

WESTERN COALFIELDS LIMITED

विषय :-वनमंडल पश्चिम छिन्दवाड़ा के परिक्षेत्र जामई के PF-454 के रकबा 14.000 हे० वनभूमि में भारत खुली खदानफेस- 2 कोयला उत्खनन् हेतु-मेसर्स वेस्टर्न कोलफील्ड्स लिमिटेड को उपयोग पर देने बावत्।

Name of Project	:	BHARAT OPEN CAST PATCH PHASE II
Area Applied	:	14.000 Ha.
Proposal No.	:	FP/MP/MIN/26356/2017
Query Ref.	:	File No. 8-112/2006-FCVol Dtd April/2023 of MOEFF&CC New Delhi.

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वेस्टर्नकोल फील्ड्स लिमिटेड/Western Coalfields Limited
मिनिरात कम्पनी (A Miniratna Company)
कोल इंडिया लिमिटेड की अनुसंगी कम्पनी (A Subsidiary of Coal India Limited)
CTN-1/10100MII1975G001018626



क्षेत्रीय महाप्रबन्धक का कार्यालय, कन्हान क्षेत्र
पता: रे.को.वि., कन्हान क्षेत्र, पो. हुंवारिया, जिला: छिन्दवाड़ा, मध्य प्रदेश, पिन-480553
Email: agmkanhan@westerncoal.gov.in

Office of Area General Manager, Kanhan Area
Address: WCL, Kanhan Area, PO: Durgaria, Dist: Chhindwara, MP, PIN: 480553
Fax: 07160-230520, Phone: 07160-231245

संदर्भसं: वेकोलि / कन्हान / क्षे.म.प्र. / योजना / 2023 / 1484

दिनांक :- 21/06/2023

प्रति,

प्रधान मुख्य वन संरक्षक (भू-प्रबंध) एवं

नोडल अधिकारी-वन (संरक्षण) अधिनियम 1980

सतपुड़ा भवन भोपाल मध्यप्रदेश।

विषय :- वनमंडल पश्चिम छिन्दवाड़ा के परिक्षेत्र जागई के PF-454 के रकबा 14.000 हे० वनभूमि में भारत खुली खदान फेस- 2 कोयला उत्खनन हेतु-मेसर्स वेस्टर्न कोलफील्ड्स लिमिटेड को उपयोग पर देने बावत।

संदर्भ :- File No. 8-112/2006-FCVol Dtd 24 April/2023 of MOEFF&CC New Delhi.
महोदय ,

उपरोक्त संदर्भित पत्र द्वारा चाही गई 2 बिन्दुओं की जानकारी निम्नानुसार है :-

क्र०	चाहीगयी जानकारी	जानकारी
1	Upon examination of the KML file through GIS-DSS tool, it was found that the boundaries of Mine Lease Area, 68.704 ha & 19.50 ha already diverted forest area have been changed again. Owing to this changes, this Ministry's vide its letter of even no. dated 16.08.2022 requested the State Govt. to upload the complete KML of instant project on PARIVESH on the basis of ground truthing. Thereafter the Govt. of Madhya Pradesh vide their letter No. F-1/FP/MP/MIN/26356/2017/3935 Dated 22.11.2022 informed about uploading of the complete KML file. On examination of same the DSS analysis revealed that the total forest area within lease is found to be 145.427 ha instead of 152.728 ha as per proposal on PARIVESH. Accordingly, this Ministry vide letter dated 19.12.2022 requested again to upload the complete KML file as per proposal. After that the State Government vide letter No. F-1/FP/MP/MIN/26356/2017/343 Dated	<p>In respect of forest land involved in the mining lease it is once again submitted that the total forest area within the mining lease of Ghorawari Sub-Area under MCR Lease No. 11 is 145.69 Ha.</p> <p>A snapshot of Google Earth showing forest area as 145.69 Ha was already shared in our previous reply dtd. 18.03.2023 (copy of the snapshot is enclosed for ready reference as Annexure-I).</p> <p>The snapshot of report generated on "Online Proposal Details On GIS" tab of Parivesh Portal of MoEF&CC showing forest area as 145.69 Ha (in round figure 145.7 Ha as shown in snapshot) is also enclosed for ready reference as Annexure-II.</p> <p>As such, the forest area marked in the kml file uploaded in the portal shows 145.69 Ha in Google Earth as well as Parivesh Portal GIS Tab.</p> <p>It may please be appreciated that the said forest area (including 19.50 Ha – diverted for Opencast mining, 68.704 Ha – diverted for Underground</p>

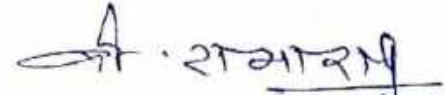
<p>25.01.2023 informed that the total forest area within lease is 145.690 ha instead of 145.427 ha and further reported that user agency has performed necessary correction in the forest area mentioned in online Part-I form on PARIVESH. The State Govt. again reiterated above said facts in their letter dated 29.03.2023. Keeping in view of the above mentioned facts, the Mining lease boundary has been examined by the DSS Cell of this Ministry wherein it has been reported that the total 150.453 ha forest area is coming under Mining Lease boundary. It is further reported that the above said analysis has been carried out on the basis of the Forest compartment boundary available on the State Forest website. In this regard, the State Government is requested to examine the extent of forest land within mining lease and do the necessary correction.</p>	<p>mining & 14 Ha forest land proposed for diversion in subject FC application) has been delineated several times as per the directives of MoEF&CC issued time to time, through ground survey done by the officials of Chhindwara Forest Dept. as well as WCL-Kanhan Area.</p> <p>It is also to submit that this matter has been duly clarified by the MP State Govt. in its letter dtd. 29-03-2023 (copy enclosed as Annexure-III) wherein it has been stated that as per the kml file uploaded in the portal, the forest land is 145.690 Ha and the same has been cross-checked in the O/o PCCF & Nodal Officer-FC, GoMP Bhopal.</p> <p>Hence, MP State Govt. has also confirmed that the total forest area marked in kml file which is uploaded on Parivesh Portal is 145.69 Ha.</p> <p>As such, in view of the above, it is to humbly submit that utmost care has been taken while preparing the kml file for subject application and the total forest area within the mining lease of Ghorawari Sub-Area under MCR Lease No. 11 is 145.69 Ha.</p>
<p>It was reported that 14 ha forest land is required due to change in technology and extraction of substantial coal which is locked up in protective barrier within 68.704 ha diverted forest land for underground mining. Accordingly, State Govt was asked that nothing in this regard was reflected in the Mining plan. Moreover, vital project components like safety zone, external dump, infrastructure, approach road etc. should be reflected in the Mining plan and may be intimated by the State Government. However, the reply submitted by the State Govt does not mention anything about the Mining Plan in this regard.</p>	<p>A Plan of Bharat OC Patch Phase-II showing vital project components like safety zone, surface infrastructure, approach road etc. was already shared in our previous reply dtd. 18.03.2023. A copy of the same is enclosed as Annexure-IV for ready reference. It is also to submit that there will be no External Dump in Bharat OC Patch Phase-II.</p> <p>In this regard it is humbly submitted that the Environmental Clearance was awarded to Ghorawari Opencast Project by MoEF& CC vide its letter dt: 26.12.2008. A copy of the same is enclosed herewith as Annexure-V.</p> <p>It may be seen from the aforesaid letter that the Ghorawari Opencast Project has already been proposed to be worked by opencast method in Patches. The proposed working of different patches has also been recorded in the said EC letter. The Actual working may vary depending on the actual acquisition of land. the EC has also recorded that these patches will work old UG working. All these facts have been duly documented in the EIA/EMP of the Project submitted to MoEF based on which the EC was accorded (<i>Page No-4(a)</i>). A copy of the EIA/EMP document is attached herewith as Annexure-VI for ready reference.</p>

In this context, a copy of the reply subsequent to the telephonic query from MoEF&CC is also attached as **Annexure-VII** and it may be worthwhile to mention here that based on the reply only EC was accorded by MoEF& CC with due according of the patch-wise working in the Project under consideration. Subsequently, Stage-II FC for Phase-I of OC Patches i.e. 19.50 Ha for Ghorawari OC Patch was accorded by MoEF&CC on 17.01.2015 (copy enclosed as **Annexure-VIII**).

In view of the above, it is again submitted that all the supporting documents related to Mine Planning & Phasing are already shared with MoEF&CC based on which Environmental Clearance and Forestry Clearance (for Phase-I-19.50 Ha) was accorded by MoEF&CC.

उपरोक्त जानकारी आपके आवश्यक कार्यवाही हेतु सादर प्रेषित।

संलग्न : उपरोक्तानुसार


क्षेत्रीय महाप्रबंधक 20.6.23
कन्हान क्षेत्र

प्रतिलिपि :-

01. मुख्य वनसंरक्षक, छिन्दवाड़ावृत्त, छिन्दवाड़ा मध्यप्रदेश।
02. वनमण्डलाधिकारी, (सामान्य) पश्चिम, मण्डल जिला छिन्दवाड़ा।
03. महाप्रबंधक (पर्यावरण), वे०को०लि० मुख्यालय नागपूर।
04. महाप्रबंधक (भू० एवं रा०), वे०को०लि० मुख्यालय नागपूर।
05. उपक्षेत्रीय प्रबंधक, घोड़ावाड़ी उपक्षेत्र।
06. क्षेत्रीय योजना अधिकारी/क्षेत्रीय सर्वेक्षण अधिकारी कन्हान क्षेत्र।

केवल नागपुर कोर्ट के अधिकाधिकार क्षेत्र में



वेस्टर्नकोल फील्ड्स लिमिटेड/Western Coalfields Limited

मिनिरात्रा कम्पनी (A Miniratna Company)

कोल इंडिया लिमिटेड की अनुसंगी कम्पनी (A Subsidiary of Coal India Limited)

CIN:U10100MH1975GO1018626



क्षेत्रीय महाप्रबन्धक का कार्यालय, कान्हा क्षेत्र
पता: वे.को.मि., कन्हा क्षेत्र, पो. दुंगरिया, जिला: छिन्दवाड़ा, मध्य प्रदेश, पिन. 480553
Email: agmkanhan@westerncoal.gov.in

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Address: WC1, Kanhan Area, PO: Durgaria, Dist: Chhindwara, MP, PIN: 480553
Fax: 07160-230520, Phone: 07160-231245

संदर्भसं:वेकोलि/कन्हा/क्षे.म.प्र./योजना/2023/ 483 दिनांक :-21/06/2023

प्रति,

वनमण्डलाधिकारी, (सामान्य) पश्चिम,
मण्डल जिला छिन्दवाड़ा।

विषय :-वनमंडल पश्चिम छिन्दवाड़ा के परिक्षेत्र जामई के PF-454 के रकबा 14.000 हे० वनभूमि में भारत खुली खदान फेस- 2 कोयला उत्खनन हेतु-मेसर्स वेस्टर्न कोलफील्ड्स लिमिटेड को उपयोग पर देने बाबत।

संदर्भ :-File No. 8-112/2006-FC Vol Dtd 24 April/2023 of MOEFF&CC New Delhi.

महोदय,

उपरोक्त संदर्भित पत्र द्वारा चाही गई 2 बिन्दुओं की जानकारी निम्नानुसार है :-

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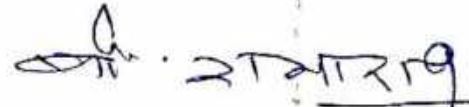
<p>145.427 ha and further reported that user agency has performed necessary correction in the forest area mentioned in online Part-I form on PARIVESH. The State Govt. again reiterated above said facts in their letter dated 29.03.2023. Keeping in view of the above mentioned facts, the Mining lease boundary has been examined by the DSS Cell of this Ministry wherein it has been reported that the total 150.453 ha forest area is coming under Mining Lease boundary. It is further reported that the above said analysis has been carried out on the basis of the Forest compartment boundary available on the State Forest website. In this regard, the State Government is requested to examine the extent of forest land within mining lease and do the necessary correction.</p>	<p>several times as per the directives of MoEF&CC issued time to time, through ground survey done by the officials of Chhindwara Forest Dept. as well as WCL-Kanhan Area.</p> <p>It is also to submit that this matter has been duly clarified by the MP State Govt. in its letter dtd. 29-03-2023 (copy enclosed as Annexure-III) wherein it has been stated that as per the kml file uploaded in the portal, the forest land is 145.690 Ha and the same has been cross-checked in the O/o PCCF & Nodal Officer-FC, GoMP Bhopal.</p> <p>Hence, MP State Govt. has also confirmed that the total forest area marked in kml file which is uploaded on Parivesh Portal is 145.69 Ha.</p> <p>As such, in view of the above, it is to humbly submit that utmost care has been taken while preparing the kml file for subject application and the total forest area within the mining lease of Ghorawari Sub-Area under MCR Lease No. 11 is 145.69 Ha.</p>
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the telephonic query from MoEF&CC is also attached as **Annexure-VII** and it may be worthwhile to mention here that based on the reply only EC was accorded by MoEF& CC with due according of the patch-wise working in the Project under consideration. Subsequently, Stage-II FC for Phase-I of OC Patches i.e. 19.50 Ha for Ghorawari OC Patch was accorded by MoEF&CC on 17.01.2015 (copy enclosed as **Annexure-VIII**).

In view of the above, it is again submitted that all the supporting documents related to Mine Planning & Phasing are already shared with MoEF&CC based on which Environmental Clearance and Forestry Clearance (for Phase-I-19.50 Ha) was accorded by MoEF&CC.

उपरोक्त जानकारी आपके आवश्यक कार्यवाही हेतु सादर प्रेषित।

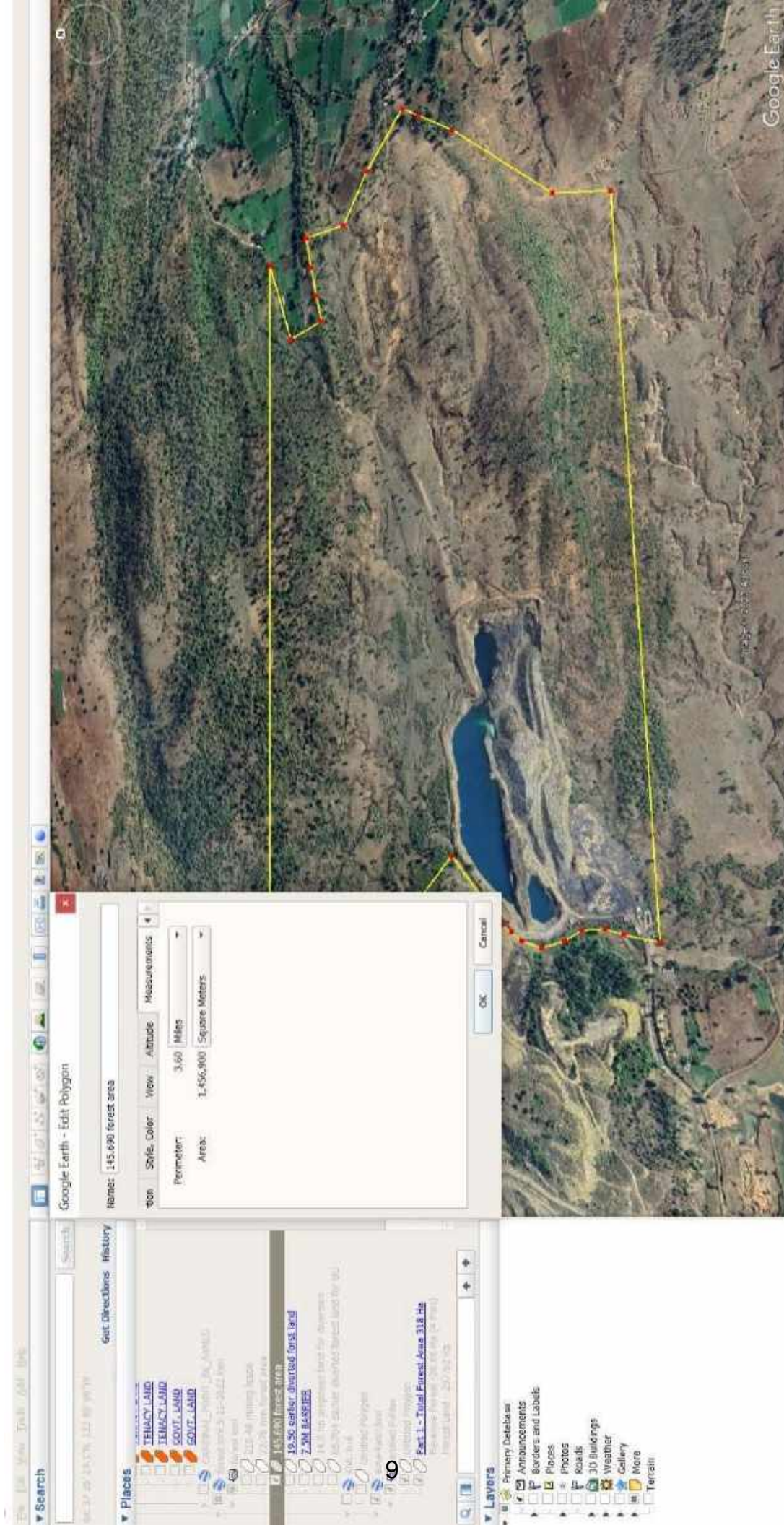
संलग्न : उपरोक्तानुसार


क्षेत्रीय महाप्रबंधक 21.06.23
कन्हान क्षेत्र

प्रतिलिपि :-

01. प्रधानमुख्य वनसंरक्षक (भू-प्रबंध), मध्यप्रदेश भोपाल।
02. मुख्य वनसंरक्षक, छिन्दवाड़ावृत्त, छिन्दवाड़ा मध्यप्रदेश।
03. महाप्रबंधक (पर्यावरण), वे०को०लि० मुख्यालय नागपूर।
04. महाप्रबंधक (भू० एवं रा०), वे०को०लि० मुख्यालय नागपूर।
05. उपक्षेत्रीय प्रबंधक, घोड़ावाड़ी उपक्षेत्र।
06. क्षेत्रीय योजना अधिकारी / क्षेत्रीय सर्वेक्षण अधिकारी कन्हान क्षेत्र।

The screenshot displays the Google Earth interface with a polygon drawn over a landscape. The 'Layers' panel on the left lists several layers, including '145,690 forest area' and '19,50 earlier diverted forest land'. The 'Tools' panel on the right shows the 'Polygon' tool selected. The 'Properties' panel at the bottom shows the polygon's name '145,690 forest area', its perimeter '3.60 Miles', and its area '1,456,900 Square Meters'.



PARIVESH
परिवेश

Online Proposal Details On GIS

Ministry of Environment, Forest and Climate Change
Government of India



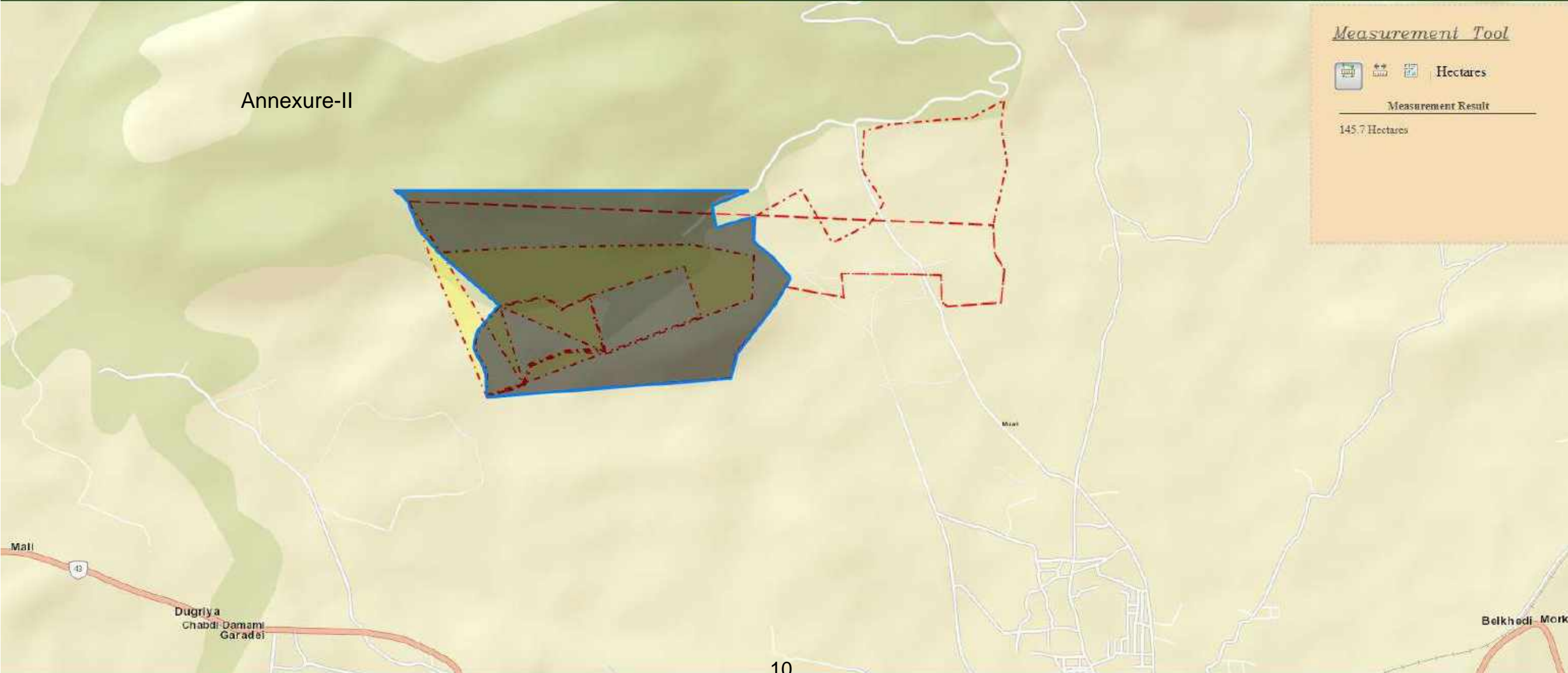
Annexure-II

Measurement Tool

  Hectares

Measurement Result

145.7 Hectares



कार्यालय प्रधान मुख्य वन संरक्षक (कक्ष भू-प्रबंध), सतपुड़ा भवन, मध्यप्रदेश, भोपाल

क्रमांक/एफ-1/FP/MP/MIN/26356/2017/129/

भोपाल, दिनांक 29/03/2023

प्रति,

वन महानिरीक्षक (एफ.सी.)

भारत सरकार, पर्यावरण वन एवं जलवायु परिवर्तन मंत्रालय
इंदिरा पर्यावरण भवन, अलीगंज, जोरबाग रोड,
नई दिल्ली-110003

विषय:- वन मंडल, पश्चिम छिन्दवाड़ा के परिक्षेत्र जामई के ग्राम जुन्नादेव विशाला के कक्ष क्र. 454 के रकबा 14.000 हे. वनभूमि भारत खुली खदान फेस-2 कोयला उत्खनन हेतु वेस्टर्न कोलफील्ड्स लिमिटेड का व्यपवर्तन का आनलाईन प्रस्ताव क्र. FP/MP/MIN/26356/2017

संदर्भ:- भारत सरकार, पर्यावरण वन एवं जलवायु परिवर्तन मंत्रालय, नई दिल्ली का पत्र क्र./ 8-112/2006-FC Vol. दिनांक 22/03/2023

विषयांकित परियोजना के संबंध में आपके द्वारा संदर्भित पत्र क्र./8-112/2006-FC Vol. दिनांक 22/03/2023 से 04 बिन्दुओं पर जानकारी चाही गई है। वेस्टर्न कोलफील्ड्स लिमिटेड द्वारा पत्र क्रमांक/1445 दिनांक 18/03/2023 से प्राप्त हुई है। प्राप्त बिन्दुवार जानकारी निम्नानुसार प्रस्तुत है:-

क्र.	चाही गई जानकारी	प्रस्तुत जानकारी
i	The State Govt has now intimated that the total forest area within mining lease is 145.690 ha whereas as the kml file submitted now the total forest area is found to be 150.453 ha. The State Government is requested to examine the extent of forest land within mining lease and do the necessary correction online along with KML file.	<p>इस बिन्दु पर आवेदक संस्था का उत्तर संलग्न है। आवेदक संस्था द्वारा अवगत कराया गया है कि पोर्टल पर अपलोड KML फाईल का रकबा 145.69 हेक्टेयर है।</p> <p>इस संबंध में यह भी अनुरोध है कि इस कार्यालय द्वारा भी पोर्टल पर अपलोड KML फाईल का रकबा निकाला गया है जो 145.69 हेक्टेयर ही आया है।</p> <p>अतः पोर्टल पर अपलोड KML फाईल का रकबा की पुनः जांच किये जाने का अनुरोध है।</p> <p>आवेदक संस्था ने यह भी बताया है कि पोर्टल पर अपलोड वनभूमि के अनुसार ही राजस्व विभाग से इस खदान की लीज के संबंध में कार्यवाही की गई है।</p>
ii	The Chindwara Van Mandal had done plantation over 14.00 ha area as a mitigation measure stipulated for the diversion of 19.5 ha forest land earlier. The State has now submitted that plantation will be carried out at the cost of user agency by the MP Van Vikas Nigam to compensate the same. However, the KML file or detail of land identified for this purpose has not been provided. In this regard the State Govt. has to ensure that the area identified for	इस संबंध में अनुरोध है कि सामान्य प्रकरण में आवेदित वनभूमि से काटे जाने वाले वृक्षों की संख्या के आधार पर वनीकरण न करते हुये आवेदित वनक्षेत्र के दुगने बिगड़े वनों में रोपण योजना तैयार कर आवेदक से राशि जमा कराई जाती। इस प्रकरण में भी नियमानुसार केवल 28.00 हेक्टेयर बिगड़े वनों में रोपण की योजना तैयार की जानी चाहिए थी। इस वनक्षेत्र में यदि वन विभाग का रोपण होता तो केवल 28.00 हेक्टेयर बिगड़े वनों में ही रोपण की राशि ली जाती।

	plantation is in line with the condition stipulated for this purpose in the approval accorded for the diversion of 19.5 ha forest land.	चूंकि प्रकरण में आवेदित भूमि पर वन विकास निगम का रोपण है, अतः इस रोपण पर अभी तक किया गया व्यय की वसूली आवेदक संस्था से की जाकर इसका भुगतान वन विकास निगम को किया जायेगा। इस राशि से वन विकास निगम अपनी इच्छा के अनुसार रोपण कर सकता है तथा इसमें किसी प्रकार की बाध्यता नहीं है। प्रकरण में नियमानुसार 28.00 हेक्टेयर बिगड़े वनों में 28000 पौधों रोपित करने की योजना तैयार की गई है, जिसकी राशि आवेदक संस्था से प्राप्त कर कैम्पा मद में जमा कराई जायेगी।
iii	Now the user agency has informed that the 19.5 ha diverted forest land shall be used for over-burden (OB) dumping of waste generated from 14 ha forest proposed for diversion. It is pertinent to mention here that a seasonal nala flows on the western flank of 19.5 ha diverted forest land. Therefore, the State Govt. shall examine the matter and submit the justification/proposed safeguards accordingly.	इस संबंध में आवेदक संस्था ने यह स्पष्ट किया है कि आवेदित वनक्षेत्र से लगी पूर्व में स्वीकृत 19.5 हेक्टेयर की खदान में खनन का कार्य पूर्ण हो चुका है। खनन के कारण जो गड्ढा (Void) निर्मित हुआ है, उसमें प्रस्तावित खदान का ओवरवर्डन इन गड्ढों को भरने में किया जायेगा। आवेदक संस्था ने यह भी अवगत कराया है कि 19.5 हेक्टेयर खदान के पश्चिम भाग में जो नाला बहता है, उसके बचाव के लिये उनके द्वारा 3 मीटर ऊँचाई का बण्ड बनाया है। अतः नाले का पानी खदान में आना सम्भावित नहीं है। आवेदक संस्था द्वारा दिये गये तर्क से यह कार्यालय सहमत है।
iv	User agency has now reported that 14 ha forest land is required due to change in technology and extraction of substantial coal which is locked up in protective barrier within 68.704 ha diverted forest land for under-ground mining. However, nothing of this fact was reflected in the Mining plan. Moreover, vital project components like safety zone, external dump, infrastructure, approach road etc. should be reflected in the Mining plan and may be intimated by the State Government.	आवेदक संस्था ने यह अवगत कराया है कि इस खदान की पर्यावरणीय स्वीकृति भारत सरकार के पत्र दिनांक 26.12.2008 से प्राप्त हुई थी। इस स्वीकृति में यह कार्य खुले खदान के रूप में करने का उल्लेख है। आवेदक संस्था ने इस संबंध में अभिलेख उपलब्ध कराये हैं, जो संलग्न हैं। इसके अतिरिक्त आवेदक संस्था ने इस खदान के संबंध में एक बड़ा मानचित्र प्रस्तुत किया है, जो संलग्न है। इस मानचित्र में सेप्टीजोन, इन्फ्रास्ट्रक्चर, सड़क आदि दर्शित हैं।

इस संबंध में यह अनुरोध है कि आवेदक संस्था की यह परियोजना अत्यन्त महत्वपूर्ण है तथा भारत सरकार स्तर से समय-समय पर की जा रही समीक्षा में इसे सम्मिलित किया गया है। इस प्रोजेक्ट के संबंध में यदि कोई कमी है तो इसे वीडियो कॉन्फ्रेंसिंग जिसमें आपका कार्यालय, आवेदक संस्था तथा इस कार्यालय के अधिकारियों को जोड़कर शेष औपचारिकतायें पूर्ण करने का अनुरोध है।

संलग्न:- उपरोक्तानुसार।

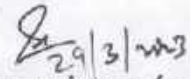
29/3/2013
(सुनील अग्रवाल)
प्रधान मुख्य वन संरक्षक (भू-प्रबंध)
मध्यप्रदेश, भोपाल

पृ. क्रमांक/एफ-1/FP/MP/MIN/26356/2017/ 1292
प्रतिलिपि:-

भोपाल, दिनांक 29/03/2023

- 1 मुख्य वन संरक्षक, छिन्दवाड़ा वृत्त, छिन्दवाड़ा, मध्यप्रदेश
- 2 वन मण्डल अधिकारी, सामान्य वन मण्डल, पश्चिम छिन्दवाड़ा मध्य प्रदेश
- 3 महाप्रबंधक, वेस्टर्न कोलफील्ड्स लिमिटेड, पोस्ट डुंगरिया तहसील जामई जिला-छिन्दवाड़ा मध्य प्रदेश।

की ओर सूचनार्थ अग्रेषित ।


29/3/23
प्रधान मुख्य वन संरक्षक (भू-प्रबंध)
मध्यप्रदेश, भोपाल



Annexure-V

No.J-11015/367/2008-IA.II(M)
Government of India
Ministry of Environment & Forests

Paryavaran Bhawan,
C.G.O.Complex,
New Delhi -110510.

