and environment subjects	ACOP (HRD)/ DNT
	Entering into strategic co-operation with US Navy for building technical expertise and collaboration through visits	ACNS (FCI)/ DFC
	Provision of common mode of transport (buses and pooled cars) for all officers and sailors to workplace	ACOL/ DTP
	Energy management and environment studies to be introduced in ab-initio training of <b>IN</b> personnel	ACOP (HRD)/ DNT
	MoU with TERI University and foreign universities on capacity building amongst core group members to implement the energy policy	ACOP (HRD)/ DNT
	Creation of Energy Management Cell in DME for monitoring and implementation of projects with allocated manpower from all cadres/ hiring of specialists for consultancy.	ACOM(D&R)/ DME ACOP (HRD)/ DNT
	Formulation of Energy Policy and its incorporation in MCPP and LTIPP	ACNS (P&P)/ DNP

<b>Sub Goals</b>	<b>Action</b>	<b>Concerned APSO at IHQ</b>
	Allocation of separate Budget Head for implementation of Energy and environment projects	<b>ACNS (P&amp;P)/ DNP</b>
	Topic of 'Energy Conservation and efficiency and environment protection' to be included in PME syllabus with SOK 'B'	<b>ACOP (HRD)/ DNT/ DNE</b>

Tele: 23011713

Integrated Headquarters  
Ministry of Defence (Navy)  
Directorate of Marine Engg  
New Delhi – 110 011

EG/Policy/Green/03/2017

22 May 17

The Flag Officer Commanding - in - Chief  
(for CSO (P&A)/ CSO (Tech))  
Headquarters, Western Naval Command  
Mumbai – 400 023

The Flag Officer Commanding - in - Chief  
(for CSO (P&A)/ CSO (Tech))  
Headquarters, Eastern Naval Command  
Visakhapatnam – 530 014

The Commander - in - Chief  
(for CSO (P&A)/ CSO (Tech))  
Headquarters, Andaman & Nicobar Command  
Port Blair – 744102

The Flag Officer Commanding - in - Chief  
(for CSO (P&A)/ CSO (Tech))  
Headquarters, Southern Naval Command  
Kochi – 682 004

**POLICY ON HAZARDOUS / OTHER WASTES AND PLASTIC WASTE  
MANAGEMENT IN NAVAL UNITS**

1. Refer to IHQ/MoD(N) letters EG/6030/ENVIRON/Policy dated 23 Jun 14.
2. The Ministry of Environment and Forests, in accordance with Environment (Protection) Act, 1986, has notified the following through Gazette notifications:-
  - (a) Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 on 04 Apr 16
  - (b) Plastic Waste Management Rules, 2016 on 18 Mar 16
3. A team of Rajya Sabha MPs of the Parliamentary Committee on Sub-ordinate Legislation visited Visakhapatnam in Oct 16, to assess ground level implementation of the above Rules/ laws. The Committee directed that the above laws, being compliant to international agreements are to be strictly implemented/ complied. Though presently not

existing, a provision for penal action for non-compliance is also being proposed during revision of these laws.

### **Hazardous and Other Wastes**

4. Hazardous wastes are predominantly generated from naval industrial establishments. Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, lists the processes generating such wastes and their management through a multi-pronged approach for prevention, minimisation, 3R (Reuse, Recycle, Recovery) and safe disposal. The rule also mandates following:-

- (a) Authorisation from the State Pollution Control Board for managing Hazardous and Other Wastes.
- (b) Maintenance of records as per laid down procedures.
- (c) Rendering of annual return to State Pollution Control Board.

### **Plastic Waste Management**

5. The management of plastic waste is relevant to shore units and residential areas apart from the Industrial establishments. Good civic practices, including minimising usage, monitoring and disposal, form important constituents of the management programme. Plastic Waste Management Rules, 2016 apply to every waste generator, with laid down procedures for segregation, collection, storage, transportation, recycling and disposals and a ban on open burning of plastic waste.

