

# **Effectiveness of Project Monitoring based on Environment Impact Assessment (EIA) in Sri Lanka: A case study of Puttalam Coal Power Project**

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## **Introduction**

The importance of environmental assessment as an effective tool for the purposes of integrating environmental considerations with development planning is highly recognized in Sri Lanka. The importance of this management tool to foresee potential environmental impacts and problems caused by proposed prescribed projects under the National Environmental Act (NEA) and its use as a means to make projects more suitable to the environment are highly appreciative in terms of environmental conservation. Considering the size of the development, intervention and its potential environmental impacts, placement of an effective Environmental Monitoring Programme is a must. Monitoring tells us what is happening, research tells us why something is happening and modelling helps to tell us what can happen. Monitoring programs can be designed to test hypotheses or to validate quantitative models used by planning and policy. Long-term observations also reveal trends and patterns that can help interpret experimental results or yield new research hypotheses. Viewed in this manner, monitoring is a valid and important endeavour within the realm of eco-system science that deserves stronger commitments from government agencies and other funding institutions (Mazzotti et al., 2007).

Environmental Monitoring is a requirement under the National Environmental (Procedure for Approval of Projects) Regulations No. 1 of 1993 as contained in Gazette Extra-Ordinary No 772/22 of 24th June 1993 and No 1159/22 of 22nd November 2000.

### ■ Regulation 14:

“It shall be the duty of all Project Approving Agencies to forward to the Authority a report which contains a plan to monitor the implementation of every approved project, within thirty days from granting of approval under regulations 9 (i) and 13 (i) by such agencies” (Centre for Environmental Studies, 1997).

## **Problem**

Environmental Impact Assessments (EIA) are approved on the basis of proposed migratory steps and monitoring. Post-EIA monitoring has been poorly implemented so far. Many of the environmental cells of the Project Approving Agency do not have full-time staff, space allocation, funds or equipment. The post-approval monitoring of EIA is very weak and a few important factors have been affecting the environmental monitoring process. This poor environmental monitoring of EIA has challenged the effectiveness and efficiency of the whole environmental impact assessment system in Sri Lanka. Environmental monitoring is becoming more and more negligible and with the size and the potential impacts of developments, it is becoming even more critically important than before (World Bank, 2012). In the context of Sri Lanka, the Puttalam Coal Power Project (PCPP) is a very significant development in its history and it is very important to monitor the potential impacts. Therefore, implementation of a proper environmental monitoring programme is essential and it should be effective in achieving its objectives.

## **Objectives**

The objective of this study was to examine whether the environmental monitoring programme had a positive influence in mitigating negative impacts generated during the operation of Phase I of the PCPP.

## **Theory and Literature**

When considering the EIA process referred to be mandated by the NEA, Coast Conservation Department Act and the Fauna and Flora Ordinance of Sri Lanka, each and every development intervention should undergo an Initial Environmental Examination or an Environmental Impact Assessment. According to procedures enforced by the acts and regulations of the country, environmental monitoring must be conducted to fulfill the following objectives: i) check the implementation of mitigation measures to investigate whether it is in conformity with the environmental impact assessment report and conditions of approval; ii) ensure that the impact does not exceed legal standards; and iii) provide timely warnings of potential environmental damage.

Reviewing the regulations, procedures, practices etc. related to environmental monitoring, the following factors may have a direct relationship on their effectiveness. Therefore, the following factors are primarily recognized as independent variables which may result in effective environmental monitoring of a development intervention i.e. Baseline information; Air quality/noise; Water resources and wastewater discharges; Solid waste management; Monitoring frequency; Intensity of monitoring; Cost of monitoring; Enforcement by the PAA; and Commitment of the proponent: commitment of the PP is very important for monitoring. These primary dependent variables can be further classified into two categories namely, environmental factors and management factors.

With a comprehensive literature review related to environmental monitoring, it was understood that none or a very insignificant amount of literature discussed or researched into the effectiveness of environmental monitoring and related factors. Based on the literature review, it was understood that there are variables which can be identified as independent on which the effectiveness of an environmental monitoring programme of a development depends on. A causal relationship of this nature has grabbed the attention of academics, where many scholars have opted to write about environmental assessment as an environmental management tool. Few have adopted a more critical outlook that questions its effectiveness or, the contribution such tools would make on ensuring positive environmental management.

## **Data source and methodology**

This study was mainly based on primary and secondary data collected with a mix of quantitative and qualitative data. The field assessment was carried out during February – May 2014. Construction of the Phase II of the Coal Power Plant was completed by that time but not commissioned. Primary data were collected both via direct analysis according to the standard methods (Air Quality, Noise, Water and Wastewater) and Key Informant Interviews (Solid waste generation, Land resources uses, Hazardous/scheduled waste, financial contribution, reporting commitments and licensing). One time sampling was carried out.

NO<sub>x</sub> (mg/Nm<sup>3</sup>) and SO<sub>2</sub> (mg/Nm<sup>5</sup>) under the air emissions testing and analysis, Model E 8500 portable industrial integrated emission system combustion gas analyzer used and Electrochemical

method was adopted. Sample collected on the stack 1 at a standard height prescribed in the EIAR of 150m. In addition, to measure TSPM ( $\mu\text{g m}^{-3}$ ) levels, two high volume air samplers (Ecotech Model 2000) equipment used and TSPM concentration at locations I and II in the ambient air in the downwind direction and upwind direction were measured simultaneously for three hours. Samples collected at two locations in two scenarios namely; Location I – Upwind (P2) and downwind (P1) of coal yard and Location II – Upwind (P4) and Downwind (P3) of fly-ash unloading area (E Instruments International LLC, 2007).