Dated: 26th December 2008

To
Director (Tech.)
M/s Western Coalfields Ltd.,
Coal Estate, Civil Lines,
Nagpur- 440001.

Sub: Ghorawari Opencast Coal Mine Project (from 0.45 MTPA to 1.50 MTPA) of M/s Western Coalfields Ltd. (WCL), located in village Ghorwari Khurd, Tehsil Junnardeo, District Chindwara, Madhya Pradesh - Environmental clearance – reg.

Sir,

This has reference to letter No. 43011/65/2008-CPAM dated 30.07.2008 forwarding the application and letters dated 18.11.2008 and 18.11.2008 on the above-mentioned subject. The Ministry of Environment & Forests has considered the application. It has been noted that the project proposal is to mine coal from patches of old UG workings by opencast operations **and expansion in production of coal from 0.45 MTPA to 1.50 million tonnes per annum(MTPA)**. EC was granted for 0.45 MTPA capacity project on 19.02.2008. The total lease area is 1296.011 ha of which 178.10 ha is agricultural land, 593 ha is forestland, 192 ha is grazing land, and 332.911 ha is Govt. land. Forestry clearance has been applied for for renewal of lease. There area no National Parks, Wildlife Sanctuary, Biosphere Reserves found in the 10 km buffer zone. River Kanhan flows at a distance of 6-7km from the ML. It is not proposed to modify the existing natural drainage.

There is no change in the geo-mining characteristics of the working of the various patches within the ML. Of the total lease area, area for excavation is 750.36 ha, area for OB dumps 217.86 ha, infrastructure is 12.34 ha, roads is 2.65 ha, area for green belt is 497.049 ha, area for township is 140 ha, and area for rationalisation is 172.80 ha. The proposal is to mine coal from patches of old UG workings by opencast operations as given below:

S.N.	Name of OC Patch	Quarry Area (ha)	TOTAL		Quarry Depth (m)		Final Backfilled Area (ha)	Final Void (ha)
			Balance Coal in LTPA	Balance OB in Lakh M3	Present	Max.		
A. Present Working Patches								
1.	No. 16/17	17	Nil	Nil	45	50	9.50	7.50
2.	No. 6A & 6B	20	0.89	17.45	30	52	18	2
	TOTAL =	37	0.89	17.45			27.50	9.50
B. Proposed upto 2015-16								
1.	No. 16 & 17 B. Ph.III	40.50	8.57	60.75	--	54	40.50	Nil
2.	Ghogra OC Patch	8.0	2.99	13.13	--	53	6	2
3.	Kathideo OC Patch	12.50	5.12	17.83	--	34	10	2.50
	TOTAL =	61	16.68	91.71			56.50	4.50

C. Proposed beyond 2015-16 upto 2025-26

1.	Ghorawari Kalan OC Patch	15	4.50	28.45	--	30	10.44	4.56
2.	Dungariya OC Patch	39	10.60	109.50	--	50	27.13	11.87
3.	Panara OC Patch	12.50	4.25	39.75	--	54	8.70	3.0
4.	Bharat Colliery OC Patch	79.20	24.0	198.0	--	48	55.10	24.10
5.	Chikalam AU OC Patch	21.25	6.55	61.58	--	67	14.61	6.39
6.	South Panara OC Patch	21.25	7.69	81.29	--	62	14.778	6.472
TOTAL =		187.95	55.84	518.48			130.758	57.192

D. Proposed beyond 2015-16 upto 2025-26

1.	Vegln Patch	168	Individual Schemes will be firmed up after 2014-15					
2.	Datla East	139.994						
TOTAL =		424.594						

E. Abandoned Patches

1.	No. 16 & 17 OC Patch Phase-I	12.50	Not Applicable				12.50	Nil
2.	No. 6 & 7 OC Patch Ph.I & II	7.50					7.50	Nil
3.	Gh-2 OC Patch	6.0					6.0	Nil
4.	Gh-3 OC Patch	4.50					4.50	Nil
5.	Kolhiya OC Patch	4					4	Nil
6.	DQ-3 OC Patch	5.316					5.316	Nil
TOTAL =		39.816					39.816	Nil
GRAND TOTAL (A+B+C+D+E)		750.36	82.90	679.11			254.574 =552.074	71.192 =198.288

Mineral transportation of **1100 TPD** of coal is by road to railway siding covering a distance of 12 km and the balance 270 TPD is by road. Ultimate working depth of the mine is 45m below ground level (bgl). Present working depth is 40m bgl. Water table is in the range of 4.05m-17.20 m bgl during pre-monsoon season and 0.05-8m bgl during post-monsoon. Mining has intersected water table. Peak water requirement is 440 m³/d, which will be met from mine pit water. Presently a total of 11.82 Mm³ of OB has been generated of which 11 Mm³ has been used for backfilling and 0.82 Mm³ has been dumped in ext. OB dump. An estimated 64.64 Mm³ of OB would be generated in the balance life of mine, which be backfilled simultaneously.

Of the total quarry area of 750.36 ha, of which 552.07 ha would be backfilled and plantation developed thereon as per table below:

S.N.	Area (ha)	Existing	Status upto 2015-16	Status upto 2025-26	Status beyond 2025-26	Status at the end of mine life
1.	Excavation	83.36	81.00	187.95	424.594	750.36
2.	Backfilled	59.316	64.50	130.758	297.500	552.074

Balance life of the mine at the rated capacity is 12 years. A void of 198.286 ha with a max. depth of 10-15m would be left at the end of mine life which would be converted into a reservoir. Public Hearing was held on 22.11.2005. The project was approved by M/s WCL on 05.11.2008. The capital cost of the project is **Rs. 1.37 crores**.

2. The Ministry of Environment & forests hereby accords environmental clearance for the above-mentioned **Ghorawari Opencast Coal Mine Project of M/s WCL for production of coal at 1.50 MTPA rated capacity** under section 7.2 of the Environmental Impact Assessment Notification, 2006 and subsequent amendments thereto subject to the compliance of the terms and conditions mentioned below:

A. Specific Conditions

- (i) No mining operations shall be undertaken in the forestland until clearance for renewal has been obtained under the provisions of FC Act, 1980.
- (ii) The environmental clearance is only for the specific patches consisting of details submitted to the Committee and summarised in the table.
- (iii) OC mining should be carried out at a safe distance for old UG workings.
- (iv) Prior permission of DGMS shall be obtained before start of the working based on the Environmental Clearance.
- (v) Safe distance shall be maintained for working adjacent to agricultural fields.
- (vi) The entire OB being generated in the balance life of mine shall be backfilled.
- (vii) No OB generated in the balance life of the mine shall be dumped in the external OB dumps. Reclamation, monitoring and management of the existing external OB dumpsite should continue until the vegetation becomes self-sustaining. Compliance status should be submitted to the Ministry of Environment & Forests and its Regional office located at Bhopal on yearly basis.
- (viii) Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected should be utilised for watering the mine area, roads, green belt development, etc. The drains should be regularly desilted and maintained properly.
Garland drains (size, gradient and length) and sump capacity should be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity should also provided adequate retention period to allow proper settling of silt material.
- (ix) Dimension of the retaining wall at the toe of the dumps and OB benches within the mine to check run-off and siltation should be based on the rainfall data.
- (x) Mining shall be carried out as per statuette at a safe distance from the Pench River flowing adjacent to the lease boundary.
- (xi) The road for coal transport shall be black topped and avenue trees developed on both sides.
- (xii) Drills should be wet operated or with dust extractors.
- (xiv) Controlled blasting should be practiced with use of delay detonators. The mitigative measures for control of ground vibrations and to arrest the fly rocks and boulders should be implemented.

- (xv) Area brought under afforestation shall be not less than 769.93 ha and includes area external OB dump (217.86 ha), backfilled area (552.074 ha), along ML boundary, infrastructure along roads and safety zone located within and outside the lease by planting native species in consultation with the local DFO/Agriculture Department. The density of the trees should be around 2500 plants per ha.
- (xvi) A Progressive Mine Closure Plan shall be implemented by reclamation of decoaled quarry area of 750.36 ha of which 552.074 ha shall be concurrently backfilled with 67.778 Mm³ of OB generated in the balance life of mine and reclaimed with plantation using native plant species in consultation with the local DFO/Agriculture Department. The number of the trees should be around 2500 plants per ha. The balance 198.286 ha of decoaled void would be converted into a water reservoir of a maximum depth of 15m, the upper benches of which shall be gently sloped and stabilised with plantation and a peripheral fencing erected all around the reservoir.
- (xvii) Regular monitoring of groundwater level and quality should be carried out by establishing a network of existing wells and construction of new piezometers. The monitoring for quantity should be done four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality in May. Data thus collected should be submitted to the Ministry of Environment & Forests and to the Central Pollution Control Board quarterly within one month of monitoring.
- (xviii) Besides carrying out regular periodic health check up of their workers, 10% of the workers identified from workforce engaged in active mining operations shall be subjected to health check up for occupational diseases and hearing impairment, if any, through an agency such as NIOH, Ahmedabad within a period of one year and the results reported to this Ministry and to DGMS.
- (xix) For monitoring land use pattern and for post mining land use, a time series of land use maps, based on satellite imagery (on a scale of 1: 5000) of the core zone and buffer zone, from the start of the project until end of mine life shall be prepared once in 3 years (for any one particular season which is consistent in the time series), and the report submitted to MOEF and its Regional office at Bhopal.
- (xx) Digital processing of the entire lease area using remote sensing technique should be done regularly once in 3 years for monitoring land use pattern and report submitted to MOEF and its Regional office at Bhopal.
- (xxi) The detailed Final Mine Closure Plan along with details of Corpus Fund should be submitted within six months to the Ministry of Environment & Forests Regional Office, Bhopal.

B. General Conditions

- (i) No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment and Forests.
- (ii) No change in the calendar plan including excavation, quantum of mineral coal and waste should be made.
- (iii) Four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for monitoring SPM, RPM, SO₂ and NO_x and heavy metals such as Hg, As, Pb, etc. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board.
- (iv) Fugitive dust emissions (SPM and RPM and heavy metals such as Hg, As, Pb, etc.) from all the sources should be controlled regularly monitored and data recorded properly. Water

spraying arrangement on haul roads, wagon loading, dump trucks (loading and unloading) points should be provided and properly maintained.

- (v) Data on ambient air quality (SPM, RPM, SO₂, NO_x and heavy metals such as Hg, As, Pb, etc.) should be regularly submitted to the Ministry including its Regional Office at Bhopal and to the State Pollution Control Board and the Central Pollution Control Board once in six months.
- (vi) Adequate measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operation of HEMM, etc should be provided with ear plugs/muffs.
- (vii) Industrial wastewater (workshop and wastewater from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May 1993 and 31st December 1993 or as amended from time to time before discharge. Oil and grease trap should be installed before discharge of workshop effluents.
- (viii) Vehicular emissions should be kept under control and regularly monitored. Vehicles used for transporting the mineral should be covered with tarpaulins and optimally loaded.
- (ix) Environmental laboratory should be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board.
- (x) Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.
Occupational health surveillance programme of the workers should be undertaken periodically to observe any contractions due to exposure to dust and to take corrective measures, if needed.
- (xi) A separate environmental management cell with suitable qualified personnel should be set up under the control of a Senior Executive, who will report directly to the Head of the company.
- (xii) The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year-wise expenditure should be reported to this Ministry and its Regional Office at Bhopal.
- (xiii) The Regional Office of this Ministry located at Bhopal shall monitor compliance of the stipulated conditions. The Project authorities shall extend full cooperation to the office(s) of the Regional Office by furnishing the requisite data/ information/monitoring reports.
- (xiv) A copy of the will be marked to concerned Panchayat/ local NGO, if any, from whom any suggestion/representation has been received while processing the proposal.
- (xv) State Pollution Control Board should display a copy of the clearance letter at the Regional Office, District Industry Centre and Collector's Office/Tehsildar's Office for 30 days.
- (xvi) The Project authorities should advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular language of the locality concerned within seven days of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution control Board and may also be seen at the website of the ministry of Environment & Forests at <http://envfor.nic.in>. The compliance status shall also be uploaded by the project authorities in their website so as to bring the same in the public domain.

3. The Ministry or any other competent authority may stipulate any further condition for environmental protection.

4. Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract the provisions of the Environment (Protection) Act, 1986.

5. The above conditions will be enforced *inter-alia*, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and Rules. The proponent shall ensure to undertake and provide for the costs incurred for taking up remedial measures in case of soil contamination, contamination of groundwater and surface water, and occupational and other diseases due to the mining operations.



(Dr. T. Chandini)
Director

Copy to:

1. Secretary, Ministry of Coal, Shastri Bhawan, New Delhi.
2. Secretary, Department of Environment & Forests, Government of Madhya Pradesh, Secretariat, Bhopal.
3. Chief Conservator of Forests, Regional office (EZ), Ministry of Environment & Forests, E-2/240 Arear Colony, Bhopal - 462016.
4. Chairman, Madhya Pradesh State Pollution Control Board, Paryavaran Parisar, E-5, Arera Colony, Bhopal - 462016.
5. Chairman, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, New Delhi - 110032.
6. Member-Secretary, Central Ground Water Authority, Ministry of Water Resources, Curzon Road Barracks, A-2, W-3 Kasturba Gandhi Marg, New Delhi.
- ✓ 7. Shri M.K. Shukla, CGM, Coal India Limited, SCOPE Minar, Core-I, 4t Floor, Vikas Marg, Laxminagar, New Delhi.
8. District Collector, Chindwara, Government of Madhya Pradesh, New Delhi.
9. Monitoring File 10. Guard File 11. Record File

APPLICATION

FOR

ENVIRONMENTAL CLEARANCE

**(AS PER CLAUSE 7(ii) OF EIA NOTIFICATION SEPT' 06 -
DUE DILIGENCE, FORM-1 AND TOR)**

OF

GHORAWARI OC EXPANSION PROJECT

(Expansion from 0.45 MTPA TO 1.50 MTPA)

FORM - 1

&

TERMS OF REFERENCE

JUNE - 2008

Prepared by :-

**ENVIRONMENT DEPARTMENT
CENTRAL MINE PLANNING & DESIGN INSTITUTE LTD
REGIONAL INSTITUTE -IV, JARIPATKA
NAGPUR - 440014**

**SUBMISSION and c FOR GRANT ENVIRONMENTAL CLEARANCE UNDER
CLAUSE 7(ii) OF EIA NOTIFICATION 2006**

BACKGROUND:

- The existing Ghorawai mine is in operation since pre-nationalisation period by different private owners and coal was extracted mainly by underground mining method. The Ghorawari OC patches are in operation since 1982 and is mainly extracting coal of already developed/depillared coal pillars and the barriers in the erstwhile UG MINE BY OPENCAST METHOD. The mine is in Kanhan Valley Coalfields in Chinndwara district of Madhya Pradesh State. The EMP of this mine was prepared and submitted in FEBRUARY' 2007 at the time of lease renewal and had been approved by MOEF for a production capacity of 0.45 MTPA and land area of 1296.011ha vide its **letter no. J-11015/382/2007-IA.II(M) dated 19/02/2008**. The mine is being monitored as per Environment (Protection) Amendment Rule, Sept. 2000 and quarterly reports are being sent regularly to MPCB and MOEF. The annual Environmental (Audit) Statement is submitted every year to MPCB before 30th September.

PROPOSAL:

In order to meet the ever growing demand of power grade coal it is proposed to enhance the production capacity of the project under consideration from present level of 0.45 MTPA to 1.50 MTPA without any increase in land area. WCL Board has accorded the approval for enhancement of production capacity of coal from present level of 0.45 MTPA to 1.50 MTPA without any increase in land area.

Now in terms of the meeting held on 28/02/2008 at New Delhi between Secretary (Coal) and Secretary (Environment) and subsequent meeting taken by Director, MOEF on 21/04/2008 at New Delhi, this **Form-1 application with due-diligence is being submitted in fulfillment of the requirement of clause 7(ii) of EIA Notification 2006 for getting environmental clearance for enhanced capacity of 1.50 MTPA without any increase in land area as well as project parameters.**

SUBMISSION:

- Therefore, it is submitted that:-
 - **A. Environmental Clearance**
 - 1) **Environmental Clearance** - The environmental clearance was obtained for 0.45 MTPA with 1296.011 ha of land area (with forestland of 593.00 ha) vide MOEF letter no. J-11015/382/2007-IA.II(M) dated 19/02/2008.

B. Mining Parameters

2) There is no change in mining technology since commissioning of the mine in 1982.

3) There is no change in the land area since last environmental clearance (1296.011 ha vide letter dated 19/02/2008).

4) There is no change in total coal, total OB, manpower and other project parameters since last environmental clearance (vide letter dated 19/02/2008).

5) No fresh sources of water proposed to be used or exploited during the balance life.

6) Land reclamation measures as suggested in the approved EMP (vide letter dated 19/02/2008) are continuing and there would be no change in the final land use pattern.

C. Socio – Economic Issues

7) As there is no increase in land area therefore there is no fresh R&R involved.

8) Public Hearing had already been conducted while taking the last environmental clearance and all the issues have been settled.

D. Environmental Parameters

9) All pollution control measures with respect to Air, Water and Noise have been taken in fulfillment of the requirement of existing EC (0.45 MTPA) and Consent to Operate. The environment quality in and around the mine is monitored every fortnight as per Environment (Protection) Amendment Rule, Sept. 2000 and quarterly reports are being sent regularly to MPPCB and MOEF. The annual Environmental (Audit) Statement is submitted every year to MPPCB before 30th September. The measures will be continued during the balance life of mine with enhancement of production so as to maintain the parameters well within the permissible limits.

E. Consent to Operate(CTO)

11) The mine is operating with Consent to Operate (0.45 MTPA) obtained from MPPCB. Consent to Operate from MPPCB will be obtained for 1.50 MTPA after receipt of environmental clearance from MOEF and the conditions of CTO will be implemented during the balance life of mine with enhancement of production so as to maintain the parameters well within the permissible limits.

F. Proposal

12) All the conditions of new EC (1.50 MTPA) shall be duly implemented and six monthly compliance report will be submitted to MOEF as per the EIA Notification 2006.

In view of the above, due-diligence environmental clearance for Ghorawari OC Patches expansion project, Tahsil – Junnardeo, Dist. – Chinndwara for enhancement of production capacity from 0.45 MTPA to 1.50 MTPA with same land area of 1296.011 ha may be accorded under clause 7(ii) of EIA Notification 2006 based on the attached duly filled Form-1, TOR, Feasibility Report and Submission as above.

APPLICATION
FOR
ENVIRONMENTAL CLEARANCE

(DUE DILIGENCE,

FORM-1 AND TOR AS PER CLAUSE 7(ii)

(AS PER EIA NOTIFICATION SEPT' 06)

OF

GHORAWARI OC EXPANSION PROJECT
(Expansion from 0.45 MTPA TO 1.50 MTPA)

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PART - I

APPLICATION
FOR
ENVIRONMENTAL CLEARANCE
(AS PER EIA NOTIFICATION SEPT' 06)
OF
GHORAWARI OC EXPANSION PROJECT
(Expansion from 0.45 MTPA TO 1.50 MTPA)
DUE - DILLIGENCE

JUNE - 2008

Prepared by :-

ENVIRONMENT DEPARTMENT
CENTRAL MINE PLANNING & DESIGN INTITUTE LTD
REGIONAL INSTITUTE- IV, JARIPATKA
NAGPUR - 440014

DUE DILIGENCE UNDER CLAUSE 7(ii) OF EIA NOTIFICATION 2006

The Due Diligence for EIA studies for the proposed expansion in production capacity without any increase in land area in respect of **Ghorawari Opencast Expansion Project of WCL** are as given below:-

S N	Macro Environm ental issues	Micro Environme ntal issues	Impact on Environment	Control measures for environmental protection in practice	Due Diligence
1	AIR ENVIRON MENT	Dust generatio n due to mining and allied activities	1) Human Health. 2) Plant growth. 3) Spoilt Aesthetic Look.	<p>At Source – Dust suppression by water spraying / sprinkling, controlled blasting, covered coal transportation.</p> <p>Multi cultural tree plantation(native species) – over OB dumps, along road side, around coal stock yard. The details of existing pollution control measures are given herewith in the feasibility report.</p> <p>Monitoring of ambient air quality at mine activity area every fortnight as per Environment (Protection) Amendment Rule 2000. The existing monitoring results show that parameters are well within the permissible limits. The reports are</p>	<p>1) All existing measures to be continued and if necessary measures will be augmented / strengthened (depending on monitoring results). The AAQ will be maintained within permissible limits.</p> <p>2) Moreover, all the conditions of fresh environmental clearance for 1.50 MTPA will be duly implemented and same will be followed for Consent to Operate to be obtained from MPPCB after EC (1.50 MTPA).</p> <p>3) Regular reports will be submitted to MOEF & MPPCB as being done at present.</p>

S N	Macro Environm ental issues	Micro Environme ntal issues	Impact on Environment	Control measures for environmental protection in practice	Due Diligence
				sent regularly to MOEF & MPPCB.	
2	WATER ENVIRON MENT	<p>1) Discharge of mine pumped out water in order to make mine working safe.</p> <p>2) Lowering of Ground Water table in the influence zone due to mine pumping.</p> <p>3) Leachets from sludge of workshop ETP & used oil & grease.</p> <p>4) Domestic sludge.</p>	<p>1) Water Born Diseases.</p> <p>2) Choking of natural water courses.</p> <p>3) Plant growth.</p> <p>4) Shortage of potable water.</p>	<p>The strata seepage water & run off water first gets accumulated in the mine sump, which has sufficient storage capacity to allow initial settlement of suspended particles. Thereafter supernatant water is pumped out on surface and led into surface sedimentation pond that allows settlement of remaining suspended particles. The treated water is then partly used within the mine premises & balance is let off into local nallah for use in agricultural & domestic activities by local residents. The quality of treated mine pumped out water is monitored every fortnight as per Environment (Protection) Amendment Rule, 2000. The existing monitoring results</p>	<p>1) All existing measures to be continued & if necessary, measures will be augmented / strengthened (depending on the monitoring results). The Water Quality will be maintained within permissible limits.</p> <p>2) Moreover, all the conditions of fresh environmental clearance for 1.50 MTPA will be duly implemented and same will be followed for Consent to Operate to be obtained from MPPCB after EC (1.50 MTPA).</p> <p>3) Regular reports will be submitted to MOEF & MPPCB as being done at present.</p>

S N	Macro Environm ental issues	Micro Environme ntal issues	Impact on Environment	Control measures for environmental protection in practice	Due Diligence
				<p>show that parameters are well within the permissible limits. The details of existing pollution control measures are given herewith in the feasibility report.</p> <p>The excess treated mine pumped out water let off into nullah provides recharging of ground water & supplements the flow in local nullah for use by adjacent inhabitation. Water shortage is also supplemented by supplying water through tankers during water scarcity months. Under community development programme facilities like bore well & dug wells have been created in nearby villages. Regular monitoring of ground water level in open wells & dug wells in nearby villages is also carried out.</p>	

S N	Macro Environm ental issues	Micro Environme ntal issues	Impact on Environment	Control measures for environmental protection in practice	Due Diligence
				The sun-dry domestic sewage / kitchen sludge is disposed off as secured land fills. Periodical medical examination for all workmen once in five years.	
3	NOISE ENVIRONMENT	Generation of high noise due to operation of Heavy Earth Moving Machineryes, Drilling in Coal & OB benches & instantaneous high noise due to blasting, crushing operation at CHP, repair & maintenance jobs at workshop.	1) Impact on human health. 2) Impact on fauna. 3) Impact on human property.	Providing protective gears to all workmen as per statute. Training & retraining of all workmen as per statute. Periodical medical examination for all workmen once in five years. Preventive & regular maintenance of all HEMMs. Use of protective devices at high noise generating points. Controlled blasting as per permission from DGMS. Multi cultural tree plantation around workshop, CHP for minimizing propogation of noise.	1) All existing measures to be continued & if necessary, measurers will be augmented / strengthened (depending on the monitoring results). The Noise Quality will be maintained within permissible limits. 2) Moreover, all the conditions of fresh environmental clearance for 1.50 MTPA will be duly implemented and same will be followed for Consent to Operate to be obtained from MPPCB after EC (1.50 MTPA). 3) Regular reports will be submitted to MOEF & MPPCB as being done at present.
4	LAND ENVIRON	Land degradati	1) Ugly scar on surface.	The mine has been planned to	There is no change in the final land use pattern as

S N	Macro Environm ental issues	Micro Environme ntal issues	Impact on Environment	Control measures for environmental protection in practice	Due Diligence
	MENT	on due to excavatio n for productio n of coal, dumping of excavate d OB & coal on surface, building various infrastru ctures for efficient & smooth operation of the mine. Soil erosion due to OB dumping.	2) Creation of dump sites. 3) Choking of natural watercourse s. 4) Loss of nutrients of soil. 5) Change in topography & drainage pattern.	minimize degradation of land during operation. The excavated land is proposed to be backfilled as per geo mining parameters & backfilled area is also proposed to be covered with plantation with native species / grasses. The OB dumps have already been partly covered with excavated topsoil & multi cultural tree plantation developed over it to minimize erosion of soil and flow of sediments and improve upon the aesthetic value. The balance OB Dumps are also proposed to be biologically reclaimed during balance life.	proposed in the earlier approved EMP(0.45 MTPA). The biological reclamation of external OB Dumps and backfilled areas will be continued.
5.	SOCIO - ECONO MIC ISSUES	1) Displace ment of village. 2) Acquisiti on of agricultur al land	1) Displaceme nt from ancestral place/prop erty leading to socio - cultural stress	Not applicable with the present proposal. The land owners from whom land has been acquired have been paid compensation at	The development works under community development & Welfare will be continued.

S N	Macro Environm ental issues	Micro Environme ntal issues	Impact on Environment	Control measures for environmental protection in practice	Due Diligence
			2) Loss of earnings	<p>the time of acquisition and eligible land losers have been provided employment in the project.</p> <p>The issues raised during the Public Hearing (While applying for last EC) have also be addressed. Various developmental works have also been undertaken in the adjoining/neighborhood villages. The details of works done so far have been detailed out in the feasibility report.</p>	
6.	Flora & Fauna	1) Loss of Native Species 2) Displacement of Fauna	1) Loss of Native species 2) Displacement of Fauna 3) Climatic Change 4) Loss of Aesthetic Value	<p>Although there is some forest land involved in the project, there is negligible destruction of forest wealth. There is no endangered/endemic species of flora & fauna found in the land acquired for the project. However adequate tree plantation/Affores</p>	Tree plantation with native species to continue during the balance life of the mine.

