CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

A.1 Title of the small-scale project activity:

>>
2.5 MW Wind Power Project at Dhalgaon, Maharashtra by M/s Gadre Marine Export
Version 01
Date: 09/10/07

A.2. Description of the small-scale project activity:

>>
The objective is development of 2.5 MW wind power project in the state of Maharashtra, India to provide reliable, renewable power to the Maharashtra state electricity grid, which is part of the Western regional electricity grid. The Project will lead to reduced greenhouse gas emissions because it displaces electricity from fossil fuel based electricity generation plants.

The Project harnesses renewable resources in the region, and thereby displacing non-renewable natural resources thereby ultimately leading to sustainable economic and environmental development. The generated electricity will be supplied to Maharashtra State Electricity Distribution Company Limited under a long-term power purchase agreement (PPA) and subsequently all the electricity generated is sold to the state electricity utility. The Project is owned by Gadre Marine Export and is having the responsibility of operation and maintenance of the Wind farm.

The proposed CDM project activity involves construction and operation of 2 number of 1.25 MW capacity Wind Electricity Generators (WEG) at Dhalgaon in the village of Jakhapur, District Sangli, Maharashtra.

The main purpose of the project activity is to generate electrical energy through sustainable means using wind power resources, to utilize the generated output and selling it to the state grid and to contribute to climate change mitigation efforts.

Project's contribution to sustainable development

Ministry of Environment and Forests, Govt. of India has stipulated the following indicators for sustainable development in the interim approval guidelines for CDM projects. The Project meets several sustainable development objectives including:

- Leads to alleviation of poverty by establishing direct and indirect employment benefits during accomplishment and operation of the project activity.
- Developing the local economy and create jobs and employment, particularly in rural areas, which is a priority concern for the Government of India;
- Development of road network and improvement of electricity quality, frequency and availability as the electricity is fed into a deficit grid.
- Contribution towards the policy objectives of Government of India and Government of Maharashtra of incremental capacity from renewable sources;
- CO2 abatement and reduction of greenhouse gas emissions through development of renewable technology;
- Reducing the average emission intensity (SOx, NOx, PM, etc.), average effluent intensity and average solid waste intensity of power generation in the system;
- Conserving natural resources including land, forests, minerals, water and ecosystems; and

A.3. Project participants:

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Name of Party involved (host indicates a host party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the party involved wishes to be considered as project participant (Yes/No)
Ministry of Environment and Forests, Govt. of India (Host Party)	Gadre Marine Export (Project Proponent)	No

A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

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A.4.1.1. Host Party(ies):

>>
India

A.4.1.2. Region/State/Province etc.:

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Region: Sangli District
State: Maharashtra

A.4.1.3. City/Town/Community etc:

>>
Village: Jakhapur
Taluka: Kavthe Mahakal

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :

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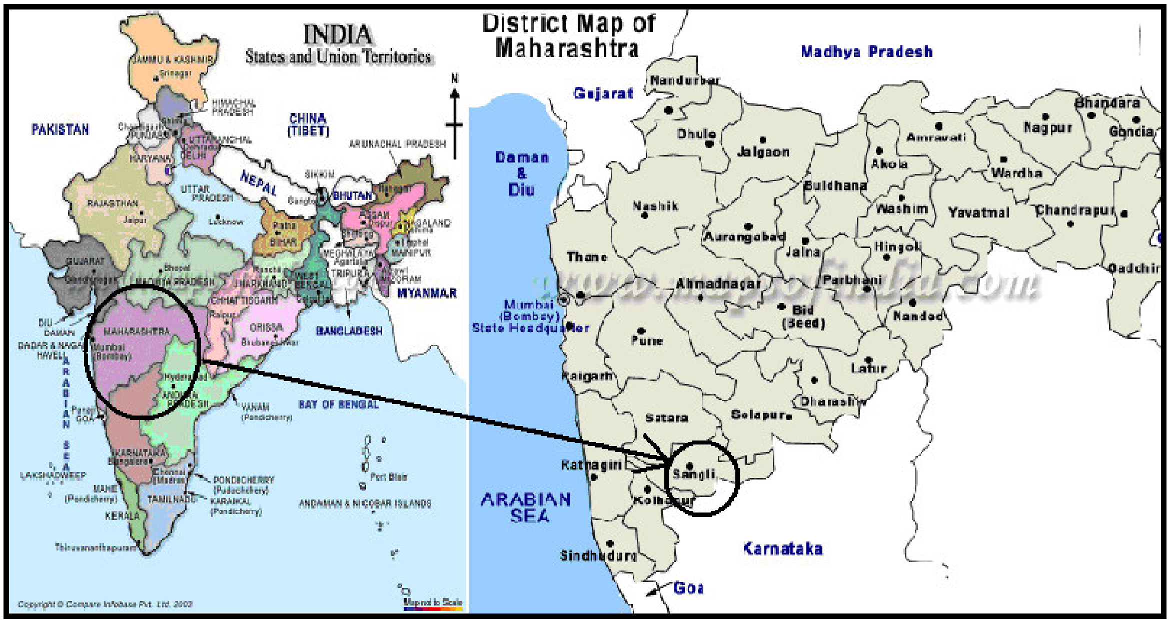
The wind farm is located at Jakhapur Village (Turbine location: G-202-203) at Sangli District in the state of Maharashtra. The location has been chosen based on the available average wind power potential in the region established by the studies done by Suzlon. The average wind velocity is estimated to be 289 Watt/ms^2 at a height of about 30meters. Sangli is located in the Western part of Maharashtra. The geographical location is: Latitude: 17^0 36'North; Longitude: 73^0 49'East. The district head quarters Sangli, is situated at a distance of 242 kms from Pune and 435 kms from Mumbai. Sangli is connected to all major cities.