### **Implementation**

6. Towards ensuring strict implementation of the above laws, the following is requested:-

- (a) Directives be issued to industrial units under respective Commands regarding adherence to Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 with issuance of local directives in each unit.
- (b) Ban on sale/ use of plastic bags and burning of plastic in all naval units and residential/ industrial areas and adherence to Plastic Waste Management Rules, 2016, in management of plastic waste (bottles, domestic/ industrial storage equipment etc).
- (c) Implementation of the above rules be monitored/ inspected by respective Command Environment Officers and additionally during Annual/ Technical Inspection of the units.
- (d) Awareness drives on the above rules through conduct of workshops/ lectures/ training.

7. Copies of the above Gazette Notifications are available on the website of Ministry of Environment, Forests and Climate Change and can be downloaded for reference.



(Sunil Kaushik)  
Commodore  
Principal Director

**Copy to:-**

The Commanding Officer  
INS India  
New Delhi 110011

**Internal**

**ACNS (P&P)**

**ACOM (D&R)**

**PDW**

**PDODY**

Tele: 2301 1471

Integrated Headquarters  
Ministry of Defence(Navy)  
New Delhi- 110 011

WK/9535/Defence Services

10 Nov 14

The Flag Officer Commanding-in-Chief  
{for CSO(P&A)}  
HQ Western Naval Command  
Shahid Bhagat Singh Road  
Mumbai – 400-023

The Flag Officer Commanding-in-Chief  
{for CSO(P&A)}  
HQ Eastern Naval Command  
Visakhapatnam-530014

The Flag Officer Commanding-in-Chief  
{for CSO(P&A)}  
HQ Southern Naval Command  
Kochi-682004

The Commander-in-Chief  
{for CSO(LA&P)}  
HQ Andaman & Nicobar Command  
Port Blair -744102

The Commanding Officer  
INS India  
Dalhousie Road  
New Delhi – 110 011

### **SOLAR POWER GENERATION IN THE ARMED FORCES**

1. Refer to IHQ MoD(N) letter EG/6030/ENVIRON/Policy dated 23 Jun 14.
2. The continuously growing demand of electricity and perpetual shortages in supply mandates that the *IN* should explore the possibility of utilising Renewable Energy Sources as an alternative to traditional electricity. There is thus a need to evolve and implement a concrete plan, so as to systematically reduce our dependence on fossil fuels.

-2-

3. Accordingly an Inter Services Working Group (ISWG) was constituted at HQ IDS to prepare and implement the road map on 'Usage of Renewal Energy Sources. In 2009, ISWG prepared an integrated road map for usage of Renewable Energy sources in the Armed Forces. The E-in-C's Branch, which is the nodal agency to monitor this implementation has issued, the road map for the Armed Forces which includes a major thrust on utilising Solar Energy as one of the most potent sources of Renewable Energy sources.

4. In order to give the necessary impetus to Solar Power Generation in the *IN*, Commands are requested to

(a) Earmark a certain percentage of their AMWP allocation, preferably 1.0-1.5% of the ceiling amount for Solar Photo Voltaic (SPV) based Renewable Energy (RE) sources. This would enable the Services to contribute towards achieving the National target of 15% within the next 10-15 Yrs.

(b) Forward a comprehensive plan for implementation of SPV based RE generation using the allocated funds of the AMWP for vetting/approval.



(R Malhotra)  
Commodore  
Principal Director Works

Internal

NA/CNS

NAV/CNS    SO/COP    SO/DCNS    TA/COM

SO/ACNS(P&P)    SO/ACOM(D&R)

PDME

L+A2

CONFIDENTIAL

Tele 23011713

Directorate of Marine Engineering  
Integrated Headquarters  
Ministry of Defence (Navy)  
New Delhi - 110011

EG/Policy/Green/08/2015

24 Aug 15

The Flag Officer Commanding-in-Chief  
(for CSO(Ops)/CSO(Tech))  
Headquarters, Western Naval Command  
Mumbai 400001