S N	Macro Environm ental issues	Micro Environme ntal issues	Impact on Environment	Control measures for environmental protection in practice	Due Diligence
				<p>tation have already been done with native species within the mine premises and the same has attracted fauna and improved the floral cover/ green cover vis – a vis pre – mining scenario and also has helped to maintain the original climatic features along with improvement in the aesthetic look surrounding the mine.</p>	

PART - II

APPLICATION

FOR

ENVIRONMENTAL CLEARANCE

(DUE DILIGENCE, FORM-1 AND TOR AS PER CLAUSE 7(ii)

(AS PER EIA NOTIFICATION SEPT' 06)

OF

GHORAWARI OC EXPANSION PROJECT
(Expansion from 0.45 MTPA TO 1.50 MTPA)

FORM - 1

(WITH TOR & FEASIBILITY REPORT)

JUNE - 2008

Prepared by :-

**ENVIRONMENT DEPARTMENT
CENTRAL MINE PLANNING & DESIGN INSTITUTE LTD
REGIONAL INSTITUTE - IV, JARIPATKA
NAGPUR - 4400014**

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FOR

GHORAWARI OPENCAST EXPANSION

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APPENDIX I

(Reference - Paragraph - 6)

FORM 1

(I) Basic Information

Name of the Project: GHORAWARI OPENCAST EXPANSION COAL MINE PROJECT

Location / site alternatives under consideration:

Tahsil - Junnardeo, Dt. Chinndwara, State - Madhya Pradesh.

Operating mine being expanded

For increase in production capacity - Within the strike & dip side limit of the sanctioned Project/ mine. As such consideration of alternate site does not arise.

Size of the Project: * Production capacity -
Existing/Sanctioned - 0.45 MTPA
Proposed - 1.50 MTPA

Total Production capacity for which
Environmental clearance being solicited - 1.50 MTPA.

Total land area for which
Environmental clearance being solicited - 1296.011 ha
There is no additional land requirement in the proposed expansion.

Expected cost of the project: Rs. 137 Lakhs.

Contact Information:

Chief General Manager , KANHAN AREA, WCL P.O. DUNGARIYA, Chinndwara District,
Madhya Pradesh State.
Phone no - 07160 - 230060

Screening Category: Not Applicable

Capacity corresponding to sectoral activity (such as production capacity for manufacturing, mining lease area and production capacity for mineral production, area for mineral exploration, length for linear transport infrastructure, generation capacity for power generation etc.,)

#####

Source -

- All the information and data submitted have been taken from the project, Environmental Quality monitoring data given by CMPDIL, RI - IV as well as the Expansion Scheme of this Project..

#####

(II) Activity

1. Construction, operation or decommissioning of the Project involving actions, which will cause physical changes in the locality (topography, land use, changes in water bodies, etc.)

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
1.1	Permanent or temporary change in land use, land cover or topography including increase in intensity of land use (with respect to local land use plan)	Yes	<p>The premining land use pattern of the total land involved in the project was as follows:- Agricultural land = 178.10 ha Govt.(waste) land = 524.911 ha Forest Land = 593.00 ha ----- 1296.011 ha</p> <p>There is no increase in land area beyond the already approved environmental clearance. The permanent change in land will be at the end of mine life which is same as given in the last approved EIA/EMP (Approved in Dec, 2007) and the details are given as below: - I) Quarry area - 750.36 ha a) Void - 262.626 ha b) Quarry area (Backfilled) - 487.734 ha II) Area Covered under External OB Dumps - 217.861 ha III) Area of Danger Zone for Blasting - 172.80 ha IV) Project Township, Infrastructures and Roads - 154.99 ha Out of the above land at the EOM, Plantation Cover - 497.049 ha Total - 1296.011 ha</p>
1.2	Clearance of existing land, vegetation and buildings?	Yes	<p>Out of the total land involved of 1296.011 ha, the entire land has been aquired. There is forestland of 593.00 ha involved in the project. There is no R&R involved in the project for balance life.</p> <p>The open cast mine is in operation with valid Environment Clearance for operating the mine for a production capacity of 0.45 MTPA with land area of 1296.011 ha from MOEF as well as valid consent to operate for 0.45 MTPA from Madhya Pradesh Pollution Control Board, Bhopal. Due to proposed increase in production capacity without any increase in land area, the clearance of existing land is as under</p>

			<p>Quarry Area - 750.36 ha</p> <p>Area for Danger Zone for blasting - 172.80 ha</p> <p>Area for External Dump - 217,861 ha</p> <p>Project Township, Infrastructure & Roads - 154.99 ha</p> <p>TOTAL – 1296.011 ha.</p>
1.3	Creation of new land uses?	No	No new land is being proposed beyond already approved land use as specified in Para - 1.1.
1.4	Pre-construction investigations e.g. Bore houses, soil testing?	No	<p>The mine is already in operation. As such not Applicable.</p> <p>However pre - construction activities involved boreholes drilled to prove coal reserves towards assessing feasibility of coal mining and the same were also carried out here.</p>
1.5	Construction Works	No	Infrastructures/ Office building constructed at the project site would cater for the balance life.
1.6	Demolition works?	No	No demolition envisaged during balance mine life.
1.7	Temporary sites used for construction works or housing of construction workers?	No	Not Applicable as the mine is already in Operation.
1.8	Above ground buildings, structures or earthworks including linear structures, cut and fill or excavations	Yes	Excavation - Coal - Existing - 37,000 Tonnes/ Month, Proposed - 1,25,000 Tonnes/ Month and OB - Existing - 3,37,000 cubic meter / month, Proposed - 9,37,500 cubic meter / month. In addition External OB Dumps, Embankment, Plantation.
1.9	Underground works including mining or tunneling?	No	Not Applicable. The mine under consideration is for opencast mining as such no underground works including mining or tunneling are there.
1.10	Reclamation works?	Yes	a) In vacant land, external OB dumps & backfilled area 1,20,500 trees have been planted, covering an area of 48.525 ha. It is proposed to do additional plantation in future to the extent of 12,51,000 trees covering an area of 497.049 ha; at the end of mining activities in this mine.
1.11	Dredging?	No	----
1.12	Offshore structures?	No	----
1.13	Production and manufacturing processes?	Yes	<p>The mine is to produce coal by Open Cast mining method. Sanctioned Capacity - 0.45 MTPA.</p> <p>Proposed Capacity - 1.50 MTPA.</p> <p>The opencast method involves Shovel -</p>

			Dumper Combination.
1.14	Facilities for storage of goods or materials?	Yes	<p>The Overburden (OB) lying above the coal seam consisting of alluvium, shale & sandstone is excavated to extract coal seam and is stacked at earmarked sites as external OB dump and also as protective embankment. The total area earmarked for External OB dump is 217.861 ha. Out of this at present total area covered under external OB dump is 15.31 ha. Part of the excavated OB is also earmarked for dumping in the decoaled void. At the end of mining operation out of 750.36 ha of quarry excavation, 552.074 ha is planned to be backfilled. Coal is stored in the earmarked site in the Coal Stock Yard. The storage of goods and other material is made in Designated Store. Explosives are stored in Magazine approved by Chief Controller of Explosives.</p>
1.15	Facilities for treatment or disposal of solid waste or liquid effluents?	Yes	<p>Solid wastes is mostly overburden lying above the coal seam consisting of alluvium, shale & sandstone is excavated to extract coal seam and is stacked at earmarked sites as external OB dump and also as protective embankment. The total area earmarked for External OB dump is 217.861 ha. Out of this at present total area covered under external OB dump is 15.31 ha. Part of the excavated OB is also earmarked for dumping in the decoaled void. At the end of mining operation out of 750.36 ha of quarry excavation, 552.074 is planned to be backfilled.</p> <p>Catch drains have been provided along the periphery of OB Dump to arrest silt and sediments flow from the dumpsite. In case of OB benches in the quarry, cross drainage has been provided which carry the silt and sediments into the main mine sump made at the floor of the seam of each patch, are acting as first stage settling pond. In addition garland drains of size 1.5 m X 1.0 m have also been provided around the periphery of the quarry area which carries surface run - off ultimately to the main mine sump of each patch. The water is then pumped out from the mine sump and is then fed into a drain (250m x 6m x 2.5m) leading into the abandoned quarry void. A part of this water is utilized within the mine premises for watering of plants, washing of HEMMs, dust suppression</p>

			measures etc. Balance water is the released onto local nullah. For treatment of domestic sewage, the individual quarters are provided with conventional soak pit system.
1.16	Facilities for long term housing of operational workers?	Yes	Housing for operational workers have already been provided.
1.17	New road, rail or sea traffic during construction or operation?	No	--
1.18	New road, rail, air waterborne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	No	---
1.19	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	No	---
1.20	New or diverted transmission lines or pipelines?	No	---

Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?

No/
Yes

There is no impoundment, damming, culverting, realignment or other changes during the balance life of the mine. The ground water abstraction will continue for safe working of the mine.

The following hydrogeological regime has been projected to represent the existing hydrogeological set-up of Ghorawari OC Patches and its buffer zone. Generally sand stone horizons serve as aquifers and shale/clay acts as aquicludes whereas weathered/secondary porous zones are aquifers in Basalts & Metamorphics. The various hydrogeological units developed in the study area are in the following table :

SL. No.	TYPE OF AQUIFER	DEPTH RANGE (m)	CORE ZONE	BUFFER ZONE
1	UNCONFINED	0 -30	Soil zone/ weathered Moturs/ Barakars/ Basalt	Wlts eathered Motur/ Barakar, Talchir, Basilts & Metamorphic

							trapeans, vesicular and fractured jointed Basalts are also lineaments, fractured/ fault zones Metamorphics.
							the hydrogeological observation well in Kanhan area has been established. Depth to water table in core zone area is 5.55 m to 12.00 m bgl in pre-monsoon and 1.30 to 8.00 bgl in post -monsoon period. Average annual fluctuation being 4.00 m. In buffer zone, depth to water table in unconfined aquifer in general varies from 4.05 m to 17.20 m bgl in premonsoon while it is from 0.05 m to 7.25 m bgl in post monsoon period. Water table fluctuation in general is from 1.50 m to 8 m between the two extreme seasons. Average being 5.00 m. Deep water levels and large zone of fluctuation are observed in the area covered by Basalts and Metamorphics. The water table configuration is mostly similar to that of topography but with that of reduced relief. Water Level Trend : Ground water level decadal average of water levels and water level for fluctuations during 2002-2003 of National Hydrograph stations network in Pench Kanhan Coalfields alongwith hydrographs drawn by CGWB for Jamai NHS were examined to assess the water level trends during premonsoon and post monsoon seasons. A rising trend both in post and premonsoon has been observed at the stations at Jamai. It is worth to make a mention of the fact that the hydrograph stations at Jamai are located in the active coal mining belt. It is imperative from the rising trend in the water levels in both the seasons that the mining activity in general in the area and underground mining in particular has not induced any effect in the ground water levels in the dugwells tapping the unconfined aquifer. It can be concluded that the underground mining at deeper depths in Gondwana covered area would affect the deeper

		<p>aquifer(confined/ semiconfined) immediately overlying the working coal seam, but there would be insignificant effect on the unconfined aquifer. Further in the Basalt covered Gondwana area , the underground mining may not induce any impact on the water table (shallow) aquifer.However, the opencast mining will induce effect on all aquifer zones overlying the working coal seam.The effect on the unconfined is considerably more in comparison to the deep aquifers i.e. semiconfined aquifer due to continous desaturation/ draining of the aquifer.</p> <p>GENERAL AQUIFER PARAMETERS : No detailed hydrogeological investigations were carried out at kanhan mine area. The bore hole drilled by CGWB at Jamai reveals aquifer at a depth of 27.70 m bgl capable of yielding 3.50 LPS. However, the aquifer parameters evaluated by CGWB in Parasia block in particular have been considered and attributed for the study area . The projected hydraulic parameters of the aquifers in Motur & Barakar formations are as follows :</p> <p>Transmissivity - 20 to 50 m² / day Hydraulic conductivity - 0.3 to.0.7 m / day Storage coeffecient - 3 x10⁻² to 5 x 10⁻⁴ Specific Yield - 0.03 to 0.05 (assigned)</p> <p>The tubewells constructed in Gondwanas have registered moderate yield ranging from 2 LPS to 5 LPS. However, the borewells in the Basalts and Metamorphics in general recorded low yield varying from negligible to 3.0 LPS. With some exceptions of moderate yield due to secondary porosity and favourable physical setting. By judicious judgement of these facts and review of formations logs, the above parameters have been arrived from the wide range of values of different formations.</p> <p>GROUND WATER RESOURCES IN THE AREA : <u>Ground water recharge :</u> Rainfall is the main recharge source for</p>
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ground water. The study area receives an average annual rainfall of 1300 mm. Additionally, ground water is also being recharged from other sources such as return flow from irrigation and mine pumped out (waste) water thrown on land /natural drains, water logged voids, etc. The replenishable ground water recharge has been computed by rainfall- infiltration method in the absence of long-term water table fluctuation data of different formations in the area. The rainfall-infiltration factor for semiconsolidated sandstones (Gondwanas), Basalts, Metamorphics and Talchir has been considered to be 12%, 13%, 8%, and 4% respectively (GEC Report -1997 CGWB NCR, 2005) by critical review of all the factors responsible for rainfall-recharge to ground water. While computation of ground water recharge , the hilly area with > 20% slope amounting to about 42 sq.km. has been discarded from the study area of 314 sq.km. The ground water recharge computation as per GEC 1997 norms I as under :

a)	Recharge from rainfall	MCM (Million
i)	Moturs/ Barakars - 99.70	14.36
ii)	Talchir - 86.90	4.17
iii)	Basalt - 58.20	9.08
iv)	Metamorphics - 27.20	2.61
	RECHARGE BY RAINFALL	30.22
b)	Recharge from other	0.60
c)	Gross Ground water	30.82

GROUND WATER DRAFT :

The ground water draft for domestic , irrigation and mine pumping use is computed as under :

Ground water draft of Ghorawari OCM area

Irrigation	5.64 MCM
Mine Pumping (Existing mines in Buffer zone)	2.31 MCM
Annual Ground water Draft	8.90 MCM

Ground Water Balance : :

i)	Gross Ground Water recharge	30.82 MCM
ii)	Natural discharge to drains and other losses (10% of item I) above)	3.08 MCM
iii)	Net annual ground water availability	27.74 MCM
iv)	Allocation/ projection for next 25 years for domestic and industrial use	0.50 MCM
v)	Annual ground water draft for all uses	8.90 MCM
vi)	Ground water balance (items iii - iv & v)	18.34 MCM

GROUND WATER STAGE OF DEVELOPMENT :

The stage of development computation in the present study is 33.88% , which can be categorized as ' Safe' with less than 70% value. As per report of CGWB and MP Govt. of 2005 , the stage of development of Jamai Block in which Ghorawari OCM is located is 21.42% and classified as ' safe' category.

Dynamic & Static Resources:

Dynamic and static reserves for the core and buffer zones are estimated by using the mine and aquifer parameters. Since the opencast mine acts as a large diameter well/ sink, the inflow to the mine is contributed from the saturated overburden formation i.e. multiple aquifer system. However, the unconfined aquifer is the most affected in the opencast mining area.

WATER QUALITY :

As part of the Environment Management Plan (EMP) preparation, the surface water, ground water and mine water quality were monitored; the water quality parameters are within the stipulated standards,

MINE DRAINAGE / PUMPING:

			<p>The ground water inflow of Ghorawari OC computation has been done by utilizing the abovementioned aquifer and mine parameters. The ground water inflow to the mine has been estimated to be around 1040 m³/day (0.38 MCM annually) at the final quarry depth of 48 m. However, to keep the water level below stipulated level as per DGMS requirement the existing Ghorawari UG mine has to pump 3120 m³/day (1.14 MCM annually).</p> <p>The operating mines in the buffer zone are continuously pumping ground water to the tune of 2.31 MCM annually as part of mine management.</p> <p>RADIUS of MINE INFLUENCE AREA :</p> <p>In the opencast mines, the different aquifers overlying the working coal seam would be contributing ground water to the mine by gravity drainage since they are exposed /removed at the mine. The anticipated ground water inflow to the mine is to the tune of 1040 m³ / day at the final quarry depth of 48 m. The shape and extent of the cone would depend on mainly hydraulic conductivity and specific yield of aquifers and also mine depth and area etc.</p> <p>Generally steep drawdown cone of depression would be formed in poor potential aquifers thereby the influence area is to a small distance and reverse is established in respect of aquifers with high hydraulic conductivity. The radius of mine influence area has been estimated for Ghorawari OC based on the abovementioned aquifer and mine parameters and works out to less than 900 m at final quarry depth of 48 m. The underground mining already done in the area may restrict the cone of depression further.</p> <p>Mine induced effect would be distinctly noticed within a distance of 500 m from the mine edge in the down-dip direction and becomes milder / insignificant thereafter. However, the effect is limited/ negligible in the up-dip side of the incrop zone due to shallow mine depth & area and further mine development is towards dip-side only.</p>
1.22	Stream crossings?	No	---
1.23	Abstraction or transfers of water	Yes	Due to excavation strata seepage water gets

	form ground or surface waters?		accumulated at the floor of the coal seam in the sump having capacity to deal with peak rainfall. In order to maintain the working faces dry for coal production this water is pumped out daily. The quantity of daily pumped out water comes to 4160 m ³ / day. No abstraction is done from surface water. The detailed of assessment of ground water has been given in point no 1.21.
1.24	Changes in water bodies or the land surface affecting drainage or run-off?	No	--
1.25	Transport of personnel or materials for construction, operation or decommissioning?	Yes	The mine is already in operation and personnel are using their own transport. Decommissioning is not envisaged in near future as the mine is proposed to get further lease of life through deepening.
1.26	Long-term dismantling or decommissioning or restoration works?	No	Not envisaged at present.
1.27	Ongoing activity during decommissioning which could have an impact on the environment?	No	Not envisaged at present.
1.28	Influx of people to an area in either temporarily or permanently?	Yes	Temporarily influx of people has taken place as the mine is in operation since 1982, who will continue to remain till the mine life. Present manpower - 217
1.29	Introduction of alien species?	No	---
1.30	Loss of native species or genetic diversity?	No	---
1.31	Any other actions?	No	

2. Use of Natural resources for construction or operation of the Project (such as land, water, materials or energy, especially any resources which are non-renewable or in short supply):

S.No.	Information/checklist confirmation	Yes/No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
2.1	Land especially undeveloped or agricultural land (ha)	Yes	Land requirement:- Agricultural land = 178.10 ha Govt.(waste) land = 524.911 ha Forest Land = 593.00 ha ----- 1296.011 ha

			There is no increase in land area beyond the already approved environmental clearance. The permanent change in land will be at the end of mine life which is same as given in the last approved EIA/EMP (Approved in Dec, 2007) and the details are given as below: - I) Quarry area - 750.36 ha c) Void - 262.626 ha d) Quarry area (Backfilled) - 487.734 ha II) Area Covered under External OB Dumps - 217.861 ha III) Area of Danger Zone for Blasting - 172.80 ha IV) Project Township, Infrastructures and Roads - 154.99 ha
2.2	Water (expected source & competing users) unit: KLD	Yes	Source - Mine Pumped out Water . Quantity -1040 KLD.from OC & 3120 KLD from UG Consumption at site -440 .00 KLD.
2.3	Minerals (MT)	Yes	COAL :Sanctioned capacity - 0.45 MTPA. Proposed capacity - 1.50 MTPA. Balance coal - 7.249 Million Tonnes.
2.4	Construction material - stor aggregates, sand / expected source - (MT)	No	---
2.5	Forests and timber (source - MT)	No	---
2.6	Energy including electricity and fuels (source, competing users) Unit: fuel (MT), energy (MW)	Yes	Electricity - Source - Madhya Pradesh State Electricity Board. - Consumption - 720000 KWH/ Month. Diesel - 45000 litres/ Month
2.7	Any other natural resources (use appropriate standard units)	No	----

3. Use, storage, transport, handling or production of substances or materials, which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health.

S.No	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
3.1	Use of substances or materials, which are hazardous (as per MSIHC rules) to human health or the environment (flora, fauna, and water supplies)	No	---
3.2	Changes in occurrence of disease or affect disease vectors (e.g. insect or water borne diseases)	No	--
3.3	Affect the welfare of people e.g. by changing living conditions?	No	--
3.4	Vulnerable groups of people who could be affected by the project e.g. hospital patients, children, the elderly etc.,	No	---
3.5	Any other cause	No	---

4. Production of solid wastes during construction or operation or decommissioning (MT/month)

S.No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
4.1	Spoil, overburden or mine wastes	Yes	Overburden consisting of Alluvium, Shale & Sand Stone. Total Quantity - 63.35 Million Cubic Meter.(Balance) Yearly excavation - As per calendar programme. Avg. S/R - 8.5 cu.m./t
4.2	Municipal waste (domestic and or commercial wastes)	Yes	Domestic - 5.00 Cubic metre / Year. Disposal - Through Land Fill. Kitchen Waste - 500 kg/ month - Disposal - Through Land Fill.
4.3	Hazardous wastes (as per Hazardous Waste Management Rules)	Yes	Used Oil - 40 Lit. / day - Disposal - Through approved Recyclers.
4.4	Other industrial process wastes	No	---

4.5	Surplus product	No	---
4.6	Sewage sludge or other sludge from effluent treatment	Yes	
4.7	Construction or demolition wastes	No	Not envisaged at present.
4.8	Redundant machinery or equipment	No	Not envisaged at present.
4.9	Contaminated soils or other materials	No	
4.10	Agricultural wastes	No	---
4.11	Other solid wastes	No	---

5. Release of pollutants or any hazardous, toxic or noxious substances to air (Kg/hr)

S.No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities / rates, wherever possible) with source of information data
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources	Yes	Operation of HEMMs leads to generation of Sox and NOx. The quantum is measured through ambient air quality monitoring in the mine activity area every fortnight as per Environment Protection Amendment Rule, 2000. The quantity is insignificant as per previous/ present records.
5.2	Emissions from production processes	Yes	Dust particles including coal dust. The quantum is measured through ambient air quality monitoring in the mine activity area every fortnight as per Environment Protection Amendment Rule, 2000. Quantity is insignificant.
5.3	Emissions from materials handling including storage or transport	Yes	Dust particles including coal dust. The quantum is measured through ambient air quality monitoring in the mine activity area every fortnight as per Environment Protection Amendment Rule, 2000. Quantity is insignificant.
5.4	Emissions from construction activities including plant and equipment	No	---
5.5	Dust or odours from handling of materials including construction	No	---

	materials, sewage and waste		
5.6	Emissions from incineration of waste	No	---
5.7	Emissions from burning of waste in open air (e.g. slash materials, construction debris)	No	----
5.8	Emissions from any other sources	No	----

6. Generation of Noise and Vibration, and Emissions of Light and Heat:

S.No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data with source of information data
6.1	From operation of equipment e.g. engines, ventilation plant, crushers	Yes	Operation of HEMMs / Machineries. The quantum is measured through ambient noise quality monitoring in the mine activity area every fortnight as per Environment Protection Amendment Rule, 2000. Generation of noise levels within the permissible limits as per records.
6.2	From industrial or similar processes	No	
6.3	From construction or demolition	No	
6.4	From blasting or piling	Yes	Blasting - Instantaneous Maintained within the permissible limits specified by DGMS.
6.5	From construction or operational traffic	Yes	Operational - through movement of coal transportation trucks and dumpers. The quantum is measured through ambient noise quality monitoring in the mine activity area every fortnight as per Environment Protection Amendment Rule, 2000. Generation of noise levels within the permissible limits as per records.
6.6	From lighting or cooling systems	No	---
6.7	From any other sources	No	---

7. Risks of contamination of land or water from releases of pollutants into the ground or into sewers, surface waters, groundwater, coastal waters or the sea:

S.No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
7.1	From handling, storage, use or spillage of hazardous materials	Yes	Used Oil - 40 Lit. / day - Disposal - Through approved Recyclers.
7.2	From discharge of sewage or other effluents to water or the land (expected mode and place of discharge)	Yes	Treated mine pumped out water is discharged into local nullah. Quality parameters are monitored every fortnight and found to be well within the permissible limits. Quantity of Final discharge - 600 KLD. From OCM Domestic sewage is treated in conventional soak pits provided with each unit.
7.3	By deposition of pollutants emitted to air into the land or into water	Yes	Fugitive emission into air from external OB dumps and coal & OB handling. Monitoring of Fugitive dust is being carried at one location viz. Security Check post.
7.4	From any other sources	No	---
7.5	Is there a risk of long term build up of pollutants in the environment from these sources?	No	---

8. Risk of accidents during construction or operation of the Project, which could affect human health or the environment

S.No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous substances	No	This is an opencast mine and day to day operations are carried out strictly as per Statute as such there is hardly any risks from explosions, spillages, fires etc.
8.2	From any other causes	Yes	1) Land Sliding in OB Dump and mine Pit - This

			<p>is taken care by proper design of slopes in OB Dump and developing afforestation over dumps. The mine pit is designed with proper slope to avoid any failure.</p> <p>2) Mine Inundation - The mine is protected from any danger due to inundation by providing protective embankment all around the mine pit. In addition garland drains are provided all around the mine pit and provision of adequate number of pumps are also made. During monsoon emergency organization is put into alert.</p> <p>3) Blasting - There are risks of ground vibration and fly rocks which are taken care by designing optimum blasting pattern and getting approval from DGMS and implementing the same.</p>
8.3	Could the project be affected by natural disasters causing environmental damage (e.g. floods, earthquakes, landslides, cloudburst etc)?	Yes	<p>Although the project is not falling under seismically active zone or land slide prone zone but chances of flood can not be ruled out. However the mine is well equipped to deal with eventuality as embankment has already been constructed all around the periphery of the mine. Moreover the mine is well equipped with all provisions of Coal Mines Regulation 1957 and related DGMS Circulars (Tech).</p>

9. Factors which should be considered (such as consequential development) which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality

9.1	<p>Lead to development of supporting facilities, ancillary development or development stimulated by the project which could have impact on the environment e.g.:</p> <ul style="list-style-type: none"> • Supporting infrastructure (roads, power supply, waste or waste water treatment, etc.) • housing development • extractive industries • supply industries • other 	Yes	<p>Economic growth associated with coal mining activities lead to semi Urban like development. This supports development of ancillary and supporting industries and other related activities. The opening of this project has already led to development of housing, roads, ancillary industries, Improvement in social & living standards by providing opportunities of direct & indirect employment to local community.</p>
9.2	Lead to after-use of the site, which could have an impact on	Yes	<p>The degraded land is proposed to be biologically reclaimed which will improve</p>

	the environment		<p>the green cover in the area. Agricultural land = 178.10 ha Govt.(waste) land = 524.911 ha Forest Land = 593.00 ha ----- 1296.011 ha</p> <p>There is no increase in land area beyond the already approved environmental clearance. The permanent change in land will be at the end of mine life which is same as given in the last approved EIA/EMP (Approved in Dec, 2007) and the details are given as below: - I) Quarry area - 750.36 ha e) Void - 262.626 ha f) Quarry area (Backfilled) - 487.734 ha II) Area Covered under External OB Dumps - 217.861 ha III)Area of Danger Zone for Blasting - 172.80 ha IV)Project Township, Infrastructures and Roads - 154.99 ha Out of the above land at the EOM, Plantation Cover - 497.049 ha Total - 1296.011 ha</p> <p>Moreover the facilities created during the mine operation could assume permanent residency considering the proposed future expansion of the mine with appropriate feed to sustain the growth mechanism.</p>
9.3	Set a precedent for later developments	Yes	Activities detailed out in previous paragraphs above do culminate in conjunction with local set - up and in a number of cases has set precedence of economic development leading to overall socio - economic growth of the area.
9.4	Have cumulative effects due to proximity to other existing or planned projects with similar effects	Yes	Coal occurs in layers continues for large distances. Associated mining activities with such closely located centers along with other related service sectors etc. could have an cumulative impact.

(III) Environmental Sensitivity

S.No.	Areas	Name/ Identity	Aerial distance (within 10 km.) Proposed project location boundary
1	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	No	---
2	Areas which are important or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests	Yes - Details given in next column.	Kanhan River flowing at a distance of 6.0 to 7.0 km. Seasonal Nallah- 0.6km. There are no coastal zones, biospheres, mountains.
3	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	No	---
4	Inland, coastal, marine or underground waters	No	---
5	State, National boundaries	No	----
6	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	No	----
7	Defence installations	No	---
8	Densely populated or built-up area	Yes- Details given in next column.	Project Set up and WCL Township. 16 Nos. of villages in the core and buffer zone of this project.
9	Areas occupied by sensitive man-made land uses (<i>hospitals, schools, places of worship, community facilities</i>)	Yes- Details given in next column.	Limited to Project Township.
10	Areas containing important, high quality or scarce resources (<i>ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals</i>)	Yes- Details given in next column.	Ground Water - Yes Surface Water - Kanhan River. Minerals - Coal.
11	Areas already subjected to pollution or environmental damage. (<i>those where existing legal environmental standards are exceeded</i>)	No	
12	Areas susceptible to natural hazard which could cause the	No	---

	project to present environmental problems (earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions)		
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**PROPOSED
TERMS OF
REFERENCE
OF
GHORAWARI OPENCAST
EXPANSION PROJECT
FOR
(DETAILED ENVIRONMENTAL IMPACT ASSESSMENT STUDY)**

(IV). Proposed Terms of Reference

Based on the information furnished in Form - I, the Terms of Reference (TORs) is proposed as under:-

The project under consideration is Ghorawari opencast expansion mine located in Junnardeo tahsil of Chinndwara district in Madhya Pradesh State as shown in the enclosed plan (Plate - I of Form - 1) and falls under the administrative control of Kanhan Area of Western Coalfields Limited.