A.4.2. Type and category(ies) and technology/measure of the small-scale project activity:

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Since the capacity of the proposed project is only 2.5 MW, which is less than the maximum qualifying capacity of 15MW, the project activity has been considered as a small scale CDM project activity and UNFCCC indicative simplified modalities and procedures are applied. According to small-scale CDM modalities the project activity falls under:

Type – I Renewable Energy Projects
Category I-D Grid connected renewable electricity generation, Version 12, EB 33

The project activity utilizes the wind potential for power generation and exports the generated electricity to the Maharashtra State grid. It follows that Type I.D. is the most appropriate category for the project under consideration.

Technology

The proposed CDM project activity involves construction and operation of 2 number of 1.25 MW capacity Wind Electricity Generators (WEG) at Dhalgaon in the village of Jakhapur, District Sangli, Maharashtra.

The technology to be employed involves converting kinetic energy of the wind into mechanical energy and subsequently into electrical energy. Wind has considerable amount of kinetic energy when blowing at high speeds. This kinetic energy when passed through the blades of the wind turbines gets converted into mechanical energy and rotates the blades of the WEGs. When the blades rotate, the connected generator also rotates, thereby producing electricity.

The project installs two Suzlon made WEGs of individual capacity 1.25 MW. The salient features of the 1.25 MW WEGs is as follows:

1. Higher Efficiency - Designed to achieve increased efficiency and co-efficient of power (Cp)
2. Minimum Stress and Load - Well-balanced weight distribution ensures lower static & dynamic loads
3. Shock Load-free Operation - Advanced hydrodynamic fluid coupling absorbs peak loads and vibrations
4. Intelligent Control - Next generation technologies applied by extensive operational experience maximizes yield
5. Maximum Power Factor - High-speed asynchronous generator with a multi-stage intelligent switching compensation system delivers power factor up to 0.99
6. Climatic Shield - Hermetically sheltered, advanced over-voltage and lightning protection system
7. Unique Micro-Pitching Control - Unmatched fine pitching with 0.1° resolution to extract every possible unit of power
8. Grid-friendly - Grid friendly design generates harmonics-free pure sinusoidal power

A direct grid-connected high-speed generator, in combination with the multiple-stage combined spur/planetary gearbox of the Suzlon Megawatt Series, offers greater robustness and reliability than a low-speed generator connected to the electrical grid via AC-DC-AC-inverter systems. High-speed asynchronous generator with a multi-stage intelligent switching compensation system delivers power factor up to 0.99. The generated power is free from harmonics and is grid friendly.

Operating Data:
1. Rotor Height: 64 m
2. Hub Height: 65 m
3. Cut in Speed: 3 m/s
4. Rated Speed: 12 m/s
5. Cut out speed: 25 m/s
6. Survival Speed: 67 m/s

Rotor:
1. Blade: 3 Blade Horizontal Axis
2. Swept Area: 3217 m2
3. Rotational Speed: 13.9 to 20.8 rpm
4. Regulation: Pitch Regulated

Generator:
1. Type: Asynchronous 4 / 6 Poles
2. Rated Output: 250 / 1250 kW
3. Rotational Speed: 1006 / 1506 rpm
4. Frequency: 50 Hz

Gear Box:
1. Type: Integrated (1 Planetary & 2 Helical)
2. Ratio: 74.971:1

Yaw System:
1. Drive: 4 electrically driven planetary gearbox
2. Bearings: Polyamide slide bearings

Braking System:
1. Aerodynamic Brake: 3 independent systems with blade pitching

2. Mechanical Brake: Hydraulic fail safe disc braking system

Control unit:

Type: Programmable microprocessor based; high speed data communication, active multilevel security, sophisticated operating software, advance data collection remote monitoring & control option, UPS backup, Real time operating indication.

Technology Transfer:
No technology transfer from other countries is involved in this project activity; instead the technology of MW class WEGs has been developed by Suzlon Energy Limited (the supplier / manufacturer) in its R & D centre.

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

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Crediting Period for the Project: Fixed for 10 years

Year	**Annual Emission Reductions tCO_2e**
2008	5,030
2009	3,934
2010	3,934
2011	3,934
2012	3,934
2013	3,934
2014	3,934
2015	3,934
2016	3,934
2017	3,934
Total estimated reductions (tonnes of CO_2e)	40,436
Total number of crediting years	10y-0m
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	4,043

In the above table, the year 2008 corresponds to the period starting from 01.01.2008 to 31.12.2008, 01.01.2008 being the expected date of registration of the Project. Similar interpretation shall apply for remaining years.

A.4.4. Public funding of the small-scale project activity:

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Project activity does not include any public funding from Annex I countries.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

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According to paragraph 2 of Appendix C to the Simplified Modalities and Procedures for Small-Scale CDM project activities, a small-scale project is considered a debundled component of a large project activity if there is a registered small-scale activity or an application to register another small-scale activity:

- With the same project participants
- In the same project category and technology
- Registered within the previous two years; and
- Whose project boundary is within 1km of the project boundary of the proposed small scale activity

The project proponents GME hereby confirms that there is no registered project activity registered within two years with them using the same technology. It is specifically stated that no two projects under GME are within proximity of 1km to the wind park at Dhalgaon in the district of Sangli. Thus the project is not a debundled component of any large-scale project activity.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the small-scale project activity:

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Project Type: I Renewable energy project

Project Category: I D Grid connected renewable electricity generation, Version 12, EB33 of Appendix B of the simplified M&P for Small Scale CDM project activities.

B.2 Justification of the choice of the project category:

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The installed capacity of the project is 2.50 MW, which is less than the limiting capacity of 15 MW and is thus eligible to use small-scale simplified methodologies. Further, the project activity is generation of electricity for a grid system using the wind energy potential. Hence, the type and category of the project activity matches with I.D. as specified in Appendix B of the indicative simplified baseline and monitoring methodologies for small-scale CDM project activities.