The Flag Officer Commanding-in-Chief  
(for CSO(Ops)/CSO(Tech))  
Headquarters, Eastern Naval Command  
Visakhapatnam 530014

The Flag Officer Commanding-in-Chief  
(for CSO(Ops)/CSO(Tech))  
Headquarters, Southern Naval Command  
Kochi 682004

The Commander-in-Chief  
(for COO(Mar Ops)/CTO(Marine))  
Headquarters, Andaman & Nicobar Command  
Port Blair 744102

FUEL CONSERVATION MEASURES ONBOARD IN SHIPS

1. Refer to the following:-
  - (a) CNO 02/2014.
  - (b) IHQ/MoD(N) letter EG/0556/Policy/COD/005/2013 dated 10 May 13.
  - (c) IHQ/MoD(N) fax EG/6030/Environ dated 05 Jun 15.
2. Regular monitoring of fuel consumption is an important activity and the fuel consumption data at various operating regimes facilitates optimal passage planning and deployment of IN ships. The data also helps in arriving at economic operating speeds of various platforms, which is an important factor towards minimising fuel consumption and its consequent cost. CNO 02/2014 mandates undertaking fuel consumption trials at

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least once a year and additionally on opportune occasions during normal deployment/ operations.

3. While fuel consumption trials benchmark the fuel consumption of a ship at various regimes, the Engine Exploitation Factor is a measurable indicator which signifies whether the main propulsion plant has been optimally utilised over a particular period, which in turn is indicative of operational cost. Policy directives have been issued by this Headquarters vide letter at para 1(b) on class-of-ship wise Engine Exploitation Factor. In light of Green Initiatives embraced by the *IN*, prudence in consumption of fuel and adherence to promulgated EEF assume greater significance. This alongwith exploitation of the main propulsion plants at economic regimes, factored into planning of various exercises/ deployments, wherever feasible, would optimise fuel consumption.

4. In view of the above, it is requested that fuel savings accrued by the adoption of optimisation measures for the exploitation of propulsion plants vis-à-vis their normal exploitation, be deduced class-of-ship wise every quarter, commencing QE 30 Sep 15, and quantified in terms of additional days of deployment which could be afforded through such savings. IHQ/MoD(N) fax EG/6030/Environ dated 05 Jun 15 is also relevant.



(Sunil Kaushik)  
Commodore  
PDME

Copy to:-

The Flag Officer Commanding  
Western Fleet (for FOO/ FEO)  
Fleet Mail Office  
Mumbai 400001

The Flag Officer Commanding  
Eastern Fleet (for FOO/ FEO)  
Fleet Mail Office  
Visakhapatnam 530014

The Flag Officer Sea Training  
INWT  
Naval Base  
Kochi 682004

Tele 23011713

Directorate of Marine Engineering  
Integrated Headquarters  
Ministry of Defence (Navy)  
New Delhi - 110011

EG/0556/Policy/COD/005/2013

13 May 13

The Flag Officer Commanding-in-Chief  
(for CSO(Ops)/CSO(Tech))  
Headquarters, Western Naval Command  
Mumbai 400001

The Flag Officer Commanding-in-Chief  
(for CSO(Ops)/CSO(Tech))  
Headquarters, Eastern Naval Command  
Visakhapatnam 530014

The Flag Officer Commanding-in-Chief  
(for CSO(Ops)/CSO(Tech))  
Headquarters, Southern Naval Command  
Kochi 682004

The Commander-in-Chief  
(for COO(Mar Ops)/CTO(Marine))  
Headquarters, Andaman & Nicobar Command  
Port Blair 744102

### POLICY - ENGINE EXPLOITATION FACTOR FOR IN SHIPS

1. Life cycle cost of a warship is largely dependent on operational cost and maintenance cost. Operational cost in turn is primarily dictated by fuel consumption and therefore by running hours of main propulsion and power generation prime movers. Optimisation of operational cost can be achieved by optimizing running hours of main propulsion plants.