A. Environmental Clearance

1) **Environmental Clearance** - The environmental clearance was obtained for 0.45 MTPA with 1296.011 ha of land area (with forestland of 593 ha.) vide MOEF letter no. J-11015/382/2007-IA.II(M) dated 19/02/2008.

B. Mining Parameters

3) There is no change in mining technology since commissioning of the mine in 1982.

4) There is no change in the land area since last environmental clearance (1296.011 ha vide letter dated 19/02/2008).

5) There is no change in total coal, total OB, manpower and other project parameters since last environmental clearance (vide letter dated 19/02/2008).

6) No fresh sources of water proposed to be used or exploited during the balance life.

7) Land reclamation measures as suggested in the approved EMP (vide letter dated 19/02/2008) are continuing and there would be no change in the final land use pattern.

C. Socio – Economic Issues

8) As there is no increase in land area therefore there is no fresh R&R involved.

9) Public Hearing had already been conducted while taking the last environmental clearance and all the issues have been settled.

D. Environmental Parameters

10) All pollution control measures with respect to Air, Water and Noise have been taken in fulfillment of the requirement of existing EC (0.45 MTPA) and Consent to Operate. The environment quality in and around the mine is monitored every fortnight as per Environment (Protection) Amendment Rule, Sept. 2000 and quarterly reports are being sent regularly to MPPCB and MOEF. The annual Environmental (Audit) Statement is submitted every year to MPPCB before 30th September. The measures will be continued during the balance life of mine with

enhancement of production so as to maintain the parameters well within the permissible limits.

E. Consent to Operate(CTO)

11) The mine is operating with Consent to Operate (0.45 MTPA) obtained from MPPCB. Consent to Operate from MPCB will be obtained for 2.50 MTPA after receipt of environmental clearance from MOEF and the conditions of CTO will be implemented during the balance life of mine with enhancement of production so as to maintain the parameters well within the permissible limits.

F. Proposal

12) All the conditions of new EC (1.50 MTPA) shall be duly implemented and six monthly compliance report will be submitted to MOEF as per the EIA Notification 2006.

In view of the above, due-diligence environmental clearance for Ghorawari OC expansion project, Tahsil – Junnardeo , Dist. – Chindwara for enhancement of production capacity from 0.45 MTPA to 1.50 MTPA with same land area of 1296.011 ha may be accorded under clause 7(ii) of EIA Notification 2006 based on the attached duly filled Form-1, TOR, Feasibility Report and Submission as above.

#####

FEASIBILITY REPORT OF GHORAWARI OPENCAST EXPANSION PROJECT

FEASIBILITY REPORT

1.0 INTRODUCTION

(A) GENERAL :

Ghorawari OC Expansion is a running mine since 1982 under Kanhan Area in Chhindwara district of Madhya Pradesh State. The EMP was approved by MOEF for a production capacity of 0.45 MTPA and land area of 1296.011 ha vide its letter no. J-11015/382/2007-IA.II (M) dated 19/02/2008. The mine is being monitored as per Environment (Protection) Amendment Rule, 2000 and quarterly reports are being sent regularly to MPPCB and MOEF. The Annual Environmental Statement is submitted every year to MPPCB before 30th September.

Now in terms of the meeting held at New Delhi on 28.02.2008 between Secretary (Coal) and Secretary (Environment) and subsequent meeting held on 21.04.2008 with Director, MOEF, Form-1 application with this feasibility report is being submitted for obtaining Environmental Clearance for peak production capacity of 1.50 MTPA under Clause 7(ii) of EIA Notification, 2006.

(B) LOCATION & COMMUNICATION :

Ghorawari OC patches mines are situated in Chhindwara district of Madhya Pradesh State and is bounded by latitudes 22 deg. 11' 43.1" and longitudes 78 deg 25' 00" to 77 deg 31' 69"E. The mine area is covered in Survey of India Topo Sheet No. 55 J/2 & J/8. Ghorawari OC Mines are situated near to Junnardeo Central Railway Station on Amla-Chindwara Central Railway Broad Gauge line.

(C) TOPOGRAPHY & DRAINAGE :

The area is undulating with few mounds. The elevation of the area varies in the range of 780 to 800 meters above MSL. Drainage of the area is mainly controlled by Kanhan River flowing about 6-7 Km away from project.

(D) CLIMATE :

The climate in this area is generally dry and hot. The summer months are from April to June followed by rainy season upto September. The winter months are from November to January. May is the hottest month and the temperature rises to 45 degree centigrade. December is the coldest month with temperature falling to 8 – 10 degree centigrade. Average annual rainfall in this area is around 1300 mm.

(E). GEOLOGICAL RESERVES & LIFE OF THE MINE :

In the beginning period of the opencast mine, dumping of OB was done at nearby abandoned OC mines, thereafter void is being used for backfilling of OB dump. Considering the enhanced production capacity of the mine and balance extractable reserve re-assessed as on 01.04.2008 is 7.249 Mt. , the life of the patches has been estimated to be around 7 years.

(F). MINING TECHNOLOGY :

Within the Opencast leasehold area, Opencast Mine is proposed in Seam – III keeping safety barrier from the leasehold boundary. Quarry batter is drawn at 45 degree, as the type of rock is hard.

Seams – I & II are very thin at high depth, hence are declared unworkable seams.

As mentioned earlier, the already developed pillars of erstwhile Ghorawari Collieries are being extracted by opencast method through excavators and dumpers in patches. The details of patches have been shown on the plan attached as Plate-III.

(G). DESPATCH & COAL HANDLING :

Coal extracted from these OC patches are brought up to Hirdagar siding (about 12 kms) through tippers and then dispatched to Sarni Thermal Power Plant by Rail from this siding. Some of the coal is also dispatched by Road to ancillary consumers.

(H). STUDY AREA

(i) Core Zone : Core Zone consists of leasehold area where the mining and allied activities take place.

The total land area of this project is 1296.011 ha. Break up is given below.

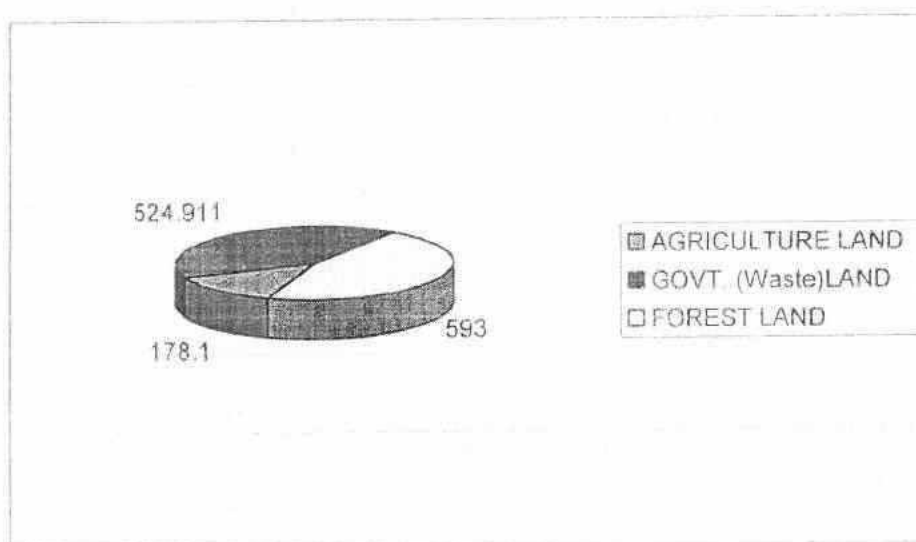
i.	Agricultural land	-	178.100 ha
ii.	Other (Govt. +WCL) land	-	524.911 ha
iii.	Forest land	-	593.000 ha

TOTAL	1296.011 ha
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(ii) Buffer Zone : Buffer Zone includes the area covered within a circle of 10 km radius from Core Zone. Buffer Zone in this case comprises of urban area, rural area and forest. There are 16 villages & WCL township in the buffer zone. Some of the features within buffer zone are given below.:

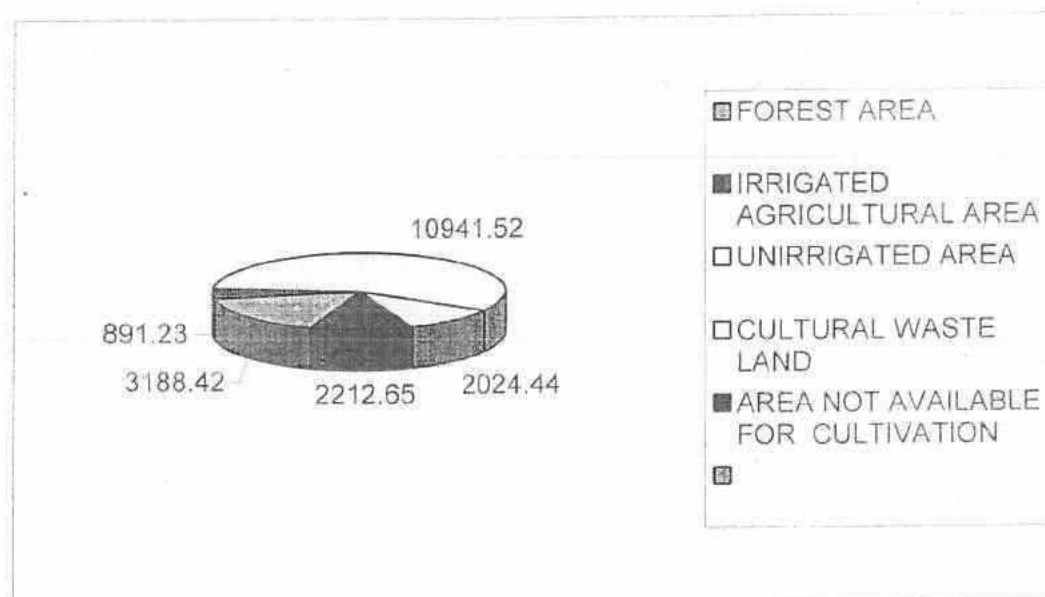
Sl. No.	FEATURES	DETAILS	DISTANCE
1	Industries / Thermal Power Plants/ Defence Installation	Nil	--
2	Other mines	Damua UG, Nandan UG, Jharna UG, Ghorawari UG, etc.	4 km
3	Railway Lines	Amla- Chindwara	3 Km
4	National / State Highway	Chindwara - Sarni	1 Km
5	Water Bodies	Kanhan River	About 6-7 km
6	Human Settlement	WCL township & 16 villages	within buffer zone

PRE MINING LAND USE IN CORE ZONE
(ALL FIGURES IN HECTARES)



Form - 1/ Ghorawari OC / Kanhan Area

EXISTING LAND USE PATTERN IN BUFFER ZONE
(ALL FIGURES IN HECTARES)



(I) PRODUCTION PERFORMANCE :-

The production performance for the last five years are given below.

Year	Coal (Mt.)
2003-2004	0.24
2004-2005	0.22
2005-2006	0.32
2006-2007	0.19
2007-2008	0.326

The total mineable reserve left in the mine is 7.249 Mt. and the balance life of mine is about 7 years. The projected production performance is given below.

YEAR	COAL (Mt)	OB(M.Cu.m.)
2008-09	0.59	5.16
2009-10	1.25	10.94
2010-11	1.25	10.94
2011-12	1.30	11.37
2012-15	$0.95 \times 3 = 2.85$	$8.31 \times 3 = 24.93$
TOTAL	7.24	63.35

Form - 11/Ghorawari OC / Kanhan Area

However , the project is anticipated to achieve a peak production capacity of 1.50 MTPA for which Env. Clearance is solicited.

(J) COAL TRANSPORTATION :

Coal from the mine is being dispatched by road to Hirdagarh Railway siding, (about 12 km) and from there the coal is being transported to Satpura TPS , Sarni of MPEB by rail.

The various air pollution control measures being adopted during coal transportation are as follows:

- i. Black topping of coal transportation road.
- ii. Regular cleaning & water spraying on coal transportation road.
- iii. Overloading of trucks is being strictly prohibited.
- iv. Coal transportation is being done in trucks covered with tarpauline.
- v. Regular monitoring of air quality as per Env. (Protection) amendment Rule,2000.
- vi. Plantation along coal transportation road.

(K) LAND MANAGEMENT

- i. Attempt has been made to minimise the land requirement for the project.
- ii. All efforts has been made to maximize the backfilling.

Mining land use – Present Status vis- a- vis End of Mining

Sl. No.	Particulars	Present Land Use (in ha)	End of Mine Life Land Use (in ha)
1	Quarry Area	66.36 (Backfilled area- 39.816) (Plantation - 30.125)	750.36 (Backfilled area- 487.734 With plantation on 254.574) (Void - 262.626)
2	External OB Dump	15.31 (Plantation - 15.31)	217-.861 (Plantation - 136.075)
3	Road	2.65	2.65
4	Infrastructure	12.34	12.34
5	Township	140.00	140.00 (Plantation - 18.40)
5	Quarry area to be worked in Balance Life	684.00	Nil
7	Area for Ext. OB for balance life	202.551	Nil

Form - 1/ Ghorawari OC / Kanhan Area

8.	Rationalisation Area	172.80	172.80 (Plantation - 88.00)
	Total	1296.011 (Plantation - 48.435)	1296.011 (Plantation - 497.049)

- iii. The backfilled area and external dumps are being reclaimed both technically and biologically. Proper reshaping of dumps and drainage arrangement for precipitation run-off will be done.
- iv. Native species and mixed culture are being selected for successful biological reclamation.

2.0 PROJECT DESCRIPTION :

(A) GEOLOGY OF GHORAWARI LEASEHOLD AREA:

A) Part of Lease 29, Lease nos. 9, 10, 11, & 13:

In Ghorawari area, the sediments encountered in the drilled boreholes are represented by Moturs, Barakar & Talchir. Northern peripheral parts are covered by flows of basalt and underneath the sediment occur.

In the West, the hilly region is occupied by basaltic rocks of Deccan trap.

Besides this, few prominent Dolerite dykes traverse through the area having EW to NE – SW trend. Few boreholes drilled by MECL have encountered the dykes.

B) Part of Lease 26 & west of Lease 26. :

Based on the sediments encountered in the drilled borehole in the area, it is observed that they represent Moturs below soil cover. Moturs are followed by Barakar & Talchir. A small outcrop of Barakar sst. is noted in the North Eastern part of the block. The Eastern part is covered by Deccan trap.

Area is traversed by Dolerite dykes having EW to NE – SW trend.

C) Lease nos. 5,6,7,8, 14, 15 & 16:

Based on the data of drilled boreholes, it reveals that soil is mostly followed by coal bearing Barakars, which is followed by Talchirs. However, few boreholes encountered Moturs above Barakars.

Area is traversed by Dolerite dykes having EW to NE – SW trend.

The geological sequence of the area is given in the following table :

AGE	FORMATION	LITHOLOGY
Sub-recent to recent	Soil / Detrital mantle	Sandy clays & Black cotton soil
----- UNCONFORMITY -----		
Middle Permian	Moturs	Greenish, purplish & variegated clays intercalated with cgd. sst.
Lower Permian	Barakar	White to grayish, mgd to cgd. sst. Shale, carb. Shale and coal.
----- UNCONFORMITY -----		
Upper carboniferous	Talchirs	Greenish to blackish splintery shale, sst. & boulder beds.
----- UNCONFORMITY -----		
Archeans	Metamorphics	Schist & gneisses

Structure of the Area :

a. Part of Lease 29, Lease nos. 9, 10, 11, & 13:

Strike (on the basis of drawn floor contours), is almost EW with minor swings while at places it is NE – SW & ESE – WNW with Northerly dip varying from 6° to 7° .

b. Part of Lease 26 & west of Lease 26. :

Strike is almost EW to N 70° E - S 70° W. At places it is NE- SW. Dip is Northerly, which varies from 5° to 13° .

c. Lease nos. 5,6,7,8, 14, 15 & 16:

Strike is almost EW to NE – SW. Dip is Northerly with amount varying from 8° to 9° . (gradient 1 in 6 to 1 in 7.8)

B. COAL SEAMS AND ITS QUALITY :

Prospecting for the area under consideration for this project had been done by MECL, IBM & NCDC and as per the reports it has been correlated that the workable coal seams from top to bottom as Seam I, II & III. In this area, two of these seams viz. Seam-I & Seam – II; not only occur in split sections, which are designated as IA, IB, IC, (Split of seam I, IIA, IIB (Split of Seam II), etc. but are also at high depth. Due to such splits in both these Seams they are also very thin, hence declared unworkable seams. As such, only Seam – III has been considered for extraction by Opencast method. The quality of coal is designated as " Grade – D ".

C. METHOD OF WORK :

Within the Opencast leasehold area of this project, Opencast Mine is proposed in Seam – III keeping safety barrier from the leasehold boundary. Quarry batter is drawn at 45 degree as the type of rock is hard.

As indicated above Seams- I & II are very thin and at high depth, hence declared unworkable.

Simultaneous OB removal and backfilling in the decoaled area has been proposed for balance life of the mine. No OB dumping has been proposed in Coal Bearing & Forest Land, for the balance life of the mine. OB dump schedule has been indicated in the progressive mine closure plan. Coal of this seam had already been extracted by under ground mining method earlier. Presently remaining coal from already developed/ depillared galleries and the left out barrier portion is being extracted by opencast mining method in small patches by deep hole blasting with shovel dumper combination by obtaining permission from DGMS.

D. CALANDER PROGRAMME FOR BALANCE LIFE:

The total mineable reserve left in the mine is 7.249 Mt. and the balance life of mine is about 7 years.

YEAR	COAL (Mt)	OB(M.Cu.m.)	INTERNAL DUMPING (M.Cu.m.)	EXTERNAL DUMPING (M.Cu.m.)
2008-09	0.59	5.16	4.16	1.00
2009-10	1.25	10.94	8.31	2.63
2010-11	1.25	10.94	8.31	2.63
2011-12	1.30	11.37	8.53	2.84
2012-15	0.95 X 3 = 2.85	8.31 X 3 = 24.93	18.95	5.98
TOTAL	7.24	63.34	48.26	15.08

Form - 1/ Ghorawari OC / Kanhan Area

E. POWER :

Power supply for Ghorawai OC is obtained by tapping 33 KV Panara Feeder originating from Khapaswami MPSEB substation. The distance of tapping from Khapaswami is around 9 Km and the length of 33 KV feeder from the tapping point to Ghorawai OC is around 5 Km. At the Colliery substation this is stepped down to 3.3 KV.

F. MARKETING, BENEFICATION & DESPATCH OF COAL

The property within the Ghorawai OC Patches is being worked by opencast method of working by using shovel dumper combination on hiring of equipment. The coal from OC patches is being dispatched to coal stockyard. The coal from the coal stockyard is being transported to Hirdagarh Siding & from there to consumer through railways. About 80 % of total coal production of Kanhan area is supplied to Thermal Power Station, Sarni and 20 % to misc. consumers.

G. MANPOWER

The total manpower strength of the Ghorawari Opencast is 217.

H. DISASTER MANAGEMENT PLAN :

A detailed study has been carried out covering identification and assessment of risk, and recommendation of measures to prevent damage to life and property against such risks. This has been discussed in detail in relevant chapter. The mine is being worked as per mining statute. All stipulations as specified by DGMS are being followed in day to day operation of the mine.

3.0 DESCRIPTION OF THE ENVIRONMENT :

A) AIR QUALITY : The ambient air quality of Ghorawari OC is being monitored as per Env. Protection Amendment Rule, 2000 at following locations.

- (i) Manager Office
- (ii) Sub- Area Manager Office
- (iii) Jharna Health Centre
- (iv) Panara Village

In addition, the baseline ambient air quality data (Period- April'06 to June'06) has been generated as per the guidelines in vogue at the following locations

Sl. No.	Location Name	Location code	Direction (from Site)	Distance (Km)
01.	Core Zone	A - 1	-	-
02.	Rakhabarra	A - 2	NE	6.2
03.	Dungariya	A - 3	E	4.8
04.	Kole	A - 4	SE	3.2
05.	Dongariya	A - 5	WSW	5.6
06.	Rayjamun	A - 6	NNW	5.6

The details are enclosed as Annexure – III. The Windrose diagram is enclosed as Annexure – II.

Further to it, in order to assess existing ambient air quality in the mine activity area, the latest ambient air quality data generated as per Env. Protection Amendment Rule, 2000 has been considered. The details of these data is enclosed as Annexure- IV.

The results indicate that the monitored parameters i.e. level of SPM & RPM are well within the permissible limit. The values of SO₂ & NO_x are insignificant.

B). WATER QUALITY : The baseline water quality data (Period - April'06 to June'06) has been generated as per the guidelines in vogue at following locations.

Sl. No.	Location Name	Location code
01.	Mine effluent in April 2006	W - 1
02.	Mine effluent in June 2006	W - 2
03.	Ghorawari Kalan – Borewell	W - 3
04.	Nimdhana – Borewell	W - 4
05.	Kanhan river U/S	W - 5
06.	Kanhan river D/S	W - 6

Form - 1/ Ghorawari OC / Kanhan Area

The details of baseline water quality data is enclosed as Annexure- V.

The present quality of pumped out water from the mine is being monitored as per Env. Protection Amendment Rule, 2000. The latest water quality data has been considered . The details of these data are enclosed as Annexure- VI.

The results indicate that observed values of different parameters of mine water discharge are well below the permissible limit .

C) NOISE LEVEL : The baseline water quality data (Period - April'06 to June'06) has been generated as per the guidelines in vogue at following locations.

Sl. No.	Location Name	Location code
01.	Core Zone	N - 1
02.	Rawarkhurd Village	N - 2
03.	Dungariya Village	N - 3
04.	Kola Village	N - 4
05.	Danuja Village	N - 5
06.	Muyari Village	N - 6
07.	Bijori Village	N - 7
08.	Junardeo Village	N - 8
09.	Minoriya Village	N - 9
10.	Markadhana Village	N - 10
11.	Biripura Village	N - 11
12.	Chikalbarri Village	N - 12

The details of baseline noise level data is enclosed as Annexure- VII.

The existing noise level data in the mine activity area which is being monitored as per Env. Protection Amendment Rule ,2000 have been enclosed as Annexure – VIII.

D) SOIL QUALITY :

Soil characteristics, erosion aspects, soil fertility etc., have direct bearing on the environment. Knowledge of soil parameters is essential for the planning and implementation of afforestation. Further, major mining activities affect the soil regime of the surrounding areas directly or indirectly. Hence, it becomes important to study the soil characteristics.

By keeping the above aspects in view, three locations were selected in the core and buffer zone during base line study period. Locations are selected in such a way that different types of soils for supporting different species of vegetation are covered. The soil quality monitoring stations are furnished below:

Corezone (Barren Land)	-	S ₁
Nimdhana (Agri.)	-	S ₂
Bandhi (Forest)	-	S ₃

The details of soil quality data has been enclosed as Annexure- IX.

E). HYDROGEOLOGY :

The following hydrogeological regime has been projected to represent the existing hydrogeological set-up of Ghorawari OC Patches and its buffer zone. Generally sand stone horizons serve as aquifers and shale/clay acts as aquicludes whereas weathered/secondary porous zones are aquifers in Basalts & Metamorphics. The various hydrogeological units developed in the study area are in the following table :

SL. No.	TYPE OF AQUIFER	DEPTH RANGE (m)	CORE ZONE	BUFFER ZONE
1	UNCONFINED	0 -30	Soil zone/ weathered Moturs/ Barakars/ Basalt	Wlts eathered Motur/ Barakar, Talchir, Basalts & Metamorphics.
	Semi-confined/ confined	Beyond 30	Motur and Barakrs	Motur/ Barakar, Talchir, Inter trapeans, vesicular and fractured / jointed Basafts and also lineaments, fractured/ fault zones in Metamorphics.

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	Semi- confined/ confined	Beyond 30	Motur and Barakrs	Motur/ Barakar, Talchir, Inter trapeans, vesicular and fractured / jointed Basalts and also lineament s, fractured/ fault zones in Metamor phics.

The hydrogeological observation well in Kanhan area has been established. Depth to water table in core zone area is 5.55 m to 12.00 m bgl in pre-monsoon and 1.30 to 8.00 bgl in post -monsoon period. Average annual fluctuation being 4.00 m.

In buffer zone, depth to water table in unconfined aquifer in general varies from 4.05 m to 17.20 m bgl in premonsoon while it is from 0.05 m to 7.25 m bgl in post monsoon period. Water table fluctuation in general is from 1.50 m to 8 m between the two extreme seasons.

Form - 1/ Ghorawari OC / Kanhan Area

Average being 5.00 m. Deep water levels and large zone of fluctuation are observed in the area covered by Basalts and Metamorphics. The water table configuration is mostly similar to that of topography but with that of reduced relief.

Water Level Trend :

Ground water level decadal average of water levels and water level fluctuations during 2002-2003 of National Hydrograph stations network in Pench Kanhan Coalfields along with hydrographs drawn by CGWB for Jamai NHS were examined to assess the water level trends during premonsoon and post monsoon seasons. A rising trend both in post and premonsoon has been observed at the stations at Jamai. It is worth to make a mention of the fact that the hydrograph stations at Jamai are located in the active coal mining belt. It is imperative from the rising trend in the water levels in both the seasons that the mining activity in general in the area and underground mining in particular has not induced any effect in the ground water levels in the dugwells tapping the unconfined aquifer. It can be concluded that the underground mining at deeper depths in Gondwana covered area

would affect the deeper aquifer (confined/ semiconfined) immediately overlying the working coal seam, but there would be insignificant effect on the unconfined aquifer. Further in the Basalt covered Gondwana area, the underground mining may not induce any impact on the water table (shallow) aquifer. However, the opencast mining will induce effect on all aquifer zones overlying the working coal seam. The effect on the unconfined is considerably more in comparison to the deep aquifers i.e. semiconfined aquifer due to continuous desaturation/ draining of the aquifer.

GENERAL AQUIFER PARAMETERS : No detailed hydrogeological investigations were carried out at Kanhan mine area. The bore hole drilled by CGWB at Jamai reveals aquifer at a depth of 27.70 m bgl capable of yielding 3.50 LPS. However, the aquifer parameters evaluated by CGWB in Parasia block in particular have been considered and attributed for the study area. The projected hydraulic parameters of the aquifers in Motur & Barakar formations are as follows :

Transmissivity - 20 to 50 m² / day

Hydraulic conductivity – 0.3 to 0.7 m / day

Storage coefficient – 3×10^{-2} to 5×10^{-4}

Specific Yield - 0.03 to 0.05 (assigned)

The tubewells constructed in Gondwanas have registered moderate yield ranging from 2 LPS to 5 LPS. However, the borewells in the Basalts and Metamorphics in general recorded low yield varying from negligible to 3.0 LPS. With some exceptions of moderate yield due to secondary porosity and favourable physical setting. By judicious judgement of these facts and review of formations logs, the above parameters have been arrived from the wide range of values of different formations.

GROUND WATER RESOURCES IN THE AREA :

Ground water recharge :

Rainfall is the main recharge source for ground water. The study area receives an average annual rainfall of 1300 mm. Additionally, ground water is also being recharged from other sources such as return flow from irrigation and mine pumped out (waste) water thrown on land / natural drains, water logged voids, etc.

Form – I / Ghorawari OC / Kanhan Area

The replenishable ground water recharge has been computed by rainfall-infiltration method in the absence of long-term water table fluctuation data of different formations in the area. The rainfall-infiltration factor for semiconsolidated sandstones (Gondwanas), Basalts, Metamorphics and Talchir has been considered to be 12%, 13%, 8%, and 4% respectively (GEC Report –1997 CGWB NCR, 2005) by critical review of all the factors responsible for rainfall-recharge to ground water. While computation of ground water recharge , the hilly area with > 20% slope amounting to about 42 sq.km. has been discarded from the study area of 314 sq.km. The ground water recharge computation as per GEC 1997 norms is as under :

a)	Recharge from rainfall area cover in 272 km ²)	MCM (Million Cubic Meters)
i)	Moturs/ Barakars – 99.70	14.36
ii)	Talchir - 86.90	4.17
iii)	Basalt - 58.20	9.08
iv)	Metamorphics - 27.20	2.61
	RECHARGE BY RAINFALL	30.22
b)	Recharge from other sources	0.60
c)	Gross Ground water recharge (a + b)	30.82

GROUND WATER DRAFT :

The ground water draft for domestic, irrigation and mine pumping use is computed as under :

Ground water draft of Ghorawari OCM area

Utility	Total Qty of withdrawal
Domestic (population)	0.95 MCM
Irrigation	5.64 MCM
Mine Pumping (Existing mines in Buffer zone	2.31 MCM
Annual Ground water Draft	8.90 MCM

Ground Water Balance ::

i)	Gross Ground Water recharge	30.82 MCM
ii)	Natural discharge to drains and other losses (10% of item I) above)	3.08 MCM
iii)	Net annual ground water availability	27.74 MCM
iv)	Allocation/ projection for next 25 years for domestic and industrial use	0.50 MCM
v)	Annual ground water draft for all uses	8.90 MCM
vi)	Ground water balance (items iii - iv & v)	18.34 MCM

The ground water balance flow chart is enclosed as Annexure - X

GROUND WATER STAGE OF DEVELOPMENT :

The stage of development computation in the present study is 33.88% , which can be categorized as ' Safe' with less than 70% value. As per report of CGWB and MP Govt. of 2005 , the stage of development of Jamai Block in which Ghorawari OCM is located is 21.42% and classified as ' safe' category.