Technology/Measure as per AMS I.D	Justification
This category comprises renewable energy generation units such as photovoltaics, hydro, tidal/wave, wind, geothermal and biomass, that supply electricity to an electricity distribution system that is or would have been supplied by at least one fossil fuel or non renewable biomass fired generating unit.	The project activity is a renewable energy generation unit based on wind source. The generated energy is supplied to the regional grid which is being supplied by several fossil fuel and non renewable biomass fired generating units.
If the unit added has both renewable and non-renewable components (e.g.. a wind/diesel unit), the eligibility limit of 15MW for a small-scale CDM project activity applies only to the renewable component. If the unit added co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15MW.	The project consists of renewable "wind" generation source only and the capacity is 2.5 MW.

B.3. Description of the project boundary:

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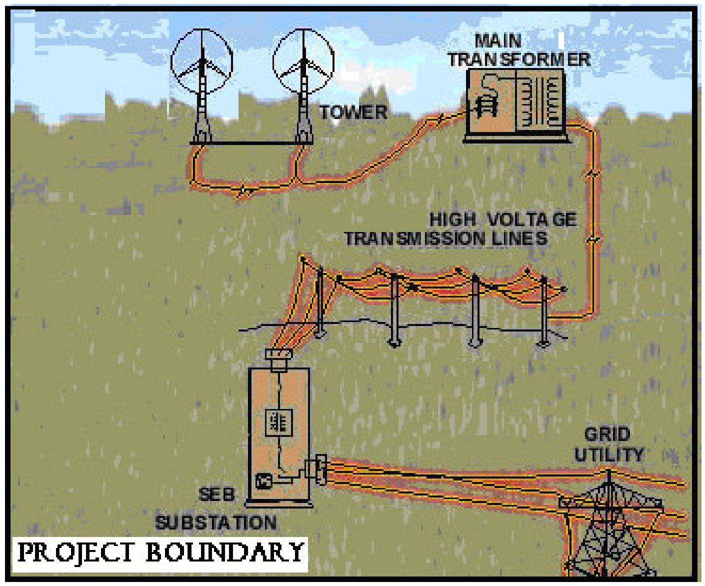
As mentioned under Type I.D. of '*the simplified modalities and procedures for small-scale CDM project activities*', project boundary encompasses the physical, geographical site of the renewable generation source.



The Wind Electricity Generators along with the other accessories lying within the periphery of the plant has been considered to be the boundary for the project activity. It encompasses the project site where the plant is situated along with the turbine and the transmission lines. However for the calculations of the baseline emissions the entire Western Region Electricity Grid has been considered.

B.4. Description of baseline and its development:

>>
The project category is renewable electricity generation for a grid system, which is fed by both fossil fuel fired generating plants (using fossil fuels such as coal, natural gas, diesel, naphtha etc.) and non-fossil fuel based generating plants (such as hydro, nuclear, biomass and wind). Hence, the applicable baseline, as per Clause 29 of Appendix B, indicative simplified baseline and monitoring methodologies is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in $kgCO_2/kWh$) calculated in a transparent and conservative manner.

As per Appendix B of the simplified Modalities and Procedures for Small-Scale CDM project activities gives two options for calculating the baseline for a Type I D project:

a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the approved methodology ACM0002. Any of the four procedures to calculate the operating margin can be chosen, but the restrictions to use the Simple OM and the Average OM calculations must be considered

OR

b) The weighted average emissions (in kg CO_2e/kWh) of the current generation mix. The data of the year in which project generation occurs must be used.

The project proponent has chosen the option (a) for the purpose of calculation of baseline where:

(i) The "approximate operating margin" is the weighted average emissions (in kg CO2equ/kWh) of all generating sources serving the system, excluding hydro, geothermal, wind, low-cost biomass, nuclear and solar generation.

(ii) The "build margin" is the weighted average emissions (in kg CO2equ/kWh) of recent capacity additions to the system, which capacity additions are defined as the greater (in MWh) of most recent 20% of existing plants or the 5 most recent plants."

Power Supply Position – Western grid
The Western Regional grid peak demand of 31,772MW during the year 2005-06, the peak demand was 31,085MW during the year 2004-05. The capacity shortage in the region was of the order of 13.5% to 20.5% during the year 2005-06. The capacity shortage in the region was of the order of 13.5% to 20.5%11.3% to 22.4% during the year 2004-05.

The installed capacity of Western Region as on 31.03.2006 as per CEA was 35,119MW. The total installed capacity comprises of Hydro – 6681.33MW, Thermal 26,039.7MW, Nuclear- 1300MW and Wind including RES – 1098.83MW. (Source: http://www.cea.nic.in/about_us/Annual%20Report/2005-06/CEA%20AR%202006%20Final.pdf)

The project will generate electricity from WEGs in the State of Maharashtra. The project activity has been essentially conceived for selling the generated output to the state electricity utility. Hence the wind power generated from the project site will be replacing the electricity generated from thermal power stations feeding into regional grid (during power surplus time). Since wind power is free from GHG emissions, the power generated will save the anthropogenic green house gas (GHG) emissions that would have been generated by the fossil fuel based thermal power stations comprising coal, diesel, furnace oil and gas. The estimation of GHG reductions by this project is limited to carbon-di-oxide (CO2) only.

In the absence of the CDM project activity, the electricity that is being delivered to the grid by this project would have been generated by the operation of grid-connected power plants and by the additions of new generation sources, as reflected in the combined margin calculations.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

>>
The installed capacity of the project is 2.5 MW, is less than the limiting capacity of 15 MW and is thus eligible to use small-scale simplified methodologies. Further, the project activity is generation of electricity for a grid system using wind energy. Hence, the type and category of the project activity matches with I.D. as specified in Appendix B of the indicative simplified baseline and monitoring methodologies for small-scale CDM project activities.