2. It is therefore incumbent to develop measurable indices of propulsion plant exploitation vis-à-vis overall operational exploitation of a warship. The ratio of the sum of the running hours of all propulsion engines onboard a ship to the hours underway for a given period is defined as Engine Exploitation Factor (EEF). EEF would serve as a pragmatic index to arrive at an optimal operational exploitation of main engines. Maintaining an optimum EEF could accrue savings in operating costs.

3. From the definition of EEF it becomes evident that EEF will be between 1.0 and the number of main engines on the ship. For example, a Delhi class ship is provided with four Gas turbines (GT). Therefore, EEF for a Delhi class ship could be between 1.0 and 4.0. An EEF of 1.0 would be achieved if only one GT is exploited at any given time and an EEF of 4.0 would result if all four GTs are in use at all times the ship is underway. The decision on the extent of use of available propulsion power is decided by the mission requirements. However, it is imperative that a conscious effort be made to make optimum use of the available propulsion power and therefore to optimise EEF.

4. The optimisation of EEF would therefore be an exercise in balancing the influence of the following factors some of which conflict each other:-

- (a) Operational speed.
- (b) Type, number and operational characteristics of the main propulsion engines/propulsion plant.
- (c) Designed life/MTBO of main engines.
- (d) Available modes/combination of main engine exploitation.
- (e) Engine exploitation envelope defined by design/material constraints.
- (f) Engine exploitation/change over policy specifically in the case of combination power plants.

5. Based on the recommendation/comments received from Commands, the following EEF is promulgated class-of-ship wise for compliance:-

Ser	Class of Ship	Optimal EEF
(a)	Delhi Class	1.6
(b)	SNFs	1.4
(c)	Talwar Class	1.6
(d)	Corvettes	1.2
(e)	1241 REs	1.6
(f)	LST (L)s	1.6
(g)	1241 PEs (With MTU engines)	1.4
(h)	Agray	1.6
(i)	OPVs	1.4
(k)	Survey Ships	1.5
(l)	SNMs	1.2
(m)	FACs	1.5
(n)	WJFACS	1.8

6. EEF Exemption. EEF has not been promulgated for several classes of ships namely Tankers, Sail Training Ships, Steam Ships, LST(JM), LCU, XFAC, Nireekshak, and Matanga. The reasons for the same are placed at Enclosure 1. EEF for new induction platforms like Shivalik class and Makar Class will be promulgated on availability of adequate exploitation/performance data.

7. In view of the above, Command Headquarters are requested to:-

(a) Direct all Operational Authorities under their command to issue necessary directives towards EEF compliance by ships as per Para 5 above. Ships are to include the value of EEF achieved every month in the SRAR-I (rendered monthly) as per format placed at Enclosure 2.

(b) Render a monthly report to IHQ MoD(N)/DME, with justification, in case the EEF promulgated at Para 4 above is exceeded.

(G Srinivasan)  
Commdore  
PDME

Copy to:-

The Flag Officer Sea Training  
INWT  
Naval Base  
Kochi 682004

The Director  
Indian Naval Ship Maintenance Authority  
C/o Fleet Mail Office  
Mumbai 400 001

Internal

NA to CNS

TA /COM

SO/DCNS

SO/ACOM(D&R)

PDNO

Enclosure 1

(refers to Para 5 of IHQ MoD(N) letter

EG/0556/Policy/COD/005/2013 dated 05 May 13)EEF EXEMPTION

1. EEF is not being promulgated for the following ships/class of ships for reasons indicated against each:-

Ser	Class of Ship	Remarks
(a)	Tankers	By virtue of their operational role, single engine operation is limited. However, these ships (except Jyoti) are to resort to single engine regime whenever navigationally and operationally feasible.
(b)	Steam Ships	The fuel consumption is determined by the number of Boilers in use and the firing rate. Due to the need to maintain redundancy coupled with the long start up time, all boilers are put to use at sea mandatorily at all times.
(c)	Nireekshak	Ship's speed is 12 Knots with both engines operating
(d)	Sail Training Ships	These ships generally propel under engine power during heavy or no wind conditions and need both engines for better sea keeping
(e)	LST(JM) and LCUs	Flat bottom hull and low operating speeds preclude single engine operation.
(f)	XFACs	Role and deployment pattern necessitate use of both engines.