Dynamic & Static Resources:

Dynamic and static reserves for the core and buffer zones are estimated by using the mine and aquifer parameters. Since the opencast mine acts as a large diameter well/ sink, the inflow to the mine is contributed from the saturated overburden formation i.e. multiple aquifer system. However, the unconfined aquifer is the most affected in the opencast mining area.

WATER QUALITY :

As part of the Environment Management Plan (EMP) preparation, the surface water, ground water and mine water quality were monitored; the water quality parameters are within the stipulated standards,

MINE DRAINAGE / PUMPING:

The ground water inflow of Ghorawari OC computation has been done by utilizing the abovementioned aquifer and mine parameters. The ground water inflow to the mine has been estimated to be around 1040 m³/day (0.38 MCM annually) at the final quarry depth of 48 m. However, to keep the water level below stipulated level as per DGMS requirement the existing Ghorawari UG mine has to pump 3120 m³/day (1.14 MCM annually).

The operating mines in the buffer zone are continuously pumping ground water to the tune of 2.31 MCM annually as part of mine management.

RADIUS of MINE INFLUENCE AREA :

In the opencast mines, the different aquifers overlying the working coal seam would be contributing ground water to the mine by gravity drainage since they are exposed /removed at the mine. The anticipated ground water inflow to the mine is to the tune of 1040 m³ / day at the final quarry depth of 48 m. The shape and extent of the cone would depend on mainly hydraulic conductivity and specific yield of aquifers and also mine depth and area etc. Mine induced effect would be distinctly noticed within a distance of 900 m from the mine edge in the down-dip direction and becomes milder / insignificant thereafter. However, the effect is limited/ negligible in the up-dip side of the incrop zone due to shallow mine depth & area and further mine development is towards dip-side only.

F. FLORA & FAUNA :

- There is no endangered & endemic species in core & buffer zone.
- By developing plantation of native species efforts are being made to improve the green cover in and around the immediate vicinity of mine area.
- WCL in association with local people will make all efforts to conserve flora & fauna in the immediate surrounding of the mine area.

The authenticated list of flora & fauna is enclosed as Annexure – I.

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

A. ENV. IMPACT ASSESSMENT

Env. Impact assessment has been carried out by studying the likely impacts on existing ambient air, water and noise conditions etc. due to proposed expansion of the project. In this direction the first step is Scoping of important environmental aspects which are given below, :-

Form – 1/ Ghorawadi OC / Kanhan Area

IMPORTANT ENVIRONMENTAL ASPECTS (Scoping)	
1. Forest land involved	Yes
2. Wild life sanctuary (10 Km. radius)	None
3. Fragile Eco/ Bio- diversity system nearby (10 Km. radius)	None
4. Coastal area nearby (10 Km. radius)	None
5. Environmental impact on the region.	No adverse impact anticipated. Efforts will be made by strengthening the existing pollution control measures with close monitoring to maintain the sinking capacity of ambient air to absorb the additional load due to proposed expansion, thereby maintaining the quality of ambient air to the existing level to the extent possible
6. Impact on quality & quantity of surface & ground water specific to the project.	<p>a. Mine pumped out water is being let out only after treatment. Hence impact on surface water quality is not significant .</p> <p>b. The mine water pumping is to the tune of 4160 m³/day & 4500 m³/day during lean & monsoon period respectively.</p> <p>c. The radius of influence estimated for this project at final quarry depth is 900 m.</p>
7. Risk & Hazards involved due to the project	Risk & hazards associated with mining is limited to mine area only. However, the mine

Form - 1/ Ghorawari OC / Kanhan Area

	is being worked as per the statute.
8. Points regarding mitigation measures for land, air, water and noise pollution	Various pollution control measures are being implemented effectively.

i. **Air Pollution Impact Assessment :**

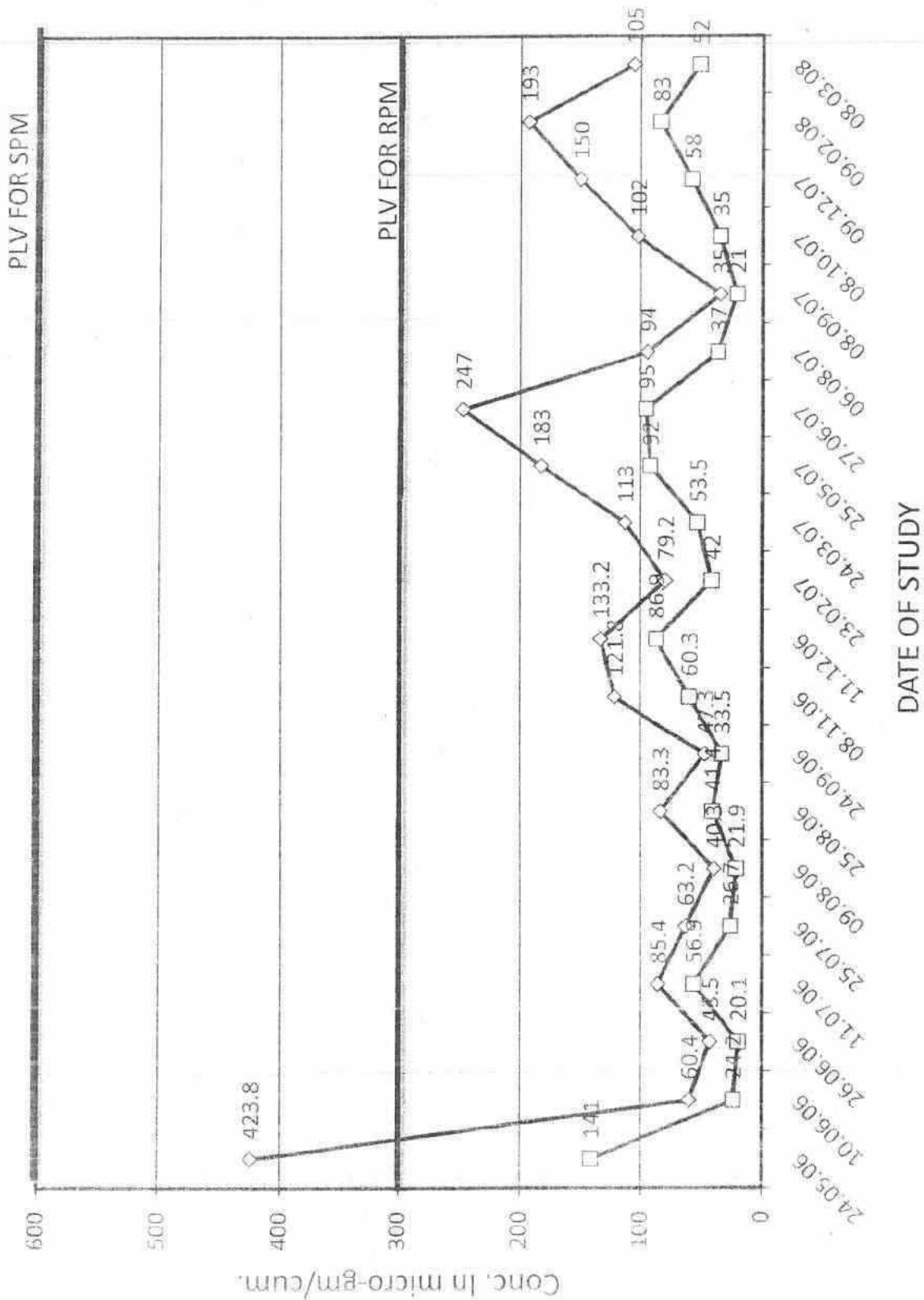
From the analysis results of present ambient air quality data, it is seen that the main pollutant arising out of coal mining and associated activities at existing mine is dust (SPM & RPM) although values are within the permissible limit. Now, with the expansion of the mine, there is likelihood of addition of pollution to the existing concentration level of different attributes of ambient air.

The ambient air monitoring data will be examined critically so as to identify the affected area and mine authorities will thereafter be able to take appropriate control measures to minimise the adverse effects as far as possible.

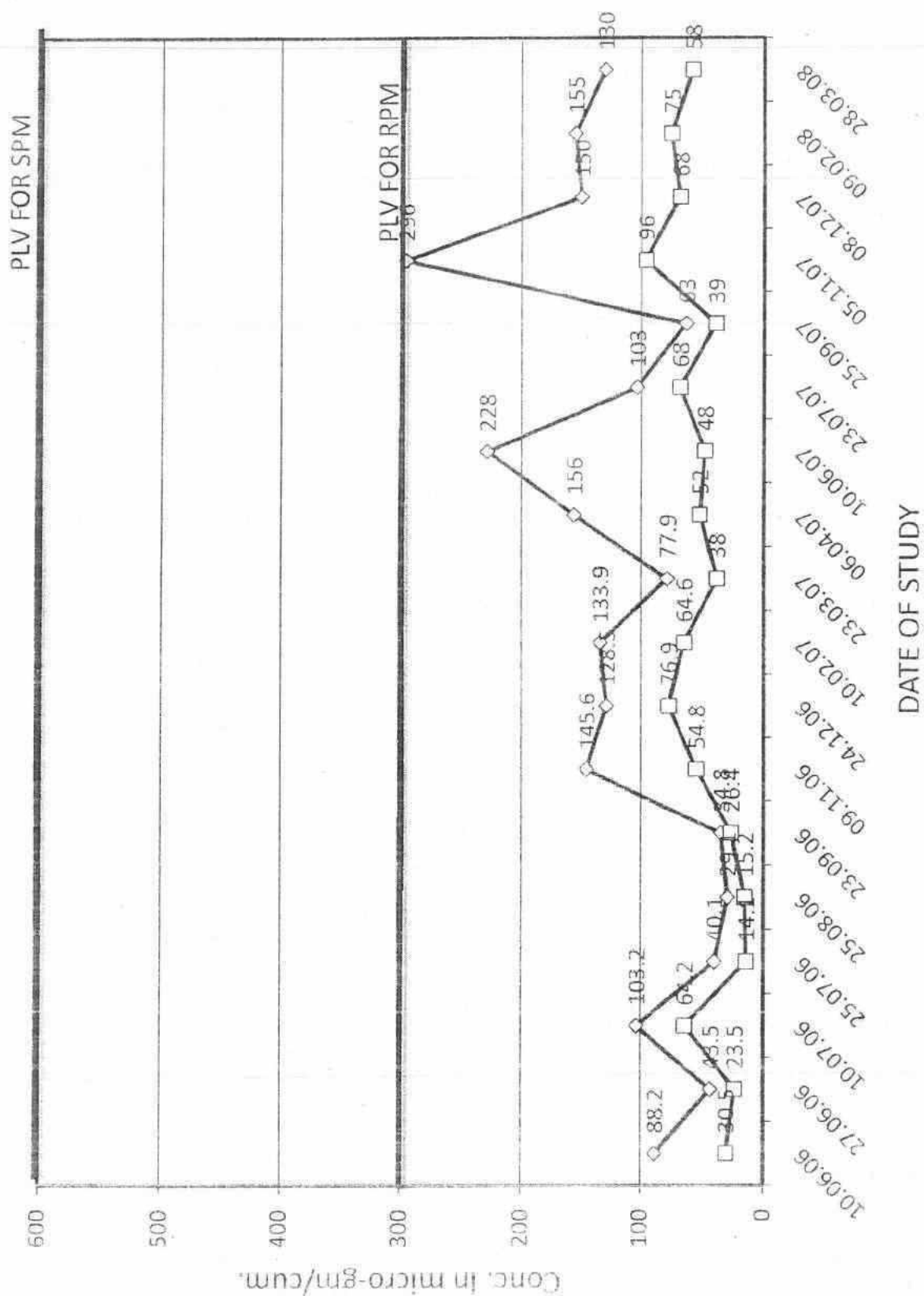
Further by strengthening the existing pollution control measures, the level is likely to remain within the permissible limit.

The representation of ambient air quality monitoring data in graphical form are shown in subsequent pages.

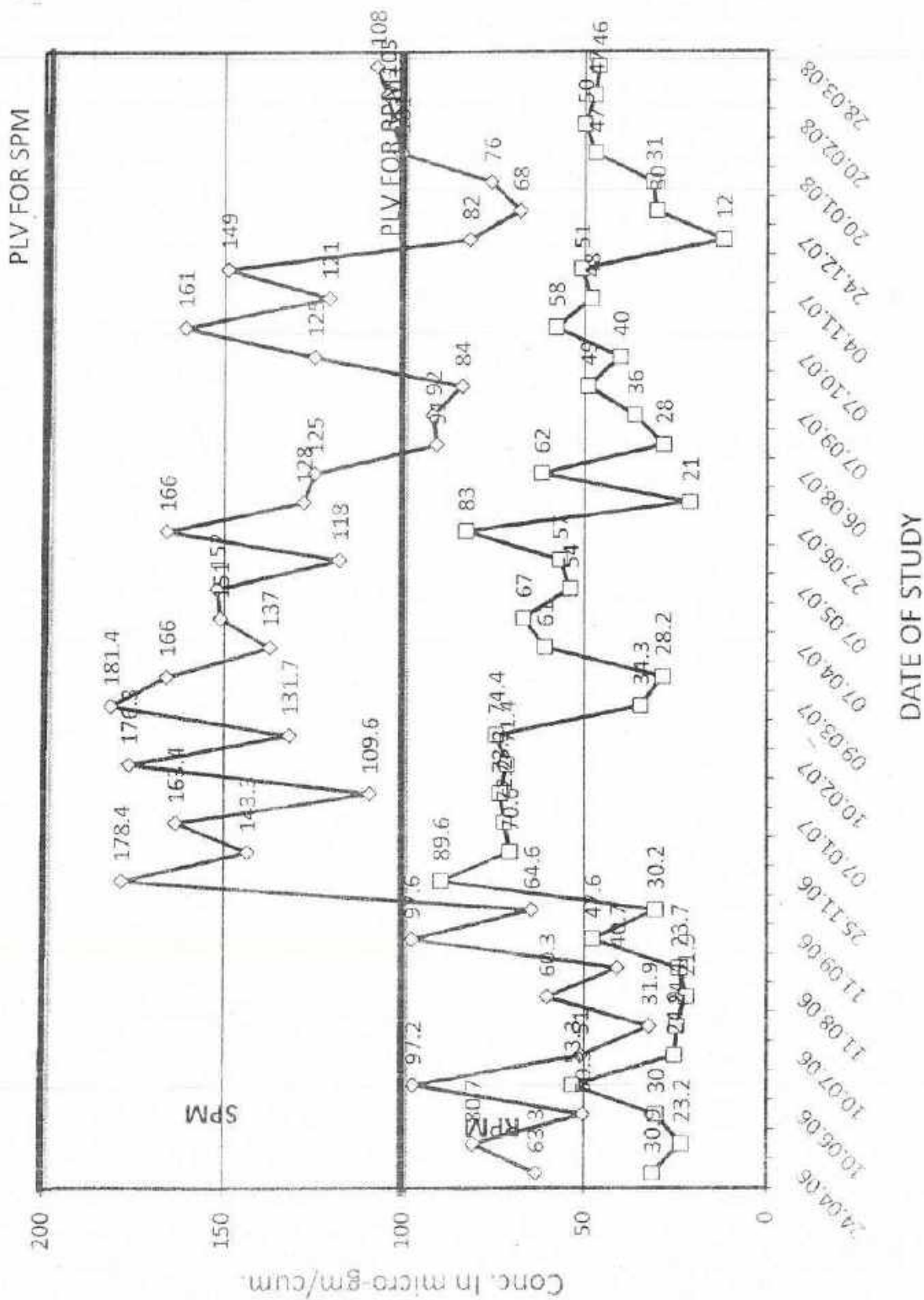
MANAGER OFFICE-GHORAWARI OC



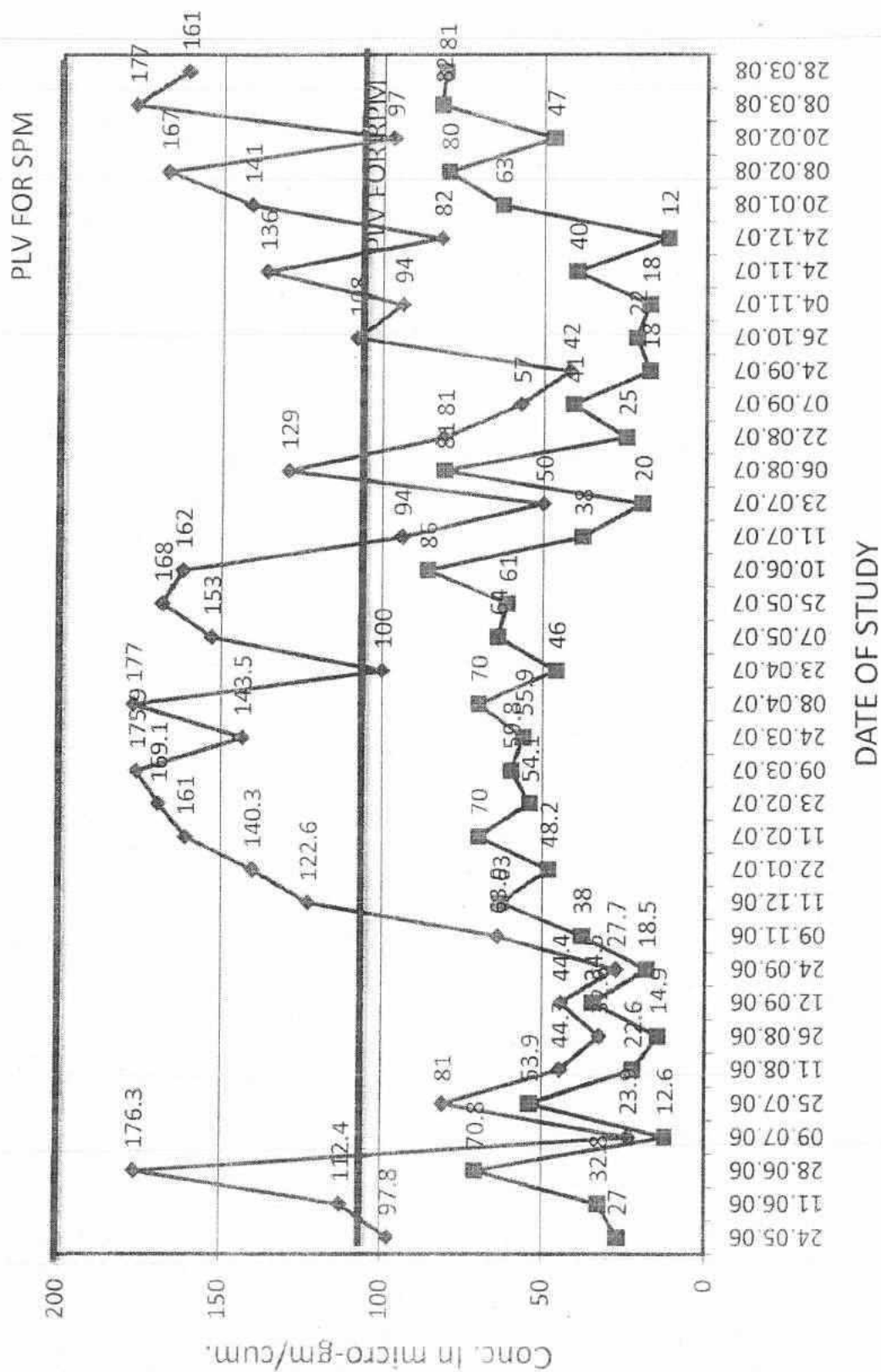
SAM OFFICE - GHORAWARI OC



COLONY - GHORAWARI OC



PANARA VILLAGE - GHORAWARI OC



Hence, it is expected that pollution load to be generated due to increase in production at Ghorawari be well within the permissible limit as the existing air pollution control measures will be further strengthened with close monitoring for efficient & effective implementation of the pollution control measures to make the operation eco-friendly and it is expected that ambient air quality will have no harmful effect on human being, flora and fauna, soil quality, surface structures and aesthetic value of the surrounding environment

.ii. Water Pollution Impact Assessment :

The present quality of mine pumped out water is being regularly monitored as per Env. Protection Amendment Rule, 2000. It is seen that the recorded value of all the quality parameters are well within the permissible limit.

Based on the factual position it can be predicted that the quality of mine pumped out water at Ghorawari OC mine due to proposed expansion is not going to change much from the existing level because of same hydrogeological conditions.

Moreover, regular monitoring of mine effluents will be continued as being carried out presently so as to assess the quality of mine effluents and if any undesirable element is found immediate mitigative action will be taken. It may be mentioned here that mine discharge is not being allowed to mix with natural water courses without treatment; i.e. mine discharge is being passed through a sedimentation pond before it is allowed to mix with nullah/stream, etc

iii. Noise Pollution Impact Assessment :

The present noise level in the mine activity area is being regularly monitored as per Env. Protection Amendment Rule, 2000. It is seen that the recorded value are well within the permissible limit.

With the proposed expansion, the noise level is likely to increase mainly in the mine activity area, but with control measures, the propagation of noise will not be significant.

However, regular ambient noise level monitoring will continue to be carried out so as to identify affected areas and appropriate control measures will be taken to minimise the same.

iv. Impact on Land :

Mining land use – Present Status vis- a- vis End of Mining

Sl. No.	Particulars	Present Land Use (in ha)	End of Mine Life Land Use (in ha)
1	Quarry Area	66.36 (Backfilled area- 39.816) (Plantation - 30.125)	750.36 (Backfilled area- 487.734 With plantation on 254.574) (Void - 262.626)
2	External OB Dump	15.31 (Plantation - 15.31)	217.861 (Plantation - 136.075)
3	Road	2.65	2.65
4	Infrastructure	12.34	12.34
5	Township	140.00	140.00 (Plantation - 18.40)
5	Quarry area to be worked in Balance Life	684.00	Nil
7	Area for Ext. OB for balance life	202.551	Nil
8.	Rationalisation Area	172.80	172.80 (Plantation - 88.00)
	Total	1296.011 (Plantation - 48.435)	1296.011 (Plantation - 497.049)

v. Socio-economic Impact :

The only major industry, being this coal mining has made its impact on the local population so as to improve the socio-economic and cultural status of the local people.

Although a few mines already exist in the buffer zone, mining activities at Ghorawari OC has definitely affected its surroundings and the employment scenario.

The direct employment opportunities have already improved around the coal mine areas & with the expansion of this project it will improve further. With the proposed expansion of the mine the occupational structure of the area is going to change further and many people are likely to be involved in the job of mining

and allied activities. Hence, income level of these people are likely to improve to significant level.

The monetary inflow in this area through salary & wages payable to the project employees will increase because almost 50% of this amount is being spent locally to meet the day to day domestic demand. This regular expenditure may lead to adequate & impressive economic-development of the area. This monetary inflow may also lead to improvement of civic amenities because people will go for more and more consumer goods, better educational facilities & communication. Simultaneously various small scale & medium scale manufacturing engineering units may also come up giving adequate alternate employment opportunities for local people.

Employment opportunities both direct & indirect in this project is likely to cause migration from outside. Amenities like medical educational, recreational etc. are available to local people and their quality of life will definitely improve.

The present network of metalled approach road to the place of work and places of public interests like shopping, education, medical services etc. is going to improve with continuation of mining operation.

With continuation of mining activities in the area, educational facilities developed in the area will continue to improve the literacy of the rural areas also.

vi. Impact on Health

At present there is a dispensary with qualified doctors & paramedical staffs in the project. At area level there is a full fledged hospital. The Periodical medical examination is being carried out regularly as per statute. The circulars and orders of DGMS including the rules and regulations under Mines Act are being adhered to in respect of occupational health and safety.

No major occupational health hazard is anticipated due to the proposed expansion of the project.

The medical facilities are being extended to nearby villages. The situation is likely to improve further.

vii. Impact on Flora & Fauna

There is no endangered & endemic species in the core & buffer zone.

Both core and buffer zones are found to be free from ecologically sensitive and biologically rich areas / habitats. As such impact on flora & fauna is likely to be insignificant.

B. MITIGATIVE MEASURES

i. Air Pollution Control Measures :

- Water spraying in coal stockyard (total area – 9,600 sq.m) and on the haul road (length – 2.50 km) through mobile water sprinkler. It is proposed to install fixed type rain guns in the coal stockyard & along the haul road ;
- In blasting operation – Optimizing fragmentation by proper design of blast parameters;
- Black topping of coal transportation road (16 km) has been done from mine site to railway siding.
- The coal transportation is being done in trucks covered with tarpaulin & having valid PUC certificate and overloading of truck is being avoided .
- Regular cleaning of coal transportation road.
- Plantation in vacant land, along road & infrastructure (7,500 Nos.). On External OB Dumps (37,500 nos.) & in backfilled areas (75,500 Nos.).

Proposed Plantation Programme –

SUMMARY OF PLANTATION DURING BALANCE MINE LIFE				
Sl. No.	PARTICULARS	NUMBER OF TREES	AREA (ha)	REMARKS
1	EXTERNAL OB DUMP	3,50,000	120.675	TO BE PLANTED WITH NATIVE SPECIES
2	BACK FILLED AREA	6,35,000	224.359	TO BE PLANTED WITH NATIVE SPECIES
3	VACANT LAND (INCLUDING TOWNSHIP)	266000	106.40	TO BE PLANTED WITH NATIVE SPECIES

The ambient air quality is being monitored as per Env.(Protection) Amendment Rule,2000.

ii. Water Pollution Control Measures

- The strata seepage water is being collected at dipside sump where suspended particles get sufficient time for settlement. The pumped out water is being utilized for domestic & industrial consumption and excess water (3720 KLD) is discharged into natural water course. Moreover the quality of mine pumped out water is quite satisfactory which is being monitored regularly as per Env. (Protection) Amendment Rule , 2000.
- Workshop effluent treatment plant for workshop effluent.
- Each residential unit is provided with conventional soak pit & septic tank arrangement.

iii. Noise Pollution Control Measures

- The mine is being worked as per mining statute after taking due permission from DGMS.
- Preventive maintenance of plants & machineries.
- Plantation in vacant land , around infrastructure , OB dump etc.
- Ear plug & ear muffs has been provided to workmen who are exposed to high noise level.
- Periodical medical examination of all workmen once in every five year.
- Regular monitoring of noise level as per Env.(Protection) Amendment Rule,2000.

iv. Land Management

- Attempt has been made to minimise the land requirement for the project.
- The backfilled area and external OB dumps are being reclaimed both technically and biologically.
- Native species and mixed culture are selected for successful biological reclamation.

Form – 1/ Ghorawan OG / Kanhan Area

The post-mining scenario can be summarized as below :

POST MINING LAND USE (CONCEPTUAL)						
Sl. No.	Category	Land Use (ha)				
		Plantation	Water Body	Public Use	Undisturbed Area	Total
1	Excavation	254.574	262.626	-	233.16	750.36
2	External OB Dump	136.075	-	-	81.786	217.861
3	Roads	-	-	2.65	-	2.65
4	Infrastructure	-	-	12.34	-	12.34
5	Township	18.40	-	121.60	-	140.00
6	Rationalisation Area	88.00	-	-	84.80	172.80
	Total	479.079	262.626	136.59	399.746	1296.011

v. Peripheral Development:

As per the present practices in WCL coal mines, adequate steps are being taken for the local villagers by providing various infrastructural and welfare facilities and giving assistance in health care in Kanhan Area of WCL, under which the existing Ghorawari OC project is in operation.

A no. of community development & social welfare measures are being undertaken by WCL authority in the nearby villages which are enclosed as Annexure- XI.

However, further community development works will be taken up as directed by MOEF and after survey of the "felt needs" of the community around the project.

vi Control measures to reduce impact on Flora and Fauna

- The enhancement of forest area will occur due to creation of green cover.
- This project is not likely to have any impact on diversity of flora & fauna species within terrestrial and aquatic habitats.
- WCL in association with local people will make all efforts to conserve the flora & fauna in the immediate surrounding of the mine area.
- Mine water is being discharged only after suitable treatment to natural water course. So ,no adverse impact on downstream aquatic life of surface water courses is expected.
- Improved blasting techniques are being used to minimise the noise & ground vibrations.

vii. Occupational Health & Safety

The circulars and orders of DGMS including the rules and regulations under Mines Act are being adhered to in respect of occupational health and safety. However, some measures regarding occupational health and safety are:

- a. Water spraying.
- b. Periodical medical examination of work force.
- c. First aid facilities.
- d. Refresher training to workforce as per statute.