The Attachment A to appendix B mentions various barriers and requires explanation to show that the project activity would not have occurred due to at least any one barrier in the following category:

(a) Investment barrier
(b) Technological barrier and
(c) Prevailing practice

a) Investment Barriers

The entire project was planned based on supplying the produced electricity to the western regional electricity grid. At the time of the investment decision, the grid availability and other structural readiness were not in a very dependable state and delays were very common.

Wind energy has not been exploited widely in India (contributes only 2980MW where the gross potential of the wind power sector has been assessed as 45,000 MW). At the time of commencement of the project, the status of the installed capacity of the wind power in India is given below

State	Installed wind capacity as on (31.12.2004)[1]	% of the installed capacity
Andhra Pradesh	101.3	3.4
Gujarat	219.9	7.4
Karnataka	276	9.3
Kerala	2	0.1
Madhya Pradesh	27.6	0.9
Maharashtra	411.2	13.8
Rajasthan	263.2	8.8
Tamil Nadu	1677.4	56.3
West Bengal	1.1	0.0
Others	0.5	0.0
Total (all India)	2980.2	100.0

This source of energy has not been exploited widely in India. It is only during the last couple of years that a commercial exploitation of wind energy started in a big way. Wind energy has been the most unpredictable of the other entire common sources of generating energy i.e. coal, diesel etc. Further wind turbines generation plant has the lowest load factor of all other sources.

The total investment made by GME for the purpose of the proposed project activity has been INR 125 Million with an equity debt ratio of 50:50. The equity has been arranged by GME from their available resources whereas the debt has been arranged through financial institution. The project activity was propose to create a revenue source for GME in order to meet the repayment of debt in its initial operation and as an additional source of income to spend on R&D work on alternate fuels and other sources of energy.

Performance of windmills depends largely on the wind pattern of the area. Few windmill manufacturers already owned the lands of the major wind zones of the country and no suitable land was available for the project proponent to put up the renewable energy producing machines. To overcome this barrier they were compelled to buy the land from the windmill supplier at their quoted cost. The choices of the location of the windmills were driven by the meteorological condition.

Comparison of Cost of power generation using other fuel options:
Conventional based power generation is the natural choice and would be the obvious replacement for the equivalent energy generation in the grid. And there are other factors, which can be compared with the other fuel options:

- Most economical option for the generating electrical power, the total cost of setting up the GME WEG plant is Rs 125 millions i.e., the cost of generation of per MW is working around Rs.50 million, which is significantly high as compared to other renewable or fossil fuel based power plants.

[1] http://mnes.nic.in/annualreport/2004_2005_English/ch6_pg3.htm

- The load factor is an uncertainty with the wind power plants when compared to other power plants.
- Quality of fuel is inconsistent and unavailable when compared to the availability of the fossil fuel resources

Since wind energy is the clean energy as there is no GHG emission from it and this makes it an option for the project proponent. But this is not the most economical alternative, as the wind energy costs 1.5 times more than the any fossil fuel generation (the option with the least cost of generation)

Regulatory Risks:

Maharashtra Electricity Regulatory Commission (MERC) in exercising its power under Sec 22(i) c and 29 of the erstwhile ERC Act 1998, and also under Sections 62 & 86 (i) e of the EA 2003, fixed the tariff rates of electricity when sold to Maharashtra State owned utility for wind energy projects that are commissioned after 1st April, 2003. This is a regulatory barrier as the rate at which electricity is to be sold was fixed by MERC and binding on the project promoter who had no say in the matter.

Investment in wind carries has an inherent risk, as the generation cannot be guaranteed. This could lead to a situation where the MSEB may prefer to buy energy from risk free energy sources such as thermal power plants. The investors were aware of the possibility of tariff being introduced in Maharashtra at the time of purchase of the WEGs, and also that even at lower prices they were at a risk of not selling his energy.

Financial viability of the project on the tariff rate: Further, a negative impact was created in the whole set-up owing to delay / defaults in payments by the State owned utility to earlier investors in wind energy projects in Maharashtra. While the former statement is a direct regulatory risk, the later statement is an indirect regulatory risk to the project promoter.

Though the potential locations for windmill installations were identified through detailed micro siting by reputed organizations in the country, the capacity factor of the windmills in the country is low.

However, considering the non-repayment of revenue from MSEB to the investors of wind energy projects that had come up in the past, created a negative impact in the whole set-up. This propped up GME, to put up a demonstration project under the new tariff regime, and demonstrated to mitigate the regulatory risk; based on this precedence, the wind energy investments in Maharashtra has started reviving as more and more investors have decided to take up the risk. The state has started getting new investment in RE sector in the current financial year.

The estimated power generation capacity in India through wind is about 45,000 MW[2]. The installed capacity is about 3594.75MW (as on 31/12/2005), which is about 7.98% of the total estimated potential. Energy generation for 1 MW wind turbine could be about 28 to 30 lakhs units per year, with a plant load factor of 20%. The wind power projects require high capital investments and have low PLF. Due to these reasons wind energy is not a very attractive option for power generation. However the regulatory framework encourages investments in renewable energy projects. (By allowing for banking, wheeling and providing a good support price). But despite these benefits and facts, the wind energy projects are not very attractive.