2. EEF is also not being promulgated for submarines as other exploitation monitoring indices like Indiscretion Rate (IR) and Achievable Estimate Value (AEV) are applicable.

5

Enclosure 2(refers to Para. of HQ MoD(N) letterEG/0556/Policy/COD/005/2013 dated 10 May 1FORMAT FOR INDICATING EEF

Name of Ship	Number of Main Engines fitted	Running hours (RH) per engine				Total Engine RH (a)	Total hours Underway (b)	EEF achieved (a / b)
		1	2	3	4			

Reasons/Justification for exceeding EEF:

1. Considerable amount of wet waste (to a tune of 600kgs) and dry waste (of about 1000kgs) is generated in the Establishment daily from various galleys and residential areas. Till 2018, the garbage collected through the conservancy contract was being disposed off at the Lonavla Municipality dumping yard at Varsoli. This included all types of waste unsegregated. However, aligning with the national policy of SWM-2016, a thorough study was undertaken by an officer wrt waste management in the Establishment. Based on the results of the study, a system for waste segregation at source, segregated waste collection from door-to-door and solid wet waste management facility inside the Base has been implemented wef Nov 18 successfully. Each resident pays an amount of Rs 75 per month as the fee iaw solid Waste Management Rules, 2016 issued by the Government of India. A contract has been concluded with a firm in Pune with the collected amount. Waste generated has been classified into seven different types namely Wet, Sanitary, Dry, E-waste, Garden waste, Debris & waste and Hazardous waste. The segregated waste is collected on different days in the week and all residents are being provided with two coloured bags to segregate the waste (wet waste in green bags and dry waste in black bags). The Unit has also provisioned different coloured dustbins at all garbage collection points and public areas. The waste collectors collect the segregated waste door-to-door from the residents and the same is composted at the Waste Management Site inside the Base as per the waste classification. Manure produced from the composted waste, about 1500 kg per month, is being used in-house in different gardens and trees. While the sanitary waste and paper waste is burnt in the incinerator which meets pollution norms, the dry and e-waste is disposed off for recycling. The segregation of the construction waste/ debris by the contractors is also being ensured and cement/ stone rubble is being used in landfills within the Establishment to level out certain areas. The electrical waste such as cables/ cable trays/ light fittings etc is being disposed off to the Municipality for recycling. In effect, the Station has been able to comply with 100% of the SWM-2019 rules as also the energy & environment management policies thus supporting the national cause. In addition to the wet waste management, following steps are also undertaken to segregate waste and to reduce Carbon footprint within the Base: -

(a) The Unit's MI room generates some amount of hazardous/ biomedical waste. Such waste is collected by the contractor under the aegis of INHS Kasturi complying with the national norms for biomedical waste disposal.

(b) All the policy directives issued at Government level/ by the E-in-C Branch/ by the Indian Navy have been compiled and an ERIC made for reference by various Board Presidents who prepare proceedings for new AMWP cases/ Special repairs of existing assets. This has ensured strict compliance of all the policy directives currently in force wrt GRIHA, LEED, ECBC etc.