The noise levels were tested using the equivalent continuous sound pressure level ( $L_{A_{eq}}$ ) was measured for a short period (T) under the fast selection mode and “A” frequency weighted scale using an integrated precision Sound Level Meter, B & K 2260. Methods laid down in British Standard BS 4142 of 1997 followed in rating industrial noise affecting mixed residential and industrial areas. Noise measured at four points at the boundary of the plant during day and night time (British Standards, BS-4142, 1997).

Water and wastewater samplings were collected at seven locations considering the generation water and wastewater from process and followed standard methods for examination of water and Wastewater as per APHA 20<sup>th</sup> Edition. Potentiometric APHA, 4500 –H+B, Electrometric AHPA, 2510 B, Thermometric AHPA, 2550B, Open Reflux Titrimetry APHA, 5220 –B, Titrimetry APHA, 5210 B for BOD, Spectrophotometry APHA, 4500 P E for  $\text{PO}_4^{3-}$  as P, Titrimetry APHA, 4500 Cl for Chloride as  $\text{Cl}^-$ , Gravimetry APHA, 4500  $\text{SO}_4^{2-}$  for Sulphate as  $\text{SO}_4^{2-}$ , and AAS APHA 3111 B for Total Pb as Pb (American Public Health Association, 1999).

Secondary data both quantitative and qualitative were collected from published reports (EIA Report of the Puttalam Coal Power Project Phase I, Letter of Approval of the Phase I - Puttalam Coal Power Project, EIA Report of Phase II - PCPP (2x300MW) and Technical Contract Documents of Phase I - PCPP).

## **Findings**

It was found that the environmental monitoring programme introduced in the EIA Report was not been implemented properly by the CEB and the project approving agency which is PEA-NWP has not monitored the progress and the compliance of monitoring. Out of 22 parameters only one parameter was monitored i.e. ground water levels only in two occasions (Ceylon Electricity Board, 1998). The status of monitoring reflects clearly that more than 95% of monitoring indicators have not been monitored. Secondary review found that when compared to the monitoring programme of other regional countries, very important parameters such as noise, vibration, geology and soil and Occupational Safety were not included in the monitoring programme (Coutinho, Miguel and Butt, Hamza K., 2014.). Another major failure is due to non-recognition of allocation of funding and cost estimates in the monitoring programme of the EIA and the CEB's poor commitment on implementing the monitoring programme. This is a major gap identified by reviewing the EIA report and assessing its effectiveness of the PCPP-Phase I.

Primary data collected and analysed revealed that Air emissions including TSPM are within the stipulated standards, Noise levels are within permissible levels and wastewater and water quality parameters comply with the tolerance limits for industrial and domestic waste discharged into marine coastal areas in the schedule 1 of the National Environmental (Protection & Quality) Regulation No 1 of the 2008 gazette No 1534/18 of 1<sup>st</sup> February. However, primary results and secondary results revealed that Wastewater (heated water) discharged into the sea reflects a very significant situation. The plant commissioned to produce 300MW of power but it was running

capacity was not the optimum capacity. In this circumstance, discharged cooling water temperature is +4<sup>0</sup>C higher than intake temperature. By adding another 600MW (cumulative impact) and by increasing the heated water volume up to 54 m<sup>3</sup>/s, a further temperature increase could be expected. This has been further validated by the hot water re-circulation study carried out for EIA (GreenTech Consultants (Pvt) Ltd, 2012).

It was also found from the primary data collection and analysis that the PCPP-CEB is operating without an Environmental Protection License (EPL) from its commissioned date which is a pre-requisite as per the law an industry to operate. However, the project proponent has applied for an EPL in 2011 and in 2013 from the PEA-NWP but EPL has not been issued up to the date of study.

## **Conclusion**

Ignorance of placing a proper monitoring framework as stipulated in the EIA Report, the CEA and the Provincial Environmental Authority of North Western Province has lost of gaining the maximum advantage of mitigating impacts. Considering the situation of Phase I of PCPP, it is highly important to re-validate the monitoring programme proposed in EIA Report of Phase II (cumulative 900MW) with addressing all the shortcomings recognized and establish a proper funding mechanism with a proper cost estimate for implementation of environmental monitoring programme.

## **References**

- American Public Health Association, 1999. Standard Methods for the Examination of Water and Wastewater: American Water Works Association, Water Environment Federation, pp 541*
- British Standards, BS-4142, 1997. Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas, ISBN 0 580 28300 3, pp 20*
- Ceylon Electricity Board, 1998. Environmental Impact Assessment Report of 300MW Coal Fired Thermal Plant in Kalpitiya Peninsula (RE-12548-017-02), pp 265*
- Coutinho, Miguel and Butt, Hamza K., 2014. Environmental Impact Assessment Guidance for Coal Fired Power Plants in Pakistan. Islamabad: IUCN Pakistan, pp 149*
- E Instruments International LLC, 2007. Instruction and Operations Manual, E8500 Portable Industrial Integrated Emissions System Combustion Gas Analyzer, Version 10.00, pp 45*
- GreenTech Consultants (Pvt) Ltd, 2012. Environmental Impact Assessment: Proposed 600MW Extension to Puttalam Coal Power Project (Phase II), pp 157*
- Hennayake, Shantha. K, A Hewage, M.S. Wijeratne and S.E. Yasaratne (Eds.) 1997. Environmental Impact Assessment: The Sri Lankan Experience. Centre for Environmental Studies, University of Peradeniya, Peradeniya, Sri Lanka, pp 135*
- The World Bank, 2012. Democratic Socialist Republic of Sri Lanka: Review of Environmental Impact Assessment System, Environment, Water Resources and Climate Change Unit, South Asia Region, pp 72*