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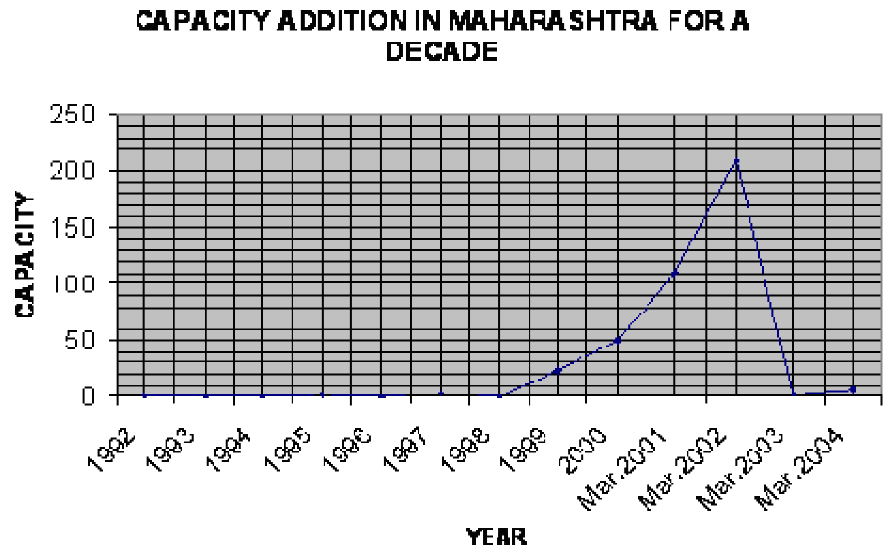
[2] http://greenbusinesscentre.com/Documents/wind.pdf



Also there is an added risk of policy changes by government. Government policies to support renewable energy project have been irregular. It has been seen in past that states have curtailed a policy after declaring it. Irregular policy changes lead to uncertainties in revenue generation and thus more project risk. The wind farm owners in turn had no prior intimation of any change/extension/expiry in the wind power policy

Pattern of Financing

The financing pattern for this wind power project is 50% through term loans and the rest 50% is achieved through own funds. It follows from here that the debt equity ratio is 50:50 bases. This poses even greater risks for the project proponents since in India the usual pattern of investment that is followed is 70:30 debt equity ratios[3]. Inspite of the commercial risks involved in the project GME still have carried on with the project just to cater to climate changes effect and also help the state of Maharashtra, which is suffering from a power crisis.

Financial Returns:

The financial returns from wind energy are low. The IRR calculated for this project was low at 9.72%. CDM revenue helped to improve the IRR to 11.19% and was the deciding factor. Wind power projects provide lower IRR as these projects entail high project cost and low PLF.

b) <u>Technological barrier:</u>

Owing to inherent risk of uncertainty in amount of electricity generated by the WEGs dependent on wind availability, additional risk comes into play when the technology used for generation is also newly implemented. In this project the newly inducted S70 WEGs of 1.25 MW had not enough / consistent track record of better performance and higher efficiency, the investment decision taken by GME carried an inherent technological risk. Lack of visible installations and lack of familiarity and experience with such new technologies can lead to perceptions of greater technical risk than for conventional energy sources. These perceptions may increase required rates of return, result in less capital availability, or place more stringent requirements on technology selection and resource assessment.

[3] http://indiabudget.nic.in/es2004-05/chapt2005/chap93.pdf

The project proponent being in the fish processing industry did not have any prior experience in the renewable energy business. The technology was new to them. They did not have the infrastructure or organizational capacity to run the windmills. They also did not have skilled manpower to operate the machines. The available manpower was trained to work in food processing industry and did not have the capacity to absorb the new technology of windmill operation and linking up with grid supply.

Connecting WTGs to weak and rural feeder lines in the absence of dedicated substations at some wind farm sites, poor grid, poor generation and loss of revenue. Other technical issues like inappropriate wind monitoring lack of industry's commitment and high cost of generation. Control system failures due to improper grounding and improper maintenance and inadequate facilities for repair. Technological barriers include lack of standardization of equipment, lack of coordination between the industry, research institutions and state and central governments.

The most critical component in a wind electric generator is the gearbox. Failure of gearbox is a real barrier for a wind farm due to non-availability of spares readily. At times, the spare will not be available for entire season of wind putting the windmill out of service for entire season. The maintenance problems of gearbox are impediment to establishing wind farms. Moreover the productivity of larger capacity machines is higher than that of smaller machines. The higher performance of large machines is achieved owing to the fact that the blade tips pitch to capture most energy from the wind, the rotor and generator speed would vary slightly to smooth out the fluctuations in power and the large swept area increases power output.[4]

c) <u>Barrier due to prevailing practice</u>

The installed capacity of Western Region as on 31.03.2006 as per CEA was 35,119MW. The total installed capacity comprises of Hydro – 6681.33MW, Thermal 26,039.7MW, Nuclear- 1300MW and RES–1098.83MW (Out of which 979.5MW is from Wind). Source: http://www.cea.nic.in/about_us/Annual%20Report/2005-6/CEA%20AR%202006%20Final.pdf). It is clearly visible from the data that the share of electricity generation from wind is very less (2.8% of total installed) in the Western Region and the current practice being followed in the region is preferentially the generation of electricity from fossil fuel based power plants.

Wind farms are located only in following 9 states of India: At the time of commencement of the project, the status of the installed capacity of the wind power in India is given below

State	Installed wind capacity (MW)[5]	% of the installed capacity
Andhra Pradesh	121.6	1.94
Gujarat	401.4	6.40
Karnataka	745.6	11.89
Kerala	2.0	0.03
Madhya Pradesh	54.9	0.88
Maharashtra	1283.7	20.47

[4] http://greenbusinesscentre.com/Documents/wind.pdf

[5] http://mnes.nic.in (Annual report 06-07)

Rajasthan	440.80	7.03
Tamil Nadu	3216.1	51.29
West Bengal	1.10	0.02
Others	3.2	0.05
Total (all India)	6270.4	

Available information on grid penetration (as mentioned above) for wind power projects in India states indicate that TamilNadu is by far the leader having achieved over 51% penetration, whereas the penetration level of wind farms in Maharashtra is merely 12.69% which clearly demonstrates that wind power generation is not a common practice.