**Tri Cycle for Waste Collection**



**Coloured Dustbin for Waste Collection**



**Pits for Compost formation**



**Waste Management Shed**

**In-house Wet Waste Management**

Phone: 23011435

WP/0124/ENVIRON

23 Oct 08

**INTEGRATED HEADQUARTERS OF MINISTRY OF DEFENCE (NAVY)**  
**VICE CHIEF OF THE NAVAL STAFF**

**MEMO No. P-21/2008**

**NOMINATION OF NODAL DIRECTORATE FOR ENVIRONMENTAL ISSUES**

1. In the quest for embracing the latest technology to achieve transformation, environment has often been the casualty. Of late, there have been concerns globally to adopt environment friendly products, processes and technologies. As the Militaries of the advanced nations are also adopting environmental friendly products, processes and technologies, Indian Navy has to be in the same stead.
2. Therefore, it is imperative that while formulating the Qualitative or Technical requirements, the concerned Directorates ensure that best environmental friendly contemporary technologies are used, without affecting the overall preparedness. Wherever space constraint, time, cost, TOT *etc.* prohibit the usage of environment friendly technology, the same should be brought out clearly by the steering Directorate.
3. At organisation level, **Directorate of Marine Engineering (DME)** would be the nodal Directorate responsible for coordination of all activities and policies related to environmental issues. It would also:-
  - (a) Conduct workshops/seminar at IHQ MoD (Navy) to increase environmental awareness among Naval personnel.
  - (b) Identify suitable courses under the aegis of globally reputed governmental agencies like UNEP, WWF *etc.* for increasing the awareness among the Naval personnel, especially steering Directorates, for larger dissemination.

  
(Raman P Suthan)  
Vice Admiral  
VCNS

**Distribution:** - Standard.

Tele: 2301 1725

Integrated Headquarters  
Ministry of Defence (Navy)  
Directorate of Marine Engg.  
'C' wing, Sena Bhawan  
New Delhi – 110 011

EG/6030/ENVIRON

25 Sep 14

The Flag Officer Commanding –in - Chief  
(for Chief of Staff)  
Headquarters, Western Naval Command  
Mumbai – 400 023

The Flag Officer Commanding –in - Chief  
(for Chief of Staff)  
Headquarters, Eastern Naval Command  
Visakhapatnam – 530 014

The Flag Officer Commanding –in - Chief  
(for Chief of Staff)  
Headquarters, Southern Naval Command  
Kochi – 682 004

### **INSTITUTION OF CNS TROPHY FOR 'BEST GREEN PRACTICES'**

1. A "CNS Rolling Trophy" to incentivise unit level pursuit of 'Green Initiatives in *IN*' has been instituted commencing 2014.
2. Reduction in carbon footprint has emerged as a 'Thrust Area' in the present era of accelerated expansion of our multidimensional Navy. In recognition of the impact of environment degradation on human lives, as a social responsibility and towards demonstration of environment stewardship amongst the Armed Forces, the Green Initiative Programme for *IN* was launched on the World Environment Day (05 Jun) with the promulgation of an Indian Navy Environment Conservation Roadmap (INCER).
3. With an aim to encourage the efforts aimed at energy efficiency and environment protection and consolidation of our unified approach towards achieving the common goal, it has been decided at IHQ MoD (N) to institute a rolling "CNS trophy for Best Green Practices" w.e.f 2014. The trophy is to be awarded every year on Navy Day, in the industrial and non-industrial categories, to the units which excel in adoption of guidelines promulgated by INCER.

4. The norms/criteria for determining the award are broadly as under:-

- (a) **Compliance**. Measures taken to adopt extant energy and environment conservation policies in practice.
- (b) **Environmental Governance and Carbon Footprint**. Measures taken to adopt low carbon and green growth methods through regular audits and adherence to environmental statement of units/establishments.
- (c) **Capacity Building**. Measures taken to outreach in terms of capacity building, creation of environmental awareness and involvement of the whole unit/ship's company.
- (d) **Innovative Clean Technologies**. Steps taken to adopt environment friendly/ green technologies and introduction of innovative techniques for environmental sustainability.

5. **Methodology**. The salient aspects of methodology for selection of award of trophy are enumerated as follows:-

(a) **Weightage of Parameters**. Towards bringing objectivity in the assessment process, marks have been allocated to each criterion as follows:-

- (i) Compliance – 20%.
- (ii) Environmental Governance and Carbon Footprint – 40%.
- (iii) Capacity Building – 20%.
- (v) Innovative Clean Technologies – 20%.