5.0 DISASTER MANAGEMENT PLAN

Mining is a hazardous industry. There is risk to life and property associated with various mining and allied activities of the project. A detailed study has been carried out covering identification and assessment of risk, and recommendation of measures to prevent damage to life and property against such risks. They are discussed below.

i. Safety aspects for outsourcing/hiring of HEMM

Special precaution should be taken while deploying workers in the mine. Before employing any labour to the mine proper vocational training should be imparted and recommendations of VIII Safety Conference should be strictly followed. Terms and conditions shall be fixed by management for deployment of labours by leaser of HEMM as well as machineries.

ii. Model traffic rules for HEMM & Light Vehicles

Suitable traffic rules as per recommendations of VII Safety Conference may be framed by Manager and implemented to ensure safe operation of dumpers, light vehicles and other HEMM deployed in the project.

iii. Precaution against Fire

- (a) Wild or herbaceous plants shall be removed from the mine.
- (b) No person shall deposit heated material or ashes on any opencast working. Also no person shall light a fire or permit a fire to be lighted in any OC working except by the permission in writing of the Manager and only for a special purpose specified therein.
- (c) No coal shall be left exposed in coal benches more than its incubation period to avoid fire in seam due to spontaneous heating.

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- (d) Proper type of the extinguisher to be kept in each HEMM ready for use in case of emergency.

In coal stock coal shall be dispatched on the basis of first in first out.

iv. General Lighting

The standards of lighting to be provided in opencast coal mines during working hours at different places or areas where natural light is not sufficient has been specified in notification as GSR 804 Dt.18.6.75 [Cir(legis)1/1976] under regulation 154 of CMR 1957. The standards are summarized below.

Sl.No.	Location	Minimum standard of illumination (LUX)	Level of which illumination is to be provided.
1.	Operational area of Dragline & Shovel	5 10	Horizontal Vertical
2.	Operational area of drills	10	Vertical
3.	Operators cabin of shovel, dragline drill etc	30	Horizontal
4.	Dumper haul road	0.5 to 3.0	Horizontal
5.	OB & Coal Dumps	3.0	Horizontal
6.	Roadways & foot path from bench to bench	3.0	Horizontal
7.	Coal handling plant, workshop & service buildings	As per BIS Specification	

Lighting near the faces and haul road may be arranged by cluster of higher pressure sodium vapour lamps located on the top of an adjustable telescopic mast, mounted on a platform with rubber tyre which or skids and having portable diesel generating set so that same can be used in emergency.

v. Dust Suppression

For suppression of dust water sprinkler has been provided. Suppression of mine dust may be done by using puller bond & dust bond, for methodology of application DGMS Circular No. 8 of 1997 may be referred.

vi. Precautions against Surface Water

The mine pit receives water from three sources namely direct precipitation over mine area, surface run-off from surrounding area and seepage from strata. In

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heavy rainstorms, there may be situation where the mine would be flooded. This may cause loss of human life and equipments.

- (a) Provisions of garland drains around mine quarry are made. This will prevent surface run-off entering the mine pit. In order to divert the rain water around the excavated portion a garland drain has to be made; which should have the gradient suitable for diverting the water to the river/or nallah part away from the mine
- (b) Provisions of pumps: Adequate number of pumps has been provided to drain mine water even during maximum rainfall.

vii. Slope Stability

It is suggested that following action may be taken to deal with slope stability problem.

- a) Vulnerable area may be identified and marked on quarry plan
- b) Observation of actual alignment of fault, its throw, joints, etc. may be recorded during the process of exploitation.
- c) Water drainage system may be properly implemented to prevent accumulation of water in cracks. Also dumps shall be leveled to prevent accumulation of water over it. Proper drainage in dumps shall be also provided to prevent erosion to toe of dump.
- d) Regular monitoring of tension cracks, horizontal and vertical movement of strata in critical area may be done.
- e) Rise side slope to be reinforced if required because it has to stand through out quarry life. No dumps/surface structures to be located within 15 m of quarry edge, as it will act as surcharge there by destabilizing the slope.
- f) No undercutting of slopes to be done
- g) Proper hydro geological studies to be done if water table is at level of slope it should be brought down by using submersible pumps to prevent hydrostatic pressure.
- h) Proper selection of site for dumping to be done before dumping place shall be made free from loose material. Dumping shall not be done at an angle more than angle of repose of material being dumped.
- i) After completion of dumping operations dumps to be stabilized by growing

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vegetation.

viii. Height & Width of benches & Manner of Extraction

- a) Height of benches (both in coal & OB) shall in no case be more than cutting/digging height of excavation.
- b) Width of bench in coal & OB shall not be less than:
Widest equipment + 5m
Height of bench Or 3x largest dumper's width
Width of bench adopted as the maximum value amongst (a) & (b)
- c) Each cycle of operation shall consist removal of overburden followed by extraction of the exposed coal. After extraction of coal no body shall be employed/no work to be done at any of the benches or bottom of quarry till benches in OB & coal are provided again from top downwards and coal is again exposed.

ix Miscellaneous Provisions

- a. HEMM deployed in the project have been equipped with suitable inbuilt safety devices like audio-visual alarm, fire extinguishers etc.
- b. Fencing should be erected around quarry surface, dumps etc. so that entry to unauthorized persons is checked.
- c. Emergency Response Plan has been prepared by Manager as per Statute & mock rehearsal is being done regularly.
- d. Monsoon preparation shall be done in project in advance each year. All provisions regarding storage, transport & use of explosive as per statute shall be strictly followed.
- e. In addition special precautionary measures as per statute will be taken while working this mine, as the method involves quarrying the already developed pillars of underground workings.

x. Conservation

Although for calculation of mineable coal reserve 10% mining losses has been taken into account, but in practice all efforts would be made to minimize the losses.

All efforts shall be taken to reduce carpet loss on floor of quarry, loss of coal in each contact zones and to reduce pilferage of coal while transporting it from coal face to coal stockyard.

6.0 MONITORING & MANAGEMENT ORGANISATION

Close monitoring of the environment and implementation of various protective measures discussed in the report forms an important part of EMP. In the earlier paragraphs the causes of various pollutions along with the preventive and mitigative measures have been discussed. In this paragraph monitoring organization is being discussed.

Monitoring Organisation

To have a close watch on the environmental condition and implementation of the various measures suggested, a multi-disciplinary approach is essential.

WCL (HQ) acts as an apex body, which monitors the activities relating to environment at project level through the Chief General Manager.

Chief General Manager of the area co-ordinates the activities of various disciplines in the area to render all necessary assistance at the implementing level i.e. the Project. Nodal Officer (Environment) of the area monitors all aspects of environment on behalf of the Chief General Manager.

He also takes suitable steps for generation of environmental data along with CMPDI team for its analysis and interpretations. Plantation is being done on a large area. At present it is implemented through State Forest Deptt. The horticulturist along with the Supervisor shall only monitor and guide the agency for selection of site, treatment of soil and selection of species.

Project Officer, Ghorawari OC is primarily responsible for reclamation of the mined out area. He shall also be responsible for biological reclamation with the assistance of CGM's office.

7.0 ENVIRONMENTAL COST

S.No.		Capital Cost		Annual recurring cost	
		Existing	Proposed	Existing	Proposed
1.	Pollution Control (Separately provide break-up)	2.0 Lakhs	----	2.0 Lakhs	To be continued
2.	Pollution Monitoring (Separately provide break-up)	---	---	2.0 Lakhs	To be continued
3.	Occupational Health	In built in the project cost			
4.	Green Belt	---	---	55.00 Lakhs	Based on the programme
	<div>▪ Mine</div> <div>▪ Township</div>				
5.	Reclamation/Rehabilitation of mined out area	In built in as per programme			
6.	Others	---			---
Total		2.0 Lakhs	---	59.00 Lakhs	---

Rs.3.00 / t has been kept under revenue head to cater for :-

- i. Plantation
- ii. Env. Monitoring / Env. Statement
- iii. Socio-economic welfare measures
- iv. Misc. Pollution Control Measures
- v. Compliance for statutory obligations like Consent fees, Water Cess payment, Authorization etc.

8.0 MINE CLOSURE PLANNING

i. Objectives of Closure Planning

Mine closure planning has to be carried out at the starting of the mine and needs periodic reviewing and revision during its life cycle to cope with the geo-technical constraints, safety and economic risks, social and environmental challenges. Various other objectives are as follows:

To allow a productive and sustainable after-use of the site which is acceptable to the mine owner and the regulatory authority;

To protect public health and safety;

To alleviate or eliminate environmental damage and thereby encourage environmental sustainability;

To minimize adverse socio-economic impacts.

ii. Different aspects of Mine Closure Planning

The mine closure planning broadly involves the following aspects:

- (a) Technical aspects
- (b) Environmental aspects
- (c) Social aspects
- (d) Financial aspects.

iii. Mine Closure Obligations

There is need to define the liabilities, responsibilities and authorities of the mine management, other regulatory bodies, Central and State Governments after mine closure. Some obligations relating to the Mine Management Companies are as follows:

- Health & Safety: Regulation Nos. 6, 61, 106, 112 of Coal Mines Regulations, 1957 and its related DGMS Circulars;
- Environment Water (Prevention & Control of Pollution) Act, 1974;
- Air (Prevention & Control of Pollution) Act, 1981;
- Environmental (Protection) Act, 1986 and Environmental Protection (Amendment) Rule, 2000;
- DGMS Directives on Noise & Ground Vibration;
- Forest (Conservation) Act, 1980 – Not applicable in this project.
- Rehabilitation

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- CIL's policy -Not applicable in this project.
- Decommissioning/asset disposal, etc.

iv. Impact Assessment Remedial Measures

Environmental Impact on Landscape, Water Source, air and noise pollution during mine life has been discussed earlier. It is imperative that the environmental monitoring may be continued for 1-2 years after closure of patch Mines in order to assess corrective measures to be implemented to sustain pre-mining ecosystem and environment in the core and buffer zone (to the extent possible).

v. Stakeholders Involvement

Various stakeholders effected due to mine closure need to be identified and they may be as follows :

The Company : Employees, Management & Stakeholders

The Community : Local business and service providers, landholders, neighbours and nearby residents, local Government and NGOs and Community Groups.

The State : The State Government, The Central Government and concerned Government Agencies.

There is need of regular consultations between the stakeholders to evolve the needs of the stakeholders and their involvement in the process.

vi. Closure Action Plan

Closure planning is a whole-of-life exercise that begins at the start of a mine and continues till post-closure. The dynamic nature of closure planning requires regular and critical review to reflect changing circumstances as a result of any operational change, new regulation, new technology and remain flexible enough to cope with unexpected events.

The following steps have to be undertaken in relation to Mine Closure Planning:

- Prior to the surface demolition/restoration a surface audit should be undertaken on all surface structures, spoil heaps, lagoons, etc. to assess whether there are any hazardous materials that could cause problems; viz. explosives, chemicals, etc. A list of surface assets should be prepared and made available to potential purchasers, prospective purchasers could be invited and asked to submit sealed bids, this could ensure that the sale of assets give better financial gain.

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LIST OF ANNEXURE

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List of Flora and Fauna of Chornwari OC mine of Karhan Area

Table no. 1 Flora and Vegetation

1.1 Top Storey of the Flora - Trees

Family name	Botanical name	Local name	Core zone	Buffer zone
Caesalpinaceae	<i>Bauhinia racemosa</i>	Apta	+	+
Caesalpinaceae	<i>Cassia siamea</i>		-	+
	<i>C. fistula</i>	Bahawa (Amaltas)	+	+
	<i>Tamarindus indica</i>	Chinch (Imli)	+	+
Simaroubaceae	<i>Ailanthus excelsa</i>	Maharukh	-	+
Combretaceae	<i>Anogiessus latifolia</i>	Dhawda	+	+
	<i>Terminalia alata</i>	Ain	-	+
Ebenaceae	<i>Diospyros melanoxylon</i>	Tendu	+	+
Euphorbiaceae	<i>Putranjiva roxburgii</i>	Putranjava		
	<i>Phyllanthus emblica</i>	Awla	+	+
Fabaceae	<i>Butea monosperma</i>	Palas	+	+
	<i>Dalbergia paniculata</i>	Dhobin	+	+
	<i>D. sisso</i>	Sisam	-	+
	<i>Erythrina variegata</i>	Kasai	+	+
	<i>Pongamia pinnata</i>	Karanj	-	+
	<i>Pterocarpus marsupium</i>	Bija	+	+
Meliaceae	<i>Azadirachta indica</i>	Neem	+	+
	<i>Melia azadirachta</i>	Bako Neem	+	+
	<i>Soymida febrifuga</i>	Rohan	+	+
Mimosaceae	<i>Acacia auriculiformis</i>	Australian Babul	+	+
	<i>A. catechu</i>	Khair	-	+
	<i>A. leucophloea</i>	Hiwar	+	+
	<i>A. nilotica</i>	Babul Australian	+	+
	<i>A. concina</i>	Shikakai	-	
	<i>Leucaena leucocephala</i>	Subabul	+	+
	<i>Prosopis cineraria</i>	Shami	+	+
Moraceae	<i>Artocarpus tintorius</i>	Phanas	-	
	<i>Ficus benghalensis</i>	Wad	+	+
	<i>F. religiosa</i>	pipal	+	+
Moringaceae	<i>Moringa critifolia</i>	Aal	+	+
Myrtaceae	<i>Syzygium cumini</i>	Jambhul/jamun	+	+
Rhamnaceae	<i>Zizyphus mauritiana</i>	Bor/ber	-	+
Rutaceae	<i>Citrus aurantium</i>	Santra	-	+
	<i>C. aurantifolia</i>	Limbu	+	+
	<i>Limonia acidissima</i>	Kwath	+	+
Sapotaceae	<i>Madhuca longifolia</i>	Mohwa	+	+
Verbenaceae	<i>Tectona grandis</i>	Sagwan	+	+

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1.2 Middle Story of the Flora - Shrub

Family name	Botanical name	Local name	Core zone	Buffer zone
Annonaceae	<i>Artabotrys hexapetalous</i>	Hirwa chapa	-	+
Apocynaceae	<i>Taberna montana coronaria</i>	Tagar	-	+
Euphorbiaceae	<i>Jatropha curcus</i>	Chandrajyoti	+	+
	<i>J. gossypifolia</i>	Ratanjyoti	+	-
Moraceae	<i>Morus alba</i>	Shahtut	+	-
Rhamnaceae	<i>Ventilago denticulata</i>	Lokhandi	+	+
	<i>Zizyphus jujuba</i>	Bhor	+	+

1.3 Lower Story of Flora - Herbs

Herbs

Family name	Botanical name	Local name	Core zone	Buffer zone
Acanthaceae	<i>Andrographis paniculata</i>	Bhui neem	+	+
Amaranthaceae	<i>Achyranthus aspera</i>		+	+
	<i>A. spinosa</i>	Kate chawli	+	+
Compositae	<i>Parthenium hysterophorus</i>	Gajar gawat	+	+
Euphorbiaceae	<i>Euphorbia hirta</i>	Dhudhi	+	+
Lamiaceae	<i>Hyptis suaveolens</i>	N/a	+	+
	<i>Leonitis nepatifolia</i>		+	+
	<i>Leucas biflora</i>		+	+
Mimosaceae	<i>Mimosa pudica</i>	Lajavanti	+	+
Solanaceae	<i>Solanum nocturnum</i>			
	<i>Datura metel</i>	Kala dhotra	+	+
Graminae	<i>Cynodon dactylon</i>	Durva/haiali/doob	+	-

Climbers

Family name	Botanical name	Local name	Core zone	Buffer zone
Cuscutaceae	<i>Cuscuta reflexa</i>	Amar vel	+	+
Convolvulaceae	<i>Ipomoea quimoquit</i>		+	+
Cucurbitaceae	<i>Momordica charantia</i>	Karela	+	-
	<i>Citrullus lanatus</i>	Tarbooz	+	+
	<i>Cucumis sativus</i>	Kakdi	+	+
Oleaceae	<i>Jasminum officinale</i>	Chameli	+	+
Periplocaceae	<i>Cryptolepis buchanani</i>	Dhdhi	+	+

1.4 Agricultural crops

Family name	Botanical name	Local name	Core zone	Buffer zone
Malvaceae	<i>Abelmoschus esculentus</i>	Bhendi	-	+
Apiaceae	<i>Coriander sativum</i>	Dhaniya	-	+
Cucurbitaceae	<i>Cucurbita pepo</i>	Kaddu	-	+
Fabaceae	<i>Cajanus cajan</i>	Tuar	-	+
	<i>Phaseolus mungo</i>	Mung	+	+
	<i>Dolichus lablab</i>	Semi	-	+

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Graminae	<i>Zey myrs</i>	Makkha	-	+
Linaceae	<i>Linum usitatissimum</i>	Jawas	+	+
Solanaceae	<i>Solanum melangana</i>	Bengan	+	+
	<i>Capsicum annuum</i>	Mirchi	-	+
	<i>Lycopersicon lycopersicon</i>	Tomato	-	+

1.5 Aquatic plants

Family name	Botanical name	Local name	Core zone	Buffer zone
Convolvulaceae	<i>Iponoea aquatica</i>		-	+
Graminae	<i>Coccoloba aquatica</i>		-	+

1.6 Agroforestry species

Family name	Botanical name	Local name	Core zone	Buffer zone
Bombacaceae	<i>Bombax ceiba</i>	Katesawari	+	+
Caesalpinaceae	<i>Tamarindus indica</i>	Imli	+	+
Combretaceae	<i>Terminalia arjuna</i>	Arjun	+	+
Euphorbiaceae	<i>Phyllanthus emblica</i>	Awla	+	+
Fabaceae	<i>Crotalaria juncea</i>	Jute	+	+
	<i>Dalbergia sisso</i>	Shesam	+	+
	<i>Pongamia pinnata</i>	Karanj	+	+
Graminae	<i>Bambusa arundinacea</i>	Bamboo	+	+
Melastomaceae	<i>Azadirachta indica</i>	Neem	+	+
Mimosaceae	<i>Acacia catechu</i>	Khair	+	+
Leguminosaceae	<i>Acacia auriculiformis</i>	Vilayati Babool	+	+
	<i>Albizia lebeck</i>	Shirish	+	+
Myrtaceae	<i>Syzygium cumini</i>	Amrud	+	+
Moraceae	<i>Artocarpus integrifolius</i>	Phanas	+	+
Nyctageniaceae	<i>Nyctanthus arbortristis</i>	Parijat	+	+
Rhamnaceae	<i>Zizyphus jujuba</i>	Bhor	+	+
Simaroubiaceae	<i>Albanthus excelsa</i>	Maharukh	-	-
Verbenaceae	<i>Tectona grandis</i>	Sagwan	+	+
Anacardiaceae	<i>Mangifera indica</i>	Amba	+	+



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Table-2 - Fauna of Ghorawari OC

2.1 Mammals

Zoological name	Common name	(Protection) Act, 1972	Core zone	Buffer zone
<i>Presbytis</i>	Common Langoor	Shedule-II, Part I,	+	+
<i>Canis aureus</i>	Jackal	Shedule-II, Part II,	+	+
<i>Herpestes</i>	Indian Grey Mongoose	Shedule-IV, section	+	+
<i>Felis chaus</i>	Jungle cat	Shedule-II, Part II,	+	+
<i>Boselaphus</i>	Nilgai	Shedule-III, section	+	+
<i>Rattus rattus</i>	House Rat	Shedule-V, section	+	+
<i>Bandicota</i>	Indian Mouse	Shedule-V, section	+	+

2.2 Fishes

<i>Channa punefatus</i>	Maral	Not Applicable	-	+
<i>Clarias batrachus</i>	Mangur	Not Applicable	-	+
<i>Catla calla</i>	Katla	Not Applicable	-	+

2.3 Birds

<i>Apus affinis</i>	House swift	Shedule-IV, section	-	+
<i>Ardea purpurea</i>	Bhagule	Shedule-IV, section	-	+
<i>Eudynamys scolop</i>	Koel	Shedule-IV, section	+	+
<i>Carvus splendens</i>	Kavwa	Shedule-V, section	-	+
<i>Columbia livia</i>	Kabutar	Shedule-IV, section	+	+
<i>Gallus gallus</i>	Jungli Mrugi	Shedule-IV, section	+	+
<i>Pavo cristatus</i>	Peafowl	Shedule-I, Part III,	-	+
<i>Vanellus indicus</i>	Titavi	Shedule-IV, section	+	+
<i>Centropus</i>	Bhardwaj	Shedule-IV, section	-	+
<i>Prodiopsis</i>	Pandubi	Shedule-IV, section	-	-


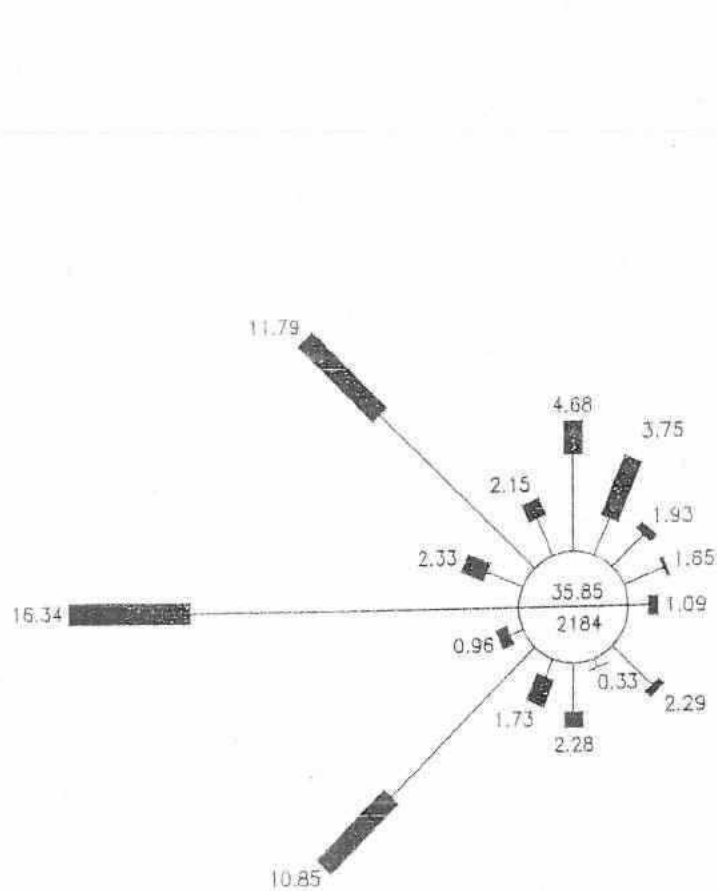

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FIG-3 : SEASONAL WINDROSE

PROJECT : GHORAWARI OCM
 LOCATION : GHORAWARI VILLAGE

SEASON : SUMMER 2006
 PERIOD : APRIL - JUNE 2006



SCALE : 1 CM = 2.5%

(NOS. IN PERCENTAGE)

WIND VELOCITY
(KMPH)

<1.0 1-4 5-11 11-19



AIR QUALITY DATA

Season : Summer 2006

Period : April '06 - June '06

Location : Core zone (A1)

Unit: $\mu\text{g}/\text{m}^3$

WEEK	DATE	SPM (24 Hrly)	RPM (24 Hrly)	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x	CO (24-hrly)
				Ist Shift	Ist Shift	II-Shift	II-Shift	III-Shift	III-Shift	24-hrly	24-hrly	
I	06/07.04.2006	346	116	8.5	13.8	8.8	14.1	8.0	12.2	8.4	13.4	<114.5
	07/08.04.2006	336	112	8.9	14.1	9.2	14.0	8.6	13.3	8.9	13.8	<114.5
II	13/14.04.2006	352	121	9.2	14.6	9.5	14.7	8.7	13.6	9.1	14.3	<114.5
	14/15.04.2006	338	115	8.5	13.9	8.8	14.3	8.2	13.0	8.5	13.7	<114.5
III	20/21.04.2006	346	117	8.7	13.1	8.9	13.8	8.0	12.4	8.5	13.1	<114.5
	21/22.04.2006	366	126	8.2	12.9	8.5	13.1	7.9	11.6	8.2	12.5	<114.5
IV	27/28.04.2006	358	122	8.6	12.0	8.8	12.5	8.1	10.9	8.5	11.8	<114.5
	28/29.04.2006	345	119	8.9	13.1	9.1	13.3	8.6	12.2	8.9	12.9	<114.5
V	04/05.05.2006	336	111	9.3	13.6	9.4	14.0	8.7	12.8	9.1	13.5	<114.5
	05/06.05.2006	342	116	9.1	13.4	9.3	13.8	8.6	12.6	9.0	13.3	<114.5
VI	11/12.05.2006	372	126	8.9	13.0	9.2	13.5	8.4	11.7	8.8	12.7	<114.5
	12/13.05.2006	386	128	9.5	14.1	9.6	14.1	8.9	12.6	9.3	13.6	<114.5
VII	18/19.05.2006	395	129	9.4	14.0	9.7	14.3	8.7	12.6	9.3	13.6	<114.5
	19/20.05.2006	386	125	9.7	14.3	9.9	14.6	8.5	12.7	9.4	13.9	<114.5
VIII	25/26.05.2006	349	118	9.6	13.8	9.8	14.1	8.6	12.2	9.3	13.4	<114.5
	26/27.05.2006	334	115	8.2	13.2	8.6	13.8	8.4	12.0	8.4	13.0	<114.5
IX	01/02.06.2006	391	132	9.5	14.1	9.4	14.3	8.7	13.3	9.2	13.9	<114.5
	02/03.06.2006	375	129	9.2	13.9	9.3	14.2	8.5	12.7	9.0	13.6	<114.5
X	08/09.06.2006	354	124	9.0	12.5	9.2	13.2	8.3	12.0	8.8	12.6	<114.5
	09/10.06.2006	335	116	8.7	12.7	9.0	13.1	8.1	12.2	8.6	12.7	<114.5
XI	15/16.06.2006	348	117	8.3	12.3	8.9	12.9	8.0	11.9	8.4	12.4	<114.5
	16/17.06.2006	328	109	8.5	12.5	8.7	12.8	7.9	11.7	8.4	12.3	<114.5
XII	22/23.06.2006	322	105	8.1	12.6	8.2	12.9	7.6	11.5	8.0	12.3	<114.5
	23/24.06.2006	330	109	8.3	12.7	8.6	12.8	7.9	11.5	8.3	12.3	<114.5

ANNEXURE -III

AIR QUALITY DATA

Location : Rawarkhurd (A2)

Season : Summer 2006

Period : April '06 - June '06

Unit $\mu\text{g}/\text{m}^3$

WEEK	DATE	SPM (24 Hrly)	RPM (24 Hrly)	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x	CC (24 hrly)
				Ist Shift	Ist Shift	II-Shift	II-Shift	III-Shift	III-Shift	24-hrly	24-hrly	
I	06/07.04.2006	95	29	4.1	7.2	4.2	7.3	4.0	6.8	4.1	7.1	<114
	07/08.04.2006	101	31	4.5	7.6	4.7	7.5	4.2	6.5	4.5	7.2	<114
II	13/14.04.2006	98	30	4.6	7.8	4.6	7.9	4.4	6.7	4.5	7.5	<114
	14/15.04.2006	94	28	5.0	8.2	5	8.3	4.8	7.2	4.9	7.9	<114
III	20/21.04.2006	105	32	4.8	7.6	4.9	7.7	4.6	6.8	4.8	7.4	<114
	21/22.04.2006	104	30	4.9	8.3	4.6	8.4	4.7	7.4	4.7	8.0	<114
IV	27/28.04.2006	96	28	4.5	7.6	4.6	7.7	4.3	7.1	4.5	7.5	<114
	28/29.04.2006	92	26	4.2	7.5	4.3	7.6	4.0	6.6	4.2	7.3	<114
V	04/05.05.2006	105	29	4.0	7.2	4.2	7.3	4.0	6.9	4.1	7.1	<114
	05/06.05.2006	116	31	4.3	7.8	4.5	7.9	4.2	7.3	4.3	7.7	<114
VI	11/12.05.2006	105	28	4.2	7.5	4.3	7.5	4.1	7.4	4.2	7.5	<114
	12/13.05.2006	112	33	4.1	7.6	4.1	7.7	4.0	6.8	4.1	7.4	<114
VII	18/19.05.2006	124	29	4.6	7.1	4.6	7.2	4.3	6.4	4.5	6.9	<114
	19/20.05.2006	108	26	4.7	6.9	4.8	7.1	4.6	6.5	4.7	6.8	<114
VIII	25/26.05.2006	96	24	4.9	6.7	4.9	6.9	4.5	6.3	4.8	6.6	<114
	26/27.05.2006	90	27	5.1	7.8	5.2	7.9	4.8	7.2	5.0	7.6	<114
IX	01/02.06.2006	86	28	5.4	8.1	5.4	8.2	4.7	7.5	5.2	7.9	<114
	02/03.06.2006	82	26	5.7	7.6	5.8	7.3	5.2	7.4	5.6	7.4	<114
X	08/09.06.2006	94	22	4.9	7.8	4.9	7.9	4.6	7.2	4.8	7.6	<114
	09/10.06.2006	92	24	5.1	6.8	5.3	6.9	4.7	6.5	5.0	6.7	<114
XI	15/16.06.2006	86	22	5.3	7.1	5.6	7.2	5.0	6.8	5.3	7.0	<114
	16/17.06.2006	94	23	5.0	6.5	5.2	6.8	4.7	6.3	5.0	6.5	<114
XII	22/23.06.2006	88	24	4.8	6.3	4.9	6.3	4.6	6.0	4.8	6.2	<114
	23/24.06.2006	82	26	4.6	6.7	4.9	6.3	4.4	6.2	4.6	6.4	<114