The technical wind power potential of the State of Maharashtra is approximately 3040 MW. The current practice followed by investors (investing in WEGs) is to execute wind electricity projects in southern states because of higher generation potential (these states observe two monsoon seasons, leading to a higher PLF). Thus the total capacity exploited in the state of Maharashtra (as on March 31, 2005) is just about 15% of the technical potential, which is far behind the potential harnessed in southern states.

The above paragraphs explain that the proposed project activity was not a business as usual case for the project proponent. It thus satisfies the additionality conditions as required under Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities. The CDM benefits will help the project activity to cover up some of the risks that it is presently facing.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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Baseline Emissions:

Baseline emissions are calculated as the KWh produced by the renewable generating unit multiplied by an emission coefficient for the Western region grid

$BE_y = EG_y * COEF_{grid}$

Where

BE_y: Baseline emissions in year y (t CO_2)

EG_y: The net quantity of electricity exported to the grid by the project in year y

$COEF_{grid}$: Baseline or Carbon dioxide Emission factor for the Western Region Grid.

The Central Electricity Authority, Ministry of Power, Government of India has published a database of Carbon Dioxide Emission from the power sector in India based on detailed authenticated information obtained from all operating power stations in the country. This database i.e. The CO2 Baseline Database provides information about the Operating Margin and Build Margin Emission Factors of all the regional electricity grids in India. The Operating Margin in the CEA database is calculated ex ante using the Simple OM approach and the Build Margin is calculated ex ante based on 20% most recent capacity additions in the grid based on net generation as described in ACM0002. We have, therefore, used the Operating Margin and Build Margin data published in the CEA database, for calculating the Baseline Emission Factor.

Baseline emission factor of the Western Regional grid is calculated as a combined margin (CM), calculated as the weighted average of the operating margin (OM) and build margin (BM) factor. In case of wind power projects default weights of 0.75 for EFOM and 0.25 for EFBM are applicable as per ACM0002.

Using the values for operating margin and build margin emission factors provided in the CEA Baseline Database, Version 02 dated 21st June 2007 and their respective weights for calculation of combined margin emission factor, the baseline carbon emission factor[6] (CM) is 907.25 tCO2e/GWh.

Project Emissions:

Wind technology is GHG free and thus emissionsns from the project activity are zero.

Leakage:

As prescribed in Appendix B of the Simplified Modalities and Procedure for small-scale CDM project activities, for Category I.D, if the energy generating equipment is transferred from another activity or if the existing equipment is transferred to another activity, leakage is to be considered.

B.6.2. Data and parameters that are available at validation:

(Copy this table for each data and parameter)

Data / Parameter:	$COEF_{grid}$
Data unit:	tco_2e/GWh
Description:	**$C0_2$ Emission Factor of the grid**
Source of data used:	"CO2 Baseline Database for Indian Power Sector" published by the Central Electricity Authority, Ministry of Power, Government of India, Version 02, 21st June 2007. The "CO2 Baseline Database for Indian Power Sector" is available at www.cea.nic.in
Value applied:	907.25
Justification of the choice of data or description of measurement methods and procedures actually applied :	CO2 Emission Factor of grid has been calculated by the Central Electricity Authority in accordance with ACM0002.
Any comment:	-

B.6.3 Ex-ante calculation of emission reductions:

>>

Baseline emissions:

Ex-ante calculation of emission reductions is equal to ex-ante calculation of baseline emissions as project emissions and leakage are nil.

$BE_y = EG_y * COEF_{grid}$

Where

BE_y: Baseline emissions in year y (t CO_2)

EG_y: The net quantity of electricity exported to the grid by the project in year y

[6] http://cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm

$COEF_{grid}$: Carbon dioxide Emission factor for the Western Region Grid.

Project Emissions:

The emissions from the project activity are zero.

Leakage:

As prescribed in Appendix B of the Simplified Modalities and Procedure for small-scale CDM project activities, for Category I.D, leakage estimation is only required if there has been any transportation of any equipment. No leakage is envisaged.

The emissions reductions from the project activity is given as: BE_y - PE_y -L_y

B.6.4 Summary of the ex-ante estimation of emission reductions:

>>

Year	Baseline Emissions (tCO_2)	Project Emissions (tCO_2)	Emission Reductions (tCO_2)
2008	5,030	0	5,030
2009	3,934	0	3,934
2010	3,934	0	3,934
2011	3,934	0	3,934
2012	3,934	0	3,934
2013	3,934	0	3,934
2014	3,934	0	3,934
2015	3,934	0	3,934
2016	3,934	0	3,934
2017	3,934	0	3,934

B.7 Application of a monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

(Copy this table for each data and parameter)	
Data / Parameter:	EG_{total}
Data unit:	MWh
Description:	Gross electricity generation
Source of data to be used:	Plant records and MSEDCL
Value of data applied for the purpose of calculating expected emission reductions in section B.5	5,600 (as contracted by supplier)
Description of measurement methods and procedures to be	The data can be very accurately measured. The meters installed measures the parameter very accurately on continuously basis. Every month plant personnel will record these readings. Records are archived for cross checking the yearly

applied:	generation data and figures. The procedures for metering and meter reading will be as per the provisions of the power purchase agreement. 100% of the data is monitored - The data is archived electronically and paper
QA/QC procedures to be applied:	QA/QC procedures will be as implemented by GME and MSEDCL pursuant to the provisions of the power purchase agreement. The generation reports of the WTG are observed instantaneously and uploaded on a daily basis and the data is archived as daily, monthly and yearly generation reports in the electronic database of the organization.
Any comment:	-