(b) **Evaluation Process**.

(i) Evaluation process will be undertaken in two stages:-

- (aa) By the Command.
- (ab) By IHQ MoD(N).

(ii) The Commands are to appoint a Board of Officers to evaluate the units in their jurisdiction and select one unit each in the industrial and non-industrial category.

(iii) The Standing BOO appointed at IHQ MoD(N) for implementation of Green initiatives are to examine the reports from Commands and also visit the recommended units/ establishments for 'on the spot assessment'.

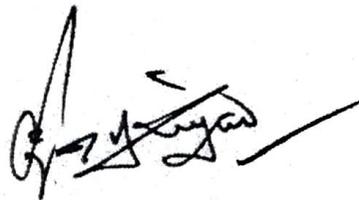
(iv) The methodology for evaluation of reports from Commands and physical assessment is to be based on the objective assessment criteria promulgated.

(c) Time Schedule.

(i) The Command HQs are to forward their recommendations for the award in the form of a self contained report to IHQ MoD(N)/ DME by 31 Oct.

(ii) The Standing Board is to submit its recommendations to ACOM (D&R) by 15 Nov every year for final approval by the CNS for award of Trophy on Navy Day.

6. Detailed guidelines on the criterion for award of the CNS Trophy are placed at Enclosure.



(S Nedunchezian)

Rear Admiral

Asst Chief of Material (Dockyard & Refits)

Encl:- As above

Internal:-

NA/CNS

NA/VCNS

TA/COM

ACNS (P&P)

Enclosure to IHQ MoD(N) letter  
EG/6030/ENVIRON dated 25 Sep 14

**CRITERIA FOR ASSESSMENT FOR AWARD OF TROPHY**

1. **Compliance – 20 marks**

- (a) Adherence to policies in vogue on energy and environment management in accordance to the INECR.
- (b) Compliance with prescribed approvals/ standards for storage/ handling/ disposal of biomedical/ solid waste as per national norms.
- (c) Policy directives on Green Building norms viz GRIHA, LEED, ECBC etc.
- (d) Compliance with policy directives issued by IHQMoD (N) and E-in-C's Branch on RE initiatives.

2. **Environmental Governance and Carbon Footprint – 40 Marks**

- (a) Annual environmental statement of the unit/ establishment.
- (b) Status of environmental audit: ISO 14001 Certification (only applicable for industrial category).
- (c) Special features of environment management in the organisation.
- (d) Percentage of buildings with GRIHA 3 star rating (new projects).
- (e) Percentage of replacement of incandescent lighting with solid state lighting (LED)/ CFL etc.
- (f) Energy (kWh)
  - (i) Total Energy use.
  - (ii) Specific energy consumption
  - (iii) Percentage change from last year.
  - (iv) Resource conservation measures to move towards renewable energy sources and energy efficiency.

- (g) Water (Litres/ Cubic meters)
  - (i) Total per capita water use
  - (ii) Specific water consumption
- (h) Material (Tonnes)
  - (i) Total recycled materials used.
  - (ii) Total packaging materials used.
  - (iii) Objectives, programmes and targets for replacement with eco-friendly materials.
- (j) Effluents/ waste (applicable for industrial unit)
  - (i) GHG emissions in tones of CO<sub>2</sub> equivalent (global warming potential).
  - (ii) Total waste (for disposal).
  - (iii) Initiatives for waste minimisation – (recycling, reuse, recover, recharge).
- (k) Air quality report
- (l) Effluents to water – discharge to water (by type)
- (m) Measures taken for treatment/ disposal of
  - (i) Effluents.
  - (ii) Emission.
  - (iii) Solid waste.
- (n) Assessment report by Command HQs for 'Best Environment Friendly Unit' at Command level.