ANNEXURE - III

AIR QUALITY DATA

Location : Dungariya (A3)

Season : Summer 2006

Period : April '06 - June '06

Unit: $\mu\text{g}/\text{m}^3$

WEEK	DATE	SPM (24 Hrly)	RPM (24 Hrly)	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x	CO (24-hrly)
				Ist Shift	Ist Shift	II-Shift	II-Shift	III-Shift	III-Shift	24-hrly	24-hrly	
I	06/07.04.2006	116	38	4.4	7.8	4.7	7.9	4.2	7.6	4.4	7.8	<114.5
	07/08.04.2006	105	34	4.8	8.1	4.9	8.3	4.6	7.9	4.8	8.1	<114.5
II	13/14.04.2006	96	32	4.5	7.9	4.6	8.3	4.3	7.5	4.5	7.9	<114.5
	14/15.04.2006	85	31	4.3	7.5	4.7	7.6	4.2	7.4	4.4	7.5	<114.5
III	20/21.04.2006	96	33	4.4	7.2	4.9	7.4	4.5	7.0	4.6	7.2	<114.5
	21/22.04.2006	108	36	4.7	7.8	5.0	8.3	4.6	7.6	4.8	7.9	<114.5
IV	27/28.04.2006	100	34	4.8	8.4	4.9	8.6	4.5	7.9	4.7	8.3	<114.5
	28/29.04.2006	94	31	4.9	7.6	5.2	7.9	4.2	7.2	4.8	7.6	<114.5
V	04/05.05.2006	85	28	4.5	7.8	4.8	8.0	4.3	7.4	4.5	7.7	<114.5
	05/06.05.2006	100	31	4.2	7.0	4.5	7.4	4.0	6.9	4.2	7.1	<114.5
VI	11/12.05.2006	91	28	4.6	7.5	4.9	7.7	4.5	7.1	4.7	7.4	<114.5
	12/13.05.2006	94	24	4.7	7.6	4.8	7.9	4.4	7.1	4.6	7.5	<114.5
VII	18/19.05.2006	82	26	5.1	8.3	5.3	8.5	4.8	7.6	5.1	8.1	<114.5
	19/20.05.2006	88	27	4.9	7.6	5.2	7.8	4.7	7.2	4.9	7.5	<114.5
VIII	25/26.05.2006	76	26	5.3	8.6	5.6	8.7	4.7	7.9	5.2	8.4	<114.5
	26/27.05.2006	81	26	5.7	9.1	5.8	9.2	5.1	8.4	5.5	8.9	<114.5
IX	01/02.06.2006	103	31	4.8	8.4	5.3	8.8	4.4	8.0	4.8	8.4	<114.5
	02/03.06.2006	114	34	5.3	7.9	5.6	8.2	4.8	7.5	5.2	7.9	<114.5
X	08/09.06.2006	82	29	5.6	8.3	5.7	8.4	4.7	7.0	5.3	7.9	<114.5
	09/10.06.2006	84	28	5.1	8.1	5.3	8.2	4.8	7.6	5.1	8.0	<114.5
XI	15/16.06.2006	76	31	4.9	7.6	5.0	7.9	4.4	7.2	4.8	7.6	<114.5
	16/17.06.2006	92	30	4.7	7.4	4.9	7.5	4.3	6.8	4.6	7.2	<114.5
XII	22/23.06.2006	95	32	5.0	7.8	5.3	7.9	4.8	6.5	5.0	7.4	<114.5
	23/24.06.2006	81	33	4.7	7.5	4.9	7.8	4.6	6.9	4.7	7.4	<114.5

ANNEXURE - III

AIR QUALITY DATA

Season : Summer 2006

Period : April '06 - June '06

Location : Kola (A4)

Unit: $\mu\text{g}/\text{m}^3$

WEEK	DATE	SPM (24 Hrly)	RPM (24 Hrly)	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x	CO (24-hrly)
				Ist Shift	Ist Shift	II-Shift	II-Shift	III-Shift	III-Shift	24-hrly	24-hrly	
I	06/07.04.2006	94	35	4.8	8.6	4.9	8.9	4.5	8.6	4.7	8.7	<114.5
	07/08.04.2006	105	38	5.2	9.0	5.3	9.3	4.7	9.2	5.1	9.2	<114.5
II	13/14.04.2006	100	37	4.8	8.7	5.1	8.9	4.6	8.7	4.8	8.8	<114.5
	14/15.04.2006	96	34	4.7	8.6	5.0	8.7	4.4	8.5	4.7	8.6	<114.5
III	20/21.04.2006	84	32	5.3	9.3	5.4	9.1	5.1	9.2	5.3	9.2	<114.5
	21/22.04.2006	95	34	5.4	9.7	5.6	9.8	5	9.0	5.3	9.5	<114.5
IV	27/28.04.2006	115	38	4.8	9.2	5.0	9.4	4.7	8.6	4.8	9.1	<114.5
	28/29.04.2006	124	41	4.7	9.3	4.9	9.3	4.2	8.4	4.6	9.0	<114.5
V	04/05.05.2006	118	39	4.9	9.8	5.2	9.9	4.8	8.6	5.0	9.4	<114.5
	05/06.05.2006	112	36	5.1	10.1	5.4	10.4	5	9.2	5.2	9.9	<114.5
VI	11/12.05.2006	106	34	4.7	8.9	5.1	9.2	4.6	8.4	4.8	8.8	<114.5
	12/13.05.2006	95	32	4.9	9.1	4.9	9.2	4.7	8.7	4.8	9.0	<114.5
VII	18/19.05.2006	98	33	4.6	9.6	4.9	9.7	4.3	8.2	4.6	9.2	<114.5
	19/20.05.2006	88	31	5.1	9.2	5.3	9.4	4.7	7.6	5.0	8.7	<114.5
VIII	25/26.05.2006	105	36	5.6	9.4	5.7	9.6	5.1	8.1	5.5	9.0	<114.5
	26/27.05.2006	101	35	5.6	9.4	5.8	9.7	5.2	8.4	5.5	9.2	<114.5
IX	01/02.06.2006	94	32	5.4	9.2	5.6	9.4	5	8.2	5.3	8.9	<114.5
	02/03.06.2006	107	35	5.7	10.3	5.8	10.4	5.1	9.4	5.5	10.0	<114.5
X	08/09.06.2006	115	37	5.2	10.1	5.3	10.2	5.1	8.9	5.2	9.7	<114.5
	09/10.06.2006	112	38	4.9	9.6	5.1	9.7	4.6	8.4	4.9	9.2	<114.5
XI	15/16.06.2006	104	37	4.7	9.6	4.9	9.8	4.7	8.1	4.8	9.2	<114.5
	16/17.06.2006	92	34	5.0	9.2	5.3	9.3	5.00	8.0	5.1	8.8	<114.5
XII	22/23.06.2006	104	38	4.9	8.9	5.1	9.1	4.7	7.6	4.9	8.5	<114.5
	23/24.06.2006	110	39	5.3	9.3	5.4	9.4	5.1	8.2	5.3	9.0	<114.5

ANNEXURE -III

AIR QUALITY DATA

Season : Summer 2006

Period : April 06 - June 06

Location : Danuja (A5)

Unit: $\mu\text{g}/\text{m}^3$

WEEK	DATE	SPM (24 Hrly)	RPM (24 Hrly)	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x	CO (24- hrly)
				Ist Shift	Ist Shift	II-Shift	II-Shift	III-Shift	III-Shift	24-hrly	24-hrly	
I	06/07.04.2006	108	36	5.5	8.4	5.7	8.8	5.2	8.0	5.5	8.4	<114.5
	07/08.04.2006	116	38	5.1	8.8	5.3	9.0	5.1	8.7	5.2	8.8	<114.5
II	13/14.04.2006	129	39	5.2	9.1	5.2	9.4	5	8.6	5.1	9.0	<114.5
	14/15.04.2006	132	35	5.6	8.7	5.4	9.1	5.4	8.2	5.5	8.7	<114.5
III	20/21.04.2006	126	32	5.2	8.4	5.3	8.8	5	8.2	5.2	8.5	<114.5
	21/22.04.2006	120	30	5.9	8.3	6.1	8.6	5.6	8.1	5.9	8.3	<114.5
IV	27/28.04.2006	105	31	5.2	9.0	5.4	9.2	5.1	8.6	5.2	8.9	<114.5
	28/29.04.2006	134	36	6.1	9.5	6.3	9.6	5.8	9.4	6.1	9.5	<114.5
V	04/05.05.2006	126	34	5.8	9.3	5.9	9.5	5.6	9.0	5.8	9.3	<114.5
	05/06.05.2006	119	33	5.2	8.8	5.4	9.4	5.1	8.4	5.2	8.9	<114.5
VI	11/12.05.2006	121	30	5.6	8.9	5.8	9.2	5.4	8.6	5.6	8.9	<114.5
	12/13.05.2006	130	32	6.3	9.1	6.2	9.5	5.8	8.8	6.1	9.1	<114.5
VII	18/19.05.2006	125	31	6.5	9.5	6.6	9.9	6.2	9.1	6.4	9.5	<114.5
	19/20.05.2006	116	30	6.0	10.1	6.1	10.4	5.8	9.4	6.0	10.0	<114.5
VIII	25/26.05.2006	110	29	5.8	9.6	5.9	9.9	5.4	9.2	5.7	9.6	<114.5
	26/27.05.2006	108	27	5.7	9.4	6	9.4	5.3	9.0	5.7	9.3	<114.5
IX	01/02.06.2006	102	29	5.3	9.3	5.7	9.4	5.2	9.1	5.4	9.3	<114.5
	02/03.06.2006	94	27	5.0	9.0	5.4	9.2	5.1	9.0	5.2	9.1	<114.5
X	08/09.06.2006	100	31	5.3	8.4	5.6	8.9	5.0	8.3	5.3	8.5	<114.5
	09/10.06.2006	103	29	5.2	8.9	5.5	8.8	5.3	8.4	5.3	8.7	<114.5
XI	15/16.06.2006	95	29	5.0	9.1	5.3	9.3	5.1	8.6	5.1	9.0	<114.5
	16/17.06.2006	98	28	4.9	8.4	5.1	8.6	4.6	8.1	4.9	8.4	<114.5
XII	22/23.06.2006	103	32	5.3	8.6	5.5	8.7	5	8.2	5.3	8.5	<114.5
	23/24.06.2006	108	34	5.6	8.7	5.8	9.0	5.1	8.4	5.5	8.7	<114.5

ANNEXURE -III

AIR QUALITY DATA

Location :Muyari (A6)

Season : Summer 2006

Period : April '06 - June '06

Unit: $\mu\text{g}/\text{m}^3$

WEEK	DATE	SPM (24 Hrly)	RPM (24 Hrly)	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x	CO (24-hrly)
				Ist Shift	Ist Shift	II-Shift	II-Shift	III-Shift	III-Shift	24-hrly	24-hrly	
I	06/07.04.2006	104	36	5.1	8.9	5.4	9.1	5.0	8.2	5.2	8.7	<114.5
	07/08.04.2006	126	41	5.6	9.4	5.9	9.6	5.2	8.9	5.6	9.3	<114.5
II	13/14.04.2006	125	40	5.4	8.8	5.5	8.9	5.3	8.0	5.4	8.6	<114.5
	14/15.04.2006	116	38	5.3	9.2	5.4	9.2	5.0	8.4	5.2	8.9	<114.5
III	20/21.04.2006	110	37	4.7	8.1	5.1	8.8	4.9	7.6	4.9	8.2	<114.5
	21/22.04.2006	105	34	4.9	8.3	5.3	9.0	4.5	7.9	4.9	8.4	<114.5
IV	27/28.04.2006	123	38	5.1	8.6	5.5	8.7	5.0	8.1	5.2	8.5	<114.5
	28/29.04.2006	112	37	5.4	8.9	5.7	9.2	5.2	8.4	5.4	8.8	<114.5
V	04/05.05.2006	108	36	5.9	9.2	5.9	9.4	5.6	8.6	5.8	9.1	<114.5
	05/06.05.2006	105	35	6.1	9.9	6.0	10.3	5.8	9.2	6.0	9.8	<114.5
VI	11/12.05.2006	96	34	5.8	9.2	5.7	9.5	5.6	9.0	5.7	9.2	<114.5
	12/13.05.2006	104	36	5.3	9.4	5.4	9.4	5.2	8.4	5.3	9.1	<114.5
VII	18/19.05.2006	124	38	5.8	10.3	5.9	10.5	5.6	9.3	5.8	10.0	<114.5
	19/20.05.2006	130	42	6.3	10.8	6.5	11.1	5.7	9.7	6.2	10.5	<114.5
VIII	25/26.05.2006	125	38	6.5	11.1	6.4	11.4	6.0	10.0	6.3	10.8	<114.5
	26/27.05.2006	134	44	5.8	10.6	6.0	10.9	5.6	9.4	5.8	10.3	<114.5
IX	01/02.06.2006	142	46	5.2	10.3	5.5	10.5	5.1	9.2	5.3	10.0	<114.5
	02/03.06.2006	136	42	5.4	9.6	5.7	9.7	5.1	8.6	5.4	9.3	<114.5
X	08/09.06.2006	125	38	5.1	9.5	5.2	9.6	5.0	8.1	5.1	9.1	<114.5
	09/10.06.2006	114	37	5.6	8.9	5.7	8.8	5.2	7.6	5.5	8.4	<114.5
XI	15/16.06.2006	106	34	5.4	8.4	5.5	8.2	5.3	8.2	5.4	8.3	<114.5
	16/17.06.2006	100	35	5.2	8.0	5.4	8.4	5.0	7.4	5.2	7.9	<114.5
XII	22/23.06.2006	96	32	4.9	8.3	5.3	8.6	4.9	7.8	5.0	8.2	<114.5
	23/24.06.2006	87	31	4.7	7.9	4.9	8.3	4.6	7.3	4.7	7.8	<114.5

AIR QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC
YEAR : 2006
Q.E. : JUNE

1. Manager Office - Ghorawadi OC : KGOA-1

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	To	SPM	RPM	NO _x	SO ₂
MAY 2006	23.05.06	24.05.06	423.8	141.0	< 6	< 6
JUNE 2006	09.06.06	10.06.06	60.4	24.2	< 6	< 6
JUNE 2006	25.06.06	26.06.06	43.5	20.1	< 6	< 6
TLV as per Env.(Protection) Amendment Rule 2000			600	300	120	120

2. SAM Office - Ghorawadi : KGOA-2

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	To	SPM	RPM	NO _x	SO ₂
JUNE 2006	09.06.06	10.06.06	88.2	30.5	< 6	< 6
JUNE 2006	26.06.06	27.06.06	43.5	23.5	< 6	< 6
TLV as per Env.(Protection) Amendment Rule 2000			600	300	120	120

3. Colony : KGOA-3

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	- To	SPM	RPM	NO _x	SO ₂
APR. 2006	23.04.06	- 24.04.06	63.3	30.9	< 6	< 6
MAY 2006	22.05.06	- 23.05.06	80.7	23.2	< 6	< 6
JUNE 2006	09.06.06	- 10.06.06	50.3	30.0	< 6	< 6
JUNE 2006	26.06.06	- 27.06.06	97.2	53.3	< 6	< 6
PERMISSIBLE LIMIT			200	100	80	80

4. Panara Village : KGOA-4

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	- To	SPM	RPM	NO _x	SO ₂
MAY 2006	23.05.06	- 24.05.06	97.8	27.0	< 6	< 6
JUNE 2006	10.06.06	- 11.06.06	112.4	32.8	< 6	< 6
JUNE 2006	27.06.06	- 28.06.06	176.3	70.8	< 6	< 6
PERMISSIBLE LIMIT			200	100	80	80

AIR QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC

YEAR : 2006
Q.E. : SEPT.

1. Manager Office - Ghorawadi OC : KGOA-1

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	To	SPM	RPM	NO _x	SO ₂
JUL. 2006	10.07.06	- 11.07.06	85.4	56.9	< 6	< 6
JUL. 2006	24.07.06	- 25.07.06	63.2	26.7	< 6	< 6
AUG. 2006	08.08.06	- 09.08.06	40.3	21.9	< 6	< 6
AUG. 2006	24.08.06	- 25.08.06	83.3	41.4	< 6	< 6
SEP. 2006	23.09.06	- 24.09.06	47.3	33.5	< 6	< 6
TLV as per Env.(Protection) Amendment Rule 2000			600	300	120	120

2. SAM Office - Ghorawadi : KGOA-2

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	To	SPM	RPM	NO _x	SO ₂
JUL. 2006	09.07.06	- 10.07.06	103.2	64.2	< 6	< 6
JUL. 2006	24.07.06	- 25.07.06	40.1	14.1	< 6	< 6
AUG. 2006	24.08.06	- 25.08.06	29.1	15.2	< 6	< 6
SEP. 2006	22.09.06	- 23.09.06	34.8	26.4	< 6	< 6
TLV as per Env.(Protection) Amendment Rule 2000			600	300	120	120

3. Colony

: KGOA-3

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	To	SPM	RPM	NO _x	SO ₂
JUL. 2006	09.07.06	- 10.07.06	51.0	24.9	< 6	< 6
JUL. 2006	23.07.06	- 24.07.06	31.9	24.4	< 6	< 6
AUG. 2006	10.08.06	- 11.08.06	60.3	21.9	< 6	< 6
AUG. 2006	24.08.06	- 25.08.06	40.7	23.7	< 6	< 6
SEP. 2006	10.09.06	- 11.09.06	97.6	47.6	< 6	< 6
SEP. 2006	22.09.06	- 23.09.06	64.6	30.2	< 6	< 6
PERMISSIBLE LIMIT			200	100	80	80

4. Panara Village

: KGOA-4

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	To	SPM	RPM	NO _x	SO ₂
JUL. 2006	08.07.06	- 09.07.06	23.9	12.6	< 6	< 6
JUL. 2006	24.07.06	- 25.07.06	81.0	53.9	< 6	< 6
AUG. 2006	10.08.06	- 11.08.06	44.7	22.6	< 6	< 6
AUG. 2006	25.08.06	- 26.08.06	32.6	14.9	< 6	< 6
SEP. 2006	11.09.06	- 12.09.06	44.4	34.5	< 6	< 6
SEP. 2006	23.09.06	- 24.09.06	27.7	18.5	< 6	< 6
PERMISSIBLE LIMIT			200	100	80	80

AIR QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC

YEAR : 2006
Q.E. : DEC.

1. Manager Office - Ghorawadi OC : KGOA-1

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	To	SPM	RPM	NO _x	SO ₂
NOV. 2006	07.11.06	08.11.06	121.8	60.3	< 6	< 6
DEC. 2006	10.12.06	11.12.06	133.2	86.9	< 6	< 6
TLV as per Env.(Protection) Amendment Rule 2000			600	300	120	120

2. SAM Office - Ghorawadi : KGOA-2

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	To	SPM	RPM	NO _x	SO ₂
NOV. 2006	08.11.06	09.11.06	145.6	54.8	< 6	< 6
DEC. 2006	23.12.06	24.12.06	128.5	76.9	< 6	< 6
TLV as per Env.(Protection) Amendment Rule 2000			600	300	120	120

3. Colony : KGOA-3

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	- To	SPM	RPM	NO _x	SO ₂
NOV. 2006	24.11.06	- 25.11.06	178.4	89.6	< 6	< 6
DEC. 2006	23.12.06	- 24.12.06	143.3	70.6	< 6	< 6
PERMISSIBLE LIMIT			200	100	80	80

4. Panara Village : KGOA-4

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	- To	SPM	RPM	NO _x	SO ₂
NOV. 2006	08.11.06	- 09.11.06	63.9	38.0	< 6	< 6
DEC. 2006	10.12.06	- 11.12.06	122.6	63.0	< 6	< 6
PERMISSIBLE LIMIT			200	100	80	80

AIR QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC

YEAR : 2007
Q.E. : MAR.

1. Manager Office - Ghorawadi OC : KGOA-1

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	To	SPM	RPM	NO _x	SO ₂
FEB. 2007	22.02.07	23.02.07	79.2	42.0	< 6	< 6
MAR. 2007	23.03.07	24.03.07	113.0	53.5	< 6	< 6
TLV as per Env.(Protection) Amendment Rule 2000			600	300	120	120

2. SAM Office - Ghorawadi : KGOA-2

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	To	SPM	RPM	NO _x	SO ₂
FEB. 2007	09.02.07	10.02.07	133.9	64.6	< 6	< 6
MAR. 2007	22.03.07	23.03.07	77.9	38.0	< 6	< 6
TLV as per Env.(Protection) Amendment Rule 2000			600	300	120	120

3. Colony

: KGOA-3

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	To	SPM	RPM	NO _x	SO ₂
JAN. 2007	06.01.07	07.01.07	163.4	72.2	< 6	< 6
JAN. 2007	21.01.07	22.01.07	109.6	73.3	< 6	< 6
FEB. 2007	09.02.07	10.02.07	176.3	71.4	< 6	< 6
FEB. 2007	23.02.07	24.02.07	131.7	74.4	< 6	< 6
MAR. 2007	08.03.07	09.03.07	181.4	34.3	< 6	< 6
MAR. 2007	22.03.07	23.03.07	166.0	28.2	< 6	< 6
PERMISSIBLE LIMIT			200	100	80	80

4. Panara Village

: KGOA-4

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	To	SPM	RPM	NO _x	SO ₂
JAN. 2007	21.01.07	22.01.07	140.3	48.2	< 6	< 6
FEB. 2007	10.02.07	11.02.07	161.0	70.0	< 6	< 6
FEB. 2007	22.02.07	23.02.07	169.1	54.1	< 6	< 6
MAR. 2007	08.03.07	09.03.07	175.9	59.8	< 6	< 6
MAR. 2007	23.03.07	24.03.07	143.5	55.9	< 6	< 6
PERMISSIBLE LIMIT			200	100	80	80

CO MONITORING DATA

(All values are given in $\mu\text{g}/\text{m}^3$)

Sl. No.	Monitoring Location	Monitoring Date	Observed Value	NAAQ Standards (1 hour)
1.	Manager office – Jharna UG	08.03.07	< 114.3	10000
2.	SAM office - Ghorawari	08.03.07	< 114.3	10000
3.	Colony	08.03.07	< 114.3	4000
4.	Panara village	08.03.07	< 114.3	4000

AIR QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC
YEAR : 2007
Q.E. : JUNE

1. Manager Office - Ghorawadi OC : KGOA-1

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	To	SPM	RPM	NO _x	SO ₂
MAY 2007	24.05.07	25.05.07	183	92	< 6	< 6
JUN. 2007	26.06.07	27.06.07	247	95	< 6	< 6
TLV as per Env.(Protection) Amendment Rule 2000			600	300	120	120

2. SAM Office - Ghorawadi : KGOA-2

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	To	SPM	RPM	NO _x	SO ₂
APR. 2007	05.04.07	06.04.07	156	52	< 6	< 6
JUN. 2007	09.06.07	10.06.07	228	48	< 6	< 6
TLV as per Env.(Protection) Amendment Rule 2000			600	300	120	120

3. Colony : KGOA-3

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	- To	SPM	RPM	NO _x	SO ₂
APR. 2007	06.04.07	- 07.04.07	137	61	< 6	< 6
APR. 2007	23.04.07	- 24.04.07	151	67	< 6	< 6
MAY 2007	06.05.07	- 07.05.07	152	54	< 6	< 6
MAY 2007	24.05.07	- 25.05.07	118	57	< 6	< 6
JUN. 2007	26.06.07	- 27.06.07	166	83	< 6	< 6
PERMISSIBLE LIMIT			200	100	80	80

4. Panara Village : KGOA-4

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	- To	SPM	RPM	NO _x	SO ₂
APR. 2007	07.04.07	- 08.04.07	177	70	< 6	< 6
APR. 2007	22.04.07	- 23.04.07	100	46	< 6	< 6
MAY 2007	06.05.07	- 07.05.07	153	64	< 6	< 6
MAY 2007	24.05.07	- 25.05.07	168	61	< 6	< 6
JUN. 2007	09.06.07	- 10.06.07	162	70	< 6	< 6
PERMISSIBLE LIMIT			200	100	80	80

AIR QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC

YEAR : 2007
Q.E. : SEP.

1. Manager Office - Ghorawadi OC : KGOA-1

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	To	SPM	RPM	NO _x	SO ₂
AUG. 2007	05.08.07	06.08.07	94	37	< 6	< 6
SEP. 2007	07.09.07	08.09.07	35	21	< 6	< 6
TLV as per Env.(Protection) Amendment Rule 2000			600	300	120	120

2. SAM Office - Ghorawadi : KGOA-2

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	To	SPM	RPM	NO _x	SO ₂
JUL. 2007	22.07.07	23.07.07	103	68	< 6	< 6
SEP. 2007	24.09.07	25.09.07	63	39	< 6	< 6
TLV as per Env.(Protection) Amendment Rule 2000			600	300	120	120

3. Colony

: KGOA-3

(24 hourly values in $\mu\text{g}/\text{m}^3$)

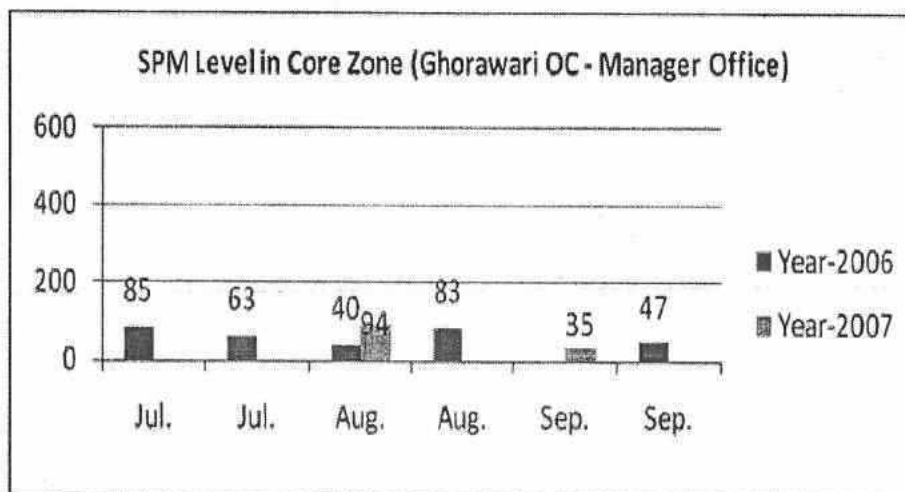
Month	Dates of Sampling			Parameters			
	From	-	To	SPM	RPM	NO _x	SO ₂
JUL. 2007	22.07.07	-	23.07.07	128	21	< 6	< 6
AUG. 2007	05.08.07	-	06.08.07	125	62	< 6	< 6
AUG. 2007	20.08.07	-	21.08.07	91	28	< 6	< 6
SEP. 2007	06.09.07	-	07.09.07	92	36	< 6	< 6
SEP. 2007	24.09.07	-	25.09.07	84	49	< 6	< 6
PERMISSIBLE LIMIT				200	100	80	80

4. Panara Village

: KGOA-4

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling			Parameters			
	From	-	To	SPM	RPM	NO _x	SO ₂
JUL. 2007	10.07.07	-	11.07.07	94	38	< 6	< 6
JUL. 2007	22.07.07	-	23.07.07	50	20	< 6	< 6
AUG. 2007	05.08.07	-	06.08.07	129	81	< 6	< 6
AUG. 2007	21.08.07	-	22.08.07	81	25	< 6	< 6
SEP. 2007	06.09.07	-	07.09.07	57	41	< 6	< 6
SEP. 2007	23.09.07	-	24.09.07	42	18	< 6	< 6
PERMISSIBLE LIMIT				200	100	80	80



AIR QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC

YEAR : 2007
Q.E. : DEC.