Data / Parameter:	EG_y
Data unit:	MWh
Description:	Net Electricity supplied to the grid by the project
Source of data to be used:	Electricity supplied to the grid as per the tariff invoices raised on MSEDCL
Value of data applied for the purpose of calculating expected emission reductions in section B.5	5,544 (for the first year) and 4,336 from second year onwards
Description of measurement methods and procedures to be applied:	Net electricity supplied to the grid is measured by main meter (export and import). The procedures for metering and meter reading will be as per the provisions of the power purchase agreement. Electricity measured is used in calculation of emission reductions. The data is measured instantaneously with Generation and recorded monthly - 100% of the data is monitored - The data is archived electronically
QA/QC procedures to be applied:	QA/QC procedures will be as implemented by MSEDCL pursuant to the provisions of the power purchase agreement. The generation reports of the WTG are observed instantaneously and uploaded on a daily basis and the data is archived as daily, monthly and yearly generation reports in the electronic database of the organization.
Any comment:	-

B.7.2 Description of the monitoring plan:

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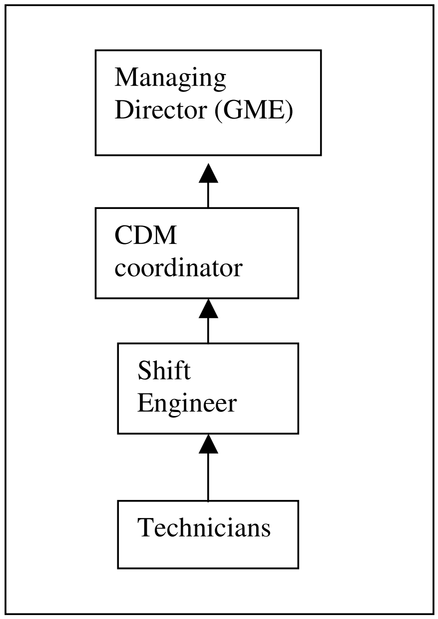
The project activity is in accordance with approved small scale methodology AMS I.D, and therefore, can use the monitoring methodology for type I.D of ‘Appendix B of the simplified M&P for small-scale CDM project activities-Version 12, EB33– Grid connected renewable electricity generation.

This approved monitoring methodology requires monitoring of the following:
· Electricity generation from the project activity; and
· Baseline Emission Factor

The monitoring methodology specified in the methodology requires that the project-monitoring plan to consist of metering the electricity generated by the renewable technology. In order to monitor the mitigation of GHG due to the project activity, the total energy exported needs to be measured. The net energy supplied to grid by the project activity multiplied by emission factor for regional grid, would form the baseline for the project activity.

Since the baseline methodology is based on ex ante determination of the baseline, the monitoring of baseline emission factor is not required. The sole parameter for monitoring is the electricity supplied to the grid. The Project is operated and managed by Gadre Marine Export (GME). The operational and management structure implemented by GME is as follows:



GME will have a designated Shift Engineer on site that will be responsible for monitoring the emission reductions of the project activity. Proper management process and routine procedures will be put in place to ensure the quality of reports required by verification audits. The daily and monthly reports stating the generation and net power export will be prepared by the engineer and verified by the plant engineer (CDM Coordinator) who will maintain the records. Records of joint meter reading will be maintained at site.

B.8 Date of completion of the application of the baseline and monitoring methodology and the name of the responsible person(s)/entity(ies)

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Date of completion and application of baseline and monitoring methodology: 02/08/2007
Name of responsible person/entity: Gadre Marine Export and its consultants.

Detailed contact address of the project participant is given in Annex 1.

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>>
29/09/2005

C.1.2. Expected operational lifetime of the project activity:

>>
20y-0m

C.2 Choice of the crediting period and related information:

C.2.1. Renewable crediting period

C.2.1.1. Starting date of the first crediting period:

>>
Not Applicable

C.2.1.2. Length of the first crediting period:

>>
Not Applicable

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
01/01/2008, being the expected date of registration of the project activity.

C.2.2.2. Length:

>>
10y-0m

SECTION D. Environmental impacts

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D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

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Environmental Impact Assessment (EIA) of this project is not an essential regulatory requirement, as it is not covered under the categories as described in EIA Notification of 1994[7] or the Amended Notification of 2006. The proposed project doesn't fall under the list of activities requiring EIA as it will not involve any negative environmental impacts, as the WEGs installed for generation of power use wind (cleanest possible source of renewable energy), thus no EIA study was conducted. However, a brief review of the environmental impacts project activity is discussed below;

During construction phase

The construction phase involved erection of a WEG in particular location. Although movement of materials for erection produced some dust pollution, the impacts were negligible and do not have any significant impact on the environment.

During operation phase

Impact on Air: There are absolutely no negative impacts on air due to the project activity.

Impact on water: No water is consumed for the project activity and no effluent is discharged from the project activity and hence, there is no impact on water due to the project activity.

Impact due to odour: There is absolutely no odour issue due to the project activity.

Impact due to noise: There are no significant impacts on the environment due to noise.

Impact on ecology: There are no known endangered species in the vicinity of the project activity and hence no significant impact on the ecology.

Social and economy issues: There are no resettlement issues due to the project activity. The installation of the project activity has given job opportunities to the local community during construction and operation of the project activity. The project activity has contributed to improving the standard of living of the local community.

The operation of this project activity will bring certain changes in the socio-economic and cultural environment by providing certain employment and livelihood opportunities improved the quality of life of the people in the surrounding habitations and also by providing cleaner environment and better health conditions to the people in the neighboring villages. The generation of electricity from such clean process would contribute towards meeting the states deficit in electricity requirements.

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[7] http://envfor.nic.in/divisions/iass/notif/eia.htm

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

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The project being a renewable energy based power project it does not fall under the purview of the Environmental Impact Assessment (EIA) notification of the Ministry of Environment and Forest, Government of India. There is no major impact on the environment due to the installation and operation of the windmills.