3. **Capacity Building – 20 marks**

- (a) Details of workshops/ seminars on energy/ environment management.

(b) Details of training courses conducted/ attended.

(c) Sensitisation drives on eco-friendly practices and environmental sustainability and involvement of the whole unit/ ship's company.

4. Innovative Clean Technologies – 20 marks

(a) Use/ development of clean technologies

(b) Steps taken for waste recycle/ recover/ reuse / recharge

(c) Use of cleaner production/ manufacturing processes and technologies (only applicable for industrial categories).

(d) Innovation/ development for consideration for pan-Navy application/ implementation.

No. 0001/2020-D(Q&C)

Government of India

Ministry of Defence

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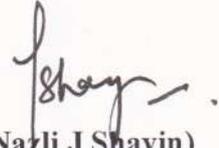
58

New Delhi, dated August, 2020.

**Sub: Order dated 11.02.2020 passed in OA No. 451/2019 in the matter of Air Marshal Anil Chopra by National Green Tribunal, Principal Bench, New Delhi – Regarding.**

Reference is invited to Ministry of Defence's letter of even No. dated 28.02.2020 and 03.07.2020 submitting Report on Environmental Issues and Waste Management vis-à-vis Armed Forces, Siachen Glacier Ecological Issues and Cantonment & Military Stations in compliance of National Green Tribunal (NGT) order dated 11.02.2020 passed in OA No. 451/2019 Air Marshal Anil.

2. It is submitted that Status report on "Environmental Issues and Waste Management - Armed Forces" is annexed as Annexure-A in respect of Coast Guard.



(Nazli J Shayin)

Joint Secretary (Lands)

011-23792043

**Assitant Registrar**

National Green Tribunal

Faridkot House, Copernicus Marg

Near India Gate, New Delhi - 110001.

**Status Report of Coast Guard on “Environmental Issues and Waste Management vis-à-vis Armed Forces”**

Coast Guard has examined the matter in consultation with CGHQ and the following is submitted:

- (i) ICG has been mentioned as component of Armed Forces along with Indian Army, Navy and Indian Air force. Emphasis has been laid on waste generated by Indian Defence Ordnance Factories, Shipyards, Aircrafts and weapon system related Factories.
  - (ii) Operation of ICG in marshy lands.
  - (iii) Need to interface with coastal initiatives of the states and Fisheries Department for ecological issues.
2. Indian Coast Guard (ICG) has been mandated for taking such measures, as necessary to preserve and protect the marine environment and to prevent and to prevent and control of marine pollution at sea. ICG mandate for enforcing the provisions in accordance with Coast Guard Act, 1978 is only in the Maritime Zone of India (MZI). Further, ICG maintains coordination amongst coastal states, fisheries department and other stakeholders at Regional and District level by conducting various programmers like Community Interaction programmer, International Coastal Cleanup for clean up drives.
  3. ICG operates two independent air stations at Daman and Ratnagiri. The air stations have been developed in such a manner that eco sensitivity of the surrounding area is not affected due to the construction related work and operation of the aircraft. The noise level and emissions generated from operation of the aircraft is minimal since maximum flying operations are conducted over conducted over sea. Necessary precautions and safety measures are in place for monitoring of the resident birds in the area to mitigate any risk to their natural habitats. The eco sensitivity of the place around the air stations has been maintained as per the existing guidelines governed i.a.w. Ministry of Civil Aviation (MoCA) and local policies in vogue.
  4. The present strength in ICG other than married (OTM) and Coast Guard Residential Area (CGRA) is miniscule. Unlike Military stations/cantonments which are generally away from the township and cities, ICG office space, accommodation and other allied facilities are in close interface with the civil populace. The mechanism of collection of garbage/waste disposal from the ICG complex/areas is undertaken by the municipal/corporation bodies. The waste management system Treatment Plants (STPS), incinerators and garbage disposal units in accordance with MARPOL convention. The daily waste generated is collected onboard and handed over to port reception facilities for proper disposal.