SECTION E. Stakeholders' comments

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E.1. Brief description how comments by local stakeholders have been invited and compiled:

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GME organised stakeholder consultation meeting with the village panchayat (elected body of representatives administering the local area) in the area with the objective to inform the interested stakeholders on the environmental and social impacts of the project activity and discuss their concerns regarding the project activity.

The nearest village to the project installation is situated nearly 5 kms away from the wind farm installation. The project site is in Dhalgaon, which is not used by the villagers except for the purpose of grazing animals. The project activity does in no way disturb the day-to-day activities of the local populace and it follows that the same activity is being carried out in the site.

The populations in the village of Jakhapur are the most important local stakeholders of the project activity. Meetings were organized with local stakeholders the village and comments were invited from the local community regarding the project activity. The villagers were informed about the proposed installation, and explained about the positive aspects of generation of electricity and economic well-being associated with the wind farm activity. The information was disseminated through the village electoral body "the village panchayat".

E.2. Summary of the comments received:

>>

Stakeholders had no objections from installation of WEGs instead they were found eligible for:

a) Job opportunities for day-to-day maintenance and security of WEGs
b) Development of roads & communication networks. The project would help in strengthening the infrastructure of the local village community.
c) Alternative source of income generation since the main source of income from agriculture was dwindling due to paucity of water and the lands becoming barren.

E.3. Report on how due account was taken of any comments received:

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The villagers had given a positive feedback and thus no measures were required to be taken.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Gadre Marine Export
Street/P.O.Box:	Mirkar Wada,
Building:	3298-A,
City:	Ratnagiri
State/Region:	Maharashtra
Postfix/ZIP:	415 612
Country:	India
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FAX:	+91 02352 232121
E-Mail:	
URL:	www.gadremarine.com
Represented by:	
Title:	Managing Director.
Salutation:	Mr.
Last Name:	Gadre
Middle Name:	-
First Name:	Arjun
Department:	
Mobile:	9823020136
Direct FAX:	+ 91-2352-230968
Direct tel:	+ 91-2352-230967 / 230533 / 231002 / 231003
Personal E-Mail:	arjun.gadre@gadremarine.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding as part of project financing from the Parties included in Annex I of the convention is involved in the project activity.

Annex 3

BASELINE INFORMATION

For the project activity the baseline scenario involves electricity consumption, which entails GHG emissions. As per the simplified methodology AMS I.D, for grid power generation as baseline scenario the Emission Factor for the displaced electricity system is calculated as per ACM0002 baseline methodology. The project proponent proceeds to determine the Emission Factor for the electricity system it imports power from.

Complete analysis of the system boundary's electricity generation mix has been carried out for calculating the emission factor of Western Regional Grid by Central Electric Authority (CEA) of India in its CO2 Baseline Database Version 2 dated 21st June 2007. The project proponent has used this analysis for computation of the grid emission factor. For more information please refer to http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm.

Annex 4

MONITORING INFORMATION

Project Management & Monitoring:

Monitoring of Generation Data
Each Wind Turbine has a local control system (LCS) in the Control Panel, which records the generation from that Turbine. Two such Wind Turbines are connected to the common metering point, which has a digital meter, which will record the total generation from Wind Turbines and auxiliary consumption.

The Site-in-Charge is responsible for the collection, reporting and archiving of daily electricity generation data, auxiliary consumption data in Physical/ electronic form. The readings taken are verified by the Project Head for monitoring and analysis.

The points given below detail the monitoring plan

The general conditions set out for metering, recording; meter readings, meter inspections, Test & Checking and communication are as per the PPA (power purchase agreement) with Maharashtra State Electricity Distribution Company Limited (MSEDCL).

Metering: The Delivered Energy is metered by MEDCL and GME at the high voltage side of the step up transformer installed at the Project Site.

Metering Equipment: Metering equipment is electronic trivector meter of accuracy class 0.5% required for the Project. The meter is installed and owned by the Project Proponent. The metering equipment is maintained in accordance with electricity standards. The meter has the capability of recording hourly and monthly readings.

Meter Readings: The monthly meter reading will be taken jointly by the MSEDCL and GME. At the conclusion of each meter reading an appointed representative of the MSEDCL and GME sign a document indicating the number of kWh indicated by the meter.

Emergency Preparedness plan:
The technicians at the Site are all aware of the steps to be taken during Emergencies at the Site. The Quality System process Manual is available at the Site for guidance. The staffs are also trained in the First aid and Safety methods.

Calibration and Maintenance of Meters:
The meters will jointly inspected/tested once in a year as per the terms of the PPA. Joint inspection and testing will also be carried out as and when difference in monthly meter readings exceeds the sum of maximum error as per accuracy class of main and back up meters.

Monitoring Data - Adjustments & Uncertainties
In case the meters are found to operate outside the permissible limits, the meters will be either replaced immediately or calibrated. Error correction will be applied to the meter reading. Whenever a main meter goes defective, the consumption recorded by the backup meter will be referred. The details of the malfunctioning along with date and time and snaps shot parameters along with load survey will be retrieved from the main meter. The exact nature of the malfunctioning will be determined after analyzing the data so retrieved and the consumption recorded by the main meter will be assessed accordingly.

If main as well as back up metering system becomes defective, the assessment of energy consumption for the outage period will be done from the backup meters by the concerned parties as mutually agreed or at the level of Metering Committee set up under the Metering Code.

The main and the backup metering systems will be sealed in presence of representatives of GME and MSEDCL.

Performance Review and Internal Audit of Reported data
There is a monthly review of generation data internally. The data of actual generation is compared to the scheduled generation and variance analysis is done and recorded in the monthly Operations Report. Corrective action is taken as required.