1. Manager Office - Ghorawadi OC : KGOA-1

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	To	SPM	RPM	NO _x	SO ₂
OCT. 2007	07.10.07	08.10.07	102	35	< 6	< 6
DEC. 2007	08.12.07	09.12.07	150	58	< 6	< 6
TLV as per Env.(Protection) Amendment Rule 2000			600	300	120	120

2. SAM Office - Ghorawadi : KGOA-2

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	To	SPM	RPM	NO _x	SO ₂
NOV. 2007	04.11.07	05.11.07	296	96	< 6	< 6
DEC. 2007	07.12.07	08.12.07	150	68	< 6	< 6
TLV as per Env.(Protection) Amendment Rule 2000			600	300	120	120

3. Colony

: KGOA-3

(24 hourly values in $\mu\text{g}/\text{m}^3$)

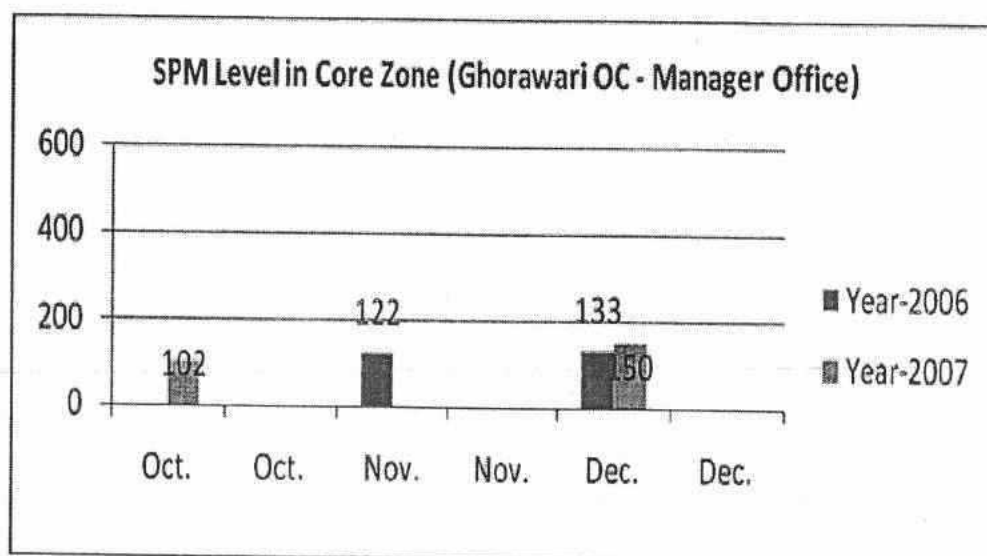
Month	Dates of Sampling			Parameters			
	From	-	To	SPM	RPM	NO _x	SO ₂
OCT. 2007	06.10.07	-	07.10.07	125	40	< 6	< 6
OCT. 2007	24.10.07	-	25.10.07	161	58	< 6	< 6
NOV. 2007	03.11.07	-	04.11.07	121	48	< 6	< 6
DEC. 2007	08.12.07	-	09.12.07	149	51	< 6	< 6
DEC. 2007	23.12.07	-	24.12.07	82	12	< 6	< 6
PERMISSIBLE LIMIT				200	100	80	80

4. Panara Village

: KGOA-4

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling			Parameters			
	From	-	To	SPM	RPM	NO _x	SO ₂
OCT. 2007	25.10.07	-	26.10.07	108	22	< 6	< 6
NOV. 2007	03.11.07	-	04.11.07	94	18	< 6	< 6
NOV. 2007	23.11.07	-	24.11.07	136	40	< 6	< 6
DEC. 2007	23.12.07	-	24.12.07	82	12	< 6	< 6
PERMISSIBLE LIMIT				200	100	80	80



AIR QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC

YEAR : 2008
Q.E. : MAR.

1. Manager Office - Ghorawadi OC : KGOA-1

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	To	SPM	RPM	NO _x	SO ₂
FEB. 2008	08.02.08	09.02.08	193	83	< 6	< 6
MAR. 2008	07.03.08	08.03.08	105	52	< 6	< 6
TLV as per Env.(Protection) Amendment Rule 2000			600	300	120	120

2. SAM Office - Ghorawadi : KGOA-2

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	To	SPM	RPM	NO _x	SO ₂
FEB. 2008	08.02.08	09.02.08	155	75	< 6	< 6
MAR. 2008	27.03.08	28.03.08	130	58	< 6	< 6
TLV as per Env.(Protection) Amendment Rule 2000			600	300	120	120

3. Colony

: KGOA-3

(24 hourly values in $\mu\text{g}/\text{m}^3$)

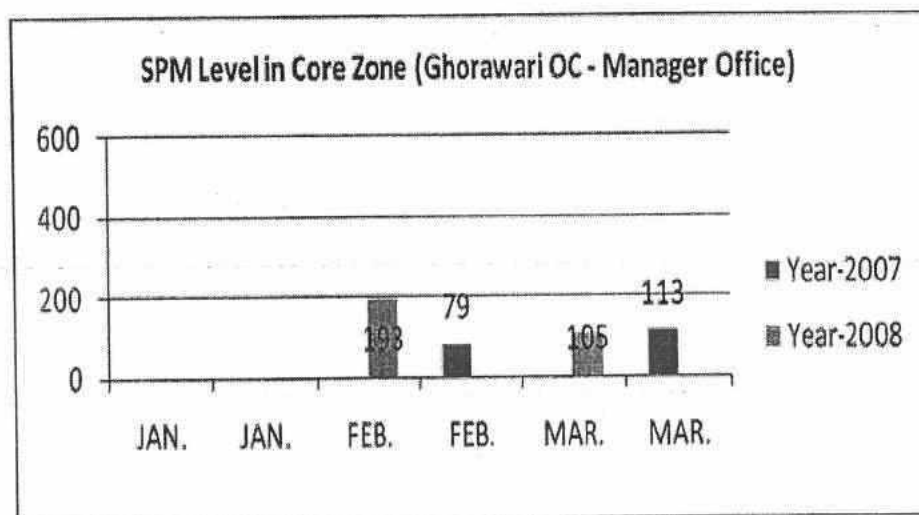
Month	Dates of Sampling		Parameters			
	From	To	SPM	RPM	NO _x	SO ₂
JAN. 2008	07.01.08	08.01.08	68	30	< 6	< 6
JAN. 2008	19.01.08	20.01.08	76	31	< 6	< 6
FEB. 2008	07.02.08	08.02.08	101	47	< 6	< 6
FEB. 2008	19.02.08	20.02.08	103	50	< 6	< 6
MAR. 2008	06.03.08	07.03.08	105	47	< 6	< 6
MAR. 2008	27.03.08	28.03.08	108	46	< 6	< 6
PERMISSIBLE LIMIT			200	100	80	80

4. Panara Village

: KGOA-4

(24 hourly values in $\mu\text{g}/\text{m}^3$)

Month	Dates of Sampling		Parameters			
	From	To	SPM	RPM	NO _x	SO ₂
JAN. 2008	19.01.08	20.01.08	141	63	< 6	< 6
FEB. 2008	07.02.08	08.02.08	167	80	< 6	< 6
FEB. 2008	19.02.08	20.02.08	97	47	< 6	< 6
MAR. 2008	07.03.08	08.03.08	177	82	< 6	< 6
MAR. 2008	27.03.08	28.03.08	161	81	< 6	< 6
PERMISSIBLE LIMIT			200	100	80	80



CO MONITORING DATA

(All values are given in $\mu\text{g}/\text{m}^3$)

Sl. No.	Monitoring Location	Monitoring Date	Observed Value	NAAQ Standards (1 hour)
1.	Manager office – Ghorawari OC	27.03.08	< 114.3	10000
2.	SAM office - Ghorawari	27.03.08	< 114.3	10000
3.	Colony	27.03.08	< 114.3	4000
4.	Panara village	27.03.08	< 114.3	4000

MINE/WASTE WATER QUALITY DATA (Summer 2006)

Location : Mine effluent

S. No	Parameter	Unit	Result		General Standards for discharge of Effluents into Inland Surface water GSR 422(E)
			Date of Sampling	20.04.2006	20.06.06
1	Colour	Pt-Co		20	10
2	Suspended Solids	mg/l		18	24
3	Particle size of suspended solids	Shall pass 850 micron ISI sieve		100% are passing through 850 micron ISI sieve	
4	Dissolved solids (inorganic)	mg/l		1050	1140
5	pH	-		7.35	7.50
6	Temperature	°C		31.5	32.0
7	Oil & Grease	mg/l		Nil	Nil
8	Total residual chlorine	mg/l		Nil	Nil
9	Ammonical Nitrogen (as N)	mg/l		0.42	0.61
10	Kjeldahl nitrogen	mg/l		1.46	1.74
11	Free ammonia (as NH ₃)	mg/l		Nil	Nil
12	BOD - 3 Days at 27°C	mg/l		4	8
13	COD	mg/l		20	24
14	Arsenic (as As)	mg/l		<0.01	<0.01
15	Mercury (as Hg)	mg/l		<0.001	<0.001
16	Lead (as Pb)	mg/l		<0.01	<0.01
17	Cadmium (as Cd)	mg/l		<0.01	<0.01
18	Hexavalent Chromium (as Cr ⁶⁺)	mg/l		<0.001	<0.001
19	Total Chromium	mg/l		<0.001	<0.001
20	Copper (as Cu)	mg/l		<0.001	<0.001
21	Zinc (as Zn)	mg/l		<0.01	<0.01
22	Selenium (as Se)	mg/l		<0.01	<0.01
23	Nickel (as Ni)	mg/l		<0.01	<0.01
24	Boron (as B)	mg/l		<0.01	<0.01
25	Percent Sodium	mg/l		29.54	30.15
26	Residual Sodium Carbonate	mg/l		Nil	Nil
27	Cyanides (as CN)	mg/l		Nil	Nil
28	Chloride (as Cl)	mg/l		360	380
29	Fluorides (as F)	mg/l		0.12	0.18
30	Dissolved Phosphates (as PO ₄)	mg/l		0.08	0.08
31	Sulphates (as SO ₄)	mg/l		102	115
32	Sulphides (as S)	mg/l		Nil	Nil
33	Phenols (as C ₆ H ₅ OH)	mg/l		Nil	Nil
34	Bio-assay test	90% survival of fish after 96 hours in 100% effluent		100% survival of fish after 96 hours in 100% effluent	
35	Manganese (as mn)	mg/l		Nil	Nil
36	Iron (as Fe ⁺²)	mg/l		0.74	0.61
37	Vanadium (as V)	mg/l		Nil	Nil
38	Nitrate Nitrogen	mg/l		0.68	0.54

GROUND WATER QUALITY DATA (Summer 2006)

Sampling Date 10.05.2006

S.N o.	Parameter	Unit	Result		IS: 10500-1991 Norms
			Borewell - Nimdana	Borewell - Gkorawari kalan	
1	pH	-	7.59	7.65	6.5 - 8.5
2	Colour	Hazen Units	<5	<5	10
3	Temperature	°C	30.5	30.5	-
4	Turbidity	NTU	6	7	10
5	Total suspended solids	mg/l	<2	<2	-
6	Total dissolved solids	mg/l	395	1105	500
7	Total volatile solids	mg/l	-	-	-
8	Dissolved Oxygen	mg/l	4.22	4.10	-
9	BOD - 3 days at 27°C	mg/l	<2	<2	-
10	COD	mg/l	10	14	-
11	Oil & grease	mg/l	Nil	Nil	-
12	Residual chlorine	mg/l	Nil	Nil	0.2
13	Chloride (as Cl)	mg/l	60	233	250
14	Flouride (as F)	mg/l	0.08	0.03	1.0
15	Sulphate (as SO ₄)	mg/l	17	105	200
16	Sulphide (as S)	mg/l	Nil	Nil	-
17	Cyanide (as CN)	mg/l	Nil	Nil	0.05
18	Insecticides/pesticides	mg/l	Nil	Nil	Absent
19	Phenols (as C ₆ H ₅ OH)	mg/l	<0.001	<0.001	0.001
20	Chromium (as Cr)	mg/l	<0.01	<0.01	0.05
21	Copper (as Cu)	mg/l	<0.01	<0.01	0.05
22	Selenium (as Se)	mg/l	<0.01	<0.01	0.01
22	Arsenic (as As)	mg/l	<0.01	<0.01	0.05
23	Barium (as Ba)	mg/l	<0.01	<0.01	-
24	Cadmium	mg/l	<0.01	<0.01	0.01
25	Nickel (as Ni)	mg/l	<0.01	<0.01	-
26	Boron (as B)	mg/l	<0.01	<0.01	-
27	Mercury (as Hg)	mg/l	<0.001	<0.001	0.001
28	Silver (as Ag)	mg/l	<0.01	<0.01	-
29	Lead (as Pb)	mg/l	<0.01	<0.01	0.05
30	Zinc (as Pb)	mg/l	0.04	0.04	5
31	Alkalinity to phenolphthalein	mg/l	Nil	Nil	-
32	Alkalinity to methyl orange	mg/l	180	350	200
33	Iron (as Fe)	mg/l	0.09	0.04	0.3
34	Total Hardness	mg/l	170	393	300
	Temporary Hardness		180	350	-
	Permanent Hardness		-	-	-
35	Calcium (as Ca)	mg/l	44	92	75
36	Magnesium (as Mg)	mg/l	14	39	30
37	Total Nitrogen (as N)	mg/l	Nil	Nil	-
38	Percent sodium	%	36.79	39.15	-
39	Coliform organisms	MPN/100ml	-0-	-0-	Absent
40	Sodium (as Na)	mg/l	49	146	200
41	Potassium (as K)	mg/l	12	81	-

SURFACE WATER QUALITY DATA (Summer 2006)

ANNEXURE -Y

Sampling Date : 15.05.2006

Sl. No.	Parameter	Unit	Kanhan river U/s	Kanhan River D/s	IS:2296-1982 Tolerance limits for Inland Surface water (Class C)
1	pH	-	7.55	7.68	6.5 - 8.5
2	Colour	Hazen Units	25	38	300
3	Temperature	°C	30.0	31.5	-
4	Turbidity	NTU	34	44	-
5	Total suspended solids	mg/l	22	30	-
6	Total dissolved solids	mg/l	590	640	1500
7	Total volatile solids	mg/l	12	13	-
8	Dissolved Oxygen	mg/l	5.34	5.11	4.0
9	BOD - 3 days, 27°C	mg/l	3	3	3.0
10	COD	mg/l	14	20	-
11	Oil & grease	mg/l	Nil	Nil	-
12	Residual chlorine	mg/l	Nil	Nil	-
13	Chloride (as Cl)	mg/l	80	104	600
14	Flouride (as F)	mg/l	0.20	0.24	1.5
15	Sulphate (as SO ₄)	mg/l	16	22	400
16	Sulphide (as S)	mg/l	Nil	Nil	-
17	Cyanide (as CN)	mg/l	<0.01	<0.01	0.05
18	Insecticides/pesticides	mg/l	Nil	Nil	Absent
19	Phenols (as C ₆ H ₅ OH)	mg/l	<0.001	<0.001	0.005
20	Chromium (as Cr)	mg/l	<0.01	<0.01	0.05
21	Copper (as Cu)	mg/l	<0.01	<0.01	1.5
22	Selenium (as Se)	mg/l	<0.01	<0.01	0.05
22	Arsenic (as As)	mg/l	<0.01	<0.01	0.2
23	Barium (as Ba)	mg/l	<0.01	<0.01	-
24	Cadmium	mg/l	<0.01	<0.01	0.01
25	Nickel (as Ni)	mg/l	<0.01	<0.01	-
26	Boron (as B)	mg/l	<0.01	<0.01	-
27	Mercury (as Hg)	mg/l	<0.001	<0.001	-
28	Silver (as Ag)	mg/l	<0.01	<0.01	-
29	Lead (as Pb)	mg/l	<0.01	<0.01	0.1
30	Zinc (as Pb)	mg/l	0.08	0.12	15
31	Alkalinity to phenolphthalein	mg/l	Nil	Nil	-
32	Alkalinity to methyl orange	mg/l	322	344	-
33	Iron (as Fe)	mg/l	1.11	1.40	50
35	Calcium (as Ca)	mg/l	62	82	-
36	Magnesium (as Mg)	mg/l	21	25	-
37	Total Nitrogen (as N)	mg/l	0.12	0.21	-
38	Percent sodium	%	28.87	26.56	-
39	Coliform organisms	MPN/100ml	<1100	<1100	5000
40	Sodium (as Na)	mg/l	48	42	-
41	Potassium (as K)	mg/l	30	28	-

EFFLUENT WATER QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC

YEAR : 2006
Q.E. : JUNE

Name of the Location : Mine water discharge - KGOW-1

Month	Date of Sample collection	Analysis Results			
		pH	TSS (mg/l)	COD (mg/l)	O & G (mg/l)
MAY 2006	23.05.06	6.75	90	140	BDL
TLV as per Env. (Protection) Amendment rule 2000		5.5 – 9.0	100	250	10

(BDL - Below Detectable Level- Value < 1.0 mg/l)

EFFLUENT WATER QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC

YEAR : 2006
Q.E. : SEPT.

Name of the Location : Mine water discharge - KGOW-1

Month	Date of Sample collection	Analysis Results			
		pH	TSS (mg/l)	COD (mg/l)	O & G (mg/l)
AUG. 2006	10.08.06	7.20	34	60	BDL
AUG. 2006	23.08.06	7.40	24	40	BDL
SEP. 2006	11.09.06	7.88	42	60	BDL
TLV as per Env. (Protection) Amendment rule 2000		5.5 – 9.0	100	250	10

(BDL - Below Detectable Level- Value < 1.0 mg/l)

EFFLUENT WATER QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC
YEAR : 2006
Q.E. : DEC.
DATE : 26.10.06

1. Name of the Location : Mine water discharge - KJOW-1

Sl. No.	Parameters	Analysis Results	Standards for discharge Part A, Schedule VI
1	pH	6.50	5.5 – 9.0
2	Temperature ($^{\circ}\text{C}$)	27.9	$T_e < T_s + 5^{\circ}\text{C}$
3	Colour (Hz)	7	*
4	Odour	Unobject.	Unobjectionable
5	Turbidity (NTU)	3	*
6	Conductivity (us/cm)	1290	*
7	Total Suspended Solids (mg/l)	12	100
8	Total Dissolved Solids (mg/l)	902	*
9	Oil & Grease (mg/l)	BDL	10
10	Dissolved Oxygen (mg/l)	3.9	*
11	C.O.D. (mg/l)	30	250
12	B.O.D. 3 days at 27°C (mg/l)	< 5	30
13	Total Residual Chlorine (mg/l)	BDL	1 (Max.)
14	Ammonical Nitrogen (mg/l)	0.03	50
15	Total kjeldahl Nitrogen (mg/l)	2.98	100
16	Free Ammonia (mg/l)	BDL	5.0
17	Arsenic (mg/l)	BDL	0.2
18	Lead (mg/l)	BDL	0.1
19	Cadmium (mg/l)	BDL	2
20	Hexavalent Chromium (mg/l)	BDL	0.1
21	Total Chromium (mg/l)	BDL	2
22	Copper (mg/l)	BDL	3
23	Zinc (mg/l)	BDL	5
24	Selenium (mg/l)	BDL	0.05
25	Nickel (mg/l)	BDL	3
26	Fluoride (mg/l)	1.47	2
27	Dissolved Phosphate (mg/l)	0.01	5
28	Sulphide (mg/l)	0.01	2
29	Iron (mg/l)	0.10	3
30	Manganese (mg/l)	BDL	2
31	Vanadium (mg/l)	BDL	0.2
32	Nitrate Nitrogen (mg/l)	2.1	10
33	Sulphate (mg/l)	444	*
34	Chloride (mg/l)	14	*
35	Phenolics Compounds (mg/l)	BDL	1

1. BDL - Below Detectable Level, 2. * - Limit not specified.

EFFLUENT WATER QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC

YEAR : 2007
Q.E. : MAR.

Name of the Location : Mine water discharge - KGOW-1

Month	Date of Sample collection	Analysis Results			
		pH	TSS (mg/l)	COD (mg/l)	O & G (mg/l)
JAN. 2007	21.01.07	7.11	42	60	BDL
FEB. 2007	23.02.07	6.96	54	80	BDL
TLV as per Env.(Protection) Amendment rule 2000		5.5 - 9.0	100	250	10

(BDL - Below Detectable Level- Value < 1.0 mg/l)

DRINKING WATER QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC

YEAR : 2007
Q.E. : JUNE
DATE : 23.05.2007

Name of the Location : Drinking water

Sl. No.	Parameter	Analysis Result	Standard (IS 10500 : 1991)	
			Desirable limit	Permissible limit in the absence of alternate source
1.	Colour (Hazen)	9	5	25
2.	Odour	Unobjectionable	Unobjectionable	-
3.	Taste	Agreeable	Agreeable	-
4.	Turbidity (NTU)	5	5	10
5.	pH value	7.20	6.5 to 8.5	No relaxation
6.	Total Hardness(as CaCO ₃) (mg/l)	368	300	600
7.	Iron (mg/l)	BDL	0.3	1.0
8.	Chlorides (mg/l)	22	250	1000
9.	Residual, Free Chlorine (mg/l)	0.04	0.2	-
10.	Dissolved Solids (mg/l)	480	500	2000
11.	Calcium (mg/l)	112	75	200
12.	Copper (mg/l)	BDL	0.05	1.5
13.	Manganese (mg/l)	BDL	0.1	0.3
14.	Sulphate (mg/l)	46	200	400
15.	Nitrate (mg/l)	12	45	100
16.	Fluoride (mg/l)		1.0	1.5
17.	Mercury (mg/l)	BDL	0.001	No relaxation
18.	Cadmium (mg/l)	BDL	0.01	No relaxation
19.	Selenium (mg/l)	BDL	0.01	No relaxation
20.	Arsenic (mg/l)	BDL	0.05	No relaxation
21.	Lead (mg/l)	BDL	0.05	No relaxation
22.	Zinc (mg/l)	BDL	5	15
23.	Chromium (Cr ⁶⁺) (mg/l)	BDL	0.05	No relaxation
24.	Alkalinity (mg/l)	48	200	600
25.	Aluminium (mg/l)	BDL	0.03	0.2
26.	Boron (mg/l)	BDL	1	5
27.	Phenolic Compounds (mg/l)	BDL	0.001	0.002
28.	Coliform (MPN / 100 ml)	NIL	Shall be absent	-

(BDL – Below Detectable Limit)

EFFLUENT WATER QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC

YEAR : 2007
Q.E. : SEP

Name of the Location : Mine water discharge - KJUW-1

Month	Date of Sample collection	Analysis Results			
		pH	TSS (mg/l)	COD (mg/l)	O & G (mg/l)
JUL. 2007	23.07.07	7.65	36	60	BDL
SEP. 2007	23.09.07	7.42	30	50	BDL
TLV as per Env. (Protection) Amendment rule 2000		5.5 – 9.0	100	250	10

(BDL - Below Detectable Level- Value < 1.0 mg/l)

EFFLUENT WATER QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC

YEAR : 2007
Q.E. : DEC.

Name of the Location : Mine water discharge - KJOW-1

Month	Date of Sample collection	Analysis Results			
		pH	TSS (mg/l)	COD (mg/l)	O & G (mg/l)
NOV. 2007	04.11.07	7.43	34	60	BDL
NOV. 2007	24.11.07	7.24	44	80	BDL
DEC. 2007	08.12.07	7.54	24	40	BDL
DEC. 2007	23.12.07	7.08	58	80	BDL
TLV as per Env. (Protection) Amendment rule 2000		5.5 – 9.0	100	250	10

(BDL - Below Detectable Level- Value < 1.0 mg/l)

EFFLUENT WATER QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC
YEAR : 2007
DATE : 23.12.07

1. Name of the Location : Mine water discharge - KJOW-1

Sl. No.	Parameters	Analysis Results	Standards for discharge Part A, Schedule VI
1	pH	7.08	5.5 – 9.0
2	Temperature ($^{\circ}$ C)	21.5	$T_e < T_s + 5^{\circ}$ C
3	Colour (Hz)	Acceptable	*
4	Odour	Unobject.	Unobjectionable
5	Turbidity (NTU)	6	*
6	Conductivity (us/cm)	820	*
7	Total Suspended Solids (mg/l)	58	100
8	Total Dissolved Solids (mg/l)	534	*
9	Oil & Grease (mg/l)	BDL	10
10	Dissolved Oxygen (mg/l)	4.6	*
11	C.O.D. (mg/l)	80	250
12	B.O.D. 3 days at 27° C (mg/l)	5	30
13	Total Residual Chlorine (mg/l)	BDL	1 (Max.)
14	Ammonical Nitrogen (mg/l)	0.1	50
15	Total kjeldahl Nitrogen (mg/l)	3.18	100
16	Free Ammonia (mg/l)	BDL	5.0
17	Arsenic (mg/l)	BDL	0.2
18	Lead (mg/l)	BDL	0.1
19	Hexavalent Chromium (mg/l)	BDL	0.1
20	Total Chromium (mg/l)	BDL	2
21	Copper (mg/l)	BDL	3
22	Zinc (mg/l)	0.1	5
23	Selenium (mg/l)	BDL	0.05
24	Nickel (mg/l)	BDL	3
25	Fluoride (mg/l)	0.51	2
26	Dissolved Phosphate (mg/l)	0.08	5
27	Sulphide (mg/l)	0.01	2
28	Iron (mg/l)	BDL	3
29	Manganese (mg/l)	BDL	2
30	Nitrate Nitrogen (mg/l)	2.1	10
31	Sulphate (mg/l)	154	*
32	Chloride (mg/l)	24	*
33	Phenolics Compounds (mg/l)	BDL	1

1. BDL - Below Detectable Level, 2. * - Limit not specified.

EFFLUENT WATER QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC

YEAR : 2008
Q.E. : MAR.

Name of the Location : Mine water discharge - KJOW-1

Month	Date of Sample collection	Analysis Results			
		pH	TSS (mg/l)	COD (mg/l)	O & G (mg/l)
JAN. 2008	19.01.08	7.31	46	80	BDL
FEB. 2008	08.02.08	7.52	80	120	BDL
FEB. 2008	22.02.08	7.10	60	80	BDL
MAR. 2008	07.03.08	7.70	32	50	BDL
MAR. 2008	27.03.08	7.32	26	40	BDL
TLV as per Env.(Protection) Amendment rule 2000		5.5 - 9.0	100	250	10

(BDL - Below Detectable Level- Value < 1.0 mg/l)

NOISE LEVEL DATA

Season : Summer 2006
 Location : Core Zone (N1)
 Sampling Date : 27.05.2006

Sl. No.	Time (Hrs.)		L _{eq} Noise Level, dB(A)	Peak Noise Level, dB(A)
1	Day	06-10	61.4	65.2
2		10-14	63.2	67.6
3		14-18	61.7	64.9
4	Night	18-22	50.5	54.7
5		22-02	52.0	55.8
6		02-06	51.5	54.9

Richardson & Cruddas (1972) Ltd.

NOISE LEVEL DATA

Season : Summer 2006
 Location : Rawarkhund village (N2)
 Sampling Date : 27.05.2006

Sl. No.	Time (Hrs.)		L _{eq} Noise Level, dB(A)	Peak Noise Level, dB(A)
1	Day	06-10	42.4	44.8
2		10-14	43.5	47.2
3		14-18	44.8	48.3
4	Night	18-22	41.2	43.2
5		22-02	36.4	38.3
6		02-06	37.1	38.7

Richardson & Cruddas (1972) Ltd.

NOISE LEVEL DATA

Season : Summer 2006
 Location : Dungariya village (N3)
 Sampling Date : 27.05.2006

Sl. No.	Time (Hrs.)		L _{eq} Noise Level, dB(A)	Peak Noise Level, dB(A)
1	Day	06-10	41.8	43.5
2		10-14	43.4	45.7
3		14-18	45.6	47.9
4	Night	18-22	40.9	42.6
5		22-02	36.5	37.9
6		02-06	37.2	38.8

Richardson & Cruddas (1972) Ltd.

NOISE LEVEL DATA

Season : Summer 2006
 Location : Kola Village (N4)
 Sampling Date : 28.05.2006

Sl. No.	Time (Hrs.)		L _{eq} Noise Level, dB(A)	Peak Noise Level, dB(A)
1	Day	06-10	42.6	44.5
2		10-14	43.8	45.9
3		14-18	45.4	47.7
4	Night	18-22	41.3	43.2
5		22-02	36.8	38.2
6		02-06	37.2	39.4

Richardson & Cruddas (1972) Ltd.

NOISE LEVEL DATA

Season : Summer 2006
 Location : Danuja Village (N5)
 Sampling Date : 28.05.2006

Sl. No.	Time (Hrs.)		L _{eq} Noise Level, dB(A)	Peak Noise Level, dB(A)
1	Day	06-10	41.8	43.9
2		10-14	43.2	45.7
3		14-18	45.4	47.8
4	Night	18-22	40.8	42.6
5		22-02	36.8	38.4
6		02-06	37.3	39.2

Richardson & Cruddas (1972) Ltd.

NOISE LEVEL DATA

Season : Summer 2006
 Location Name : Muyari Village (N6)
 Sampling Date : 28.05.2006

Sl. No.	Time (Hrs.)		L _{eq} Noise Level, dB(A)	Peak Noise Level, dB(A)
1	Day	08-10	42.8	45.2
2		10-14	43.9	46.7
3		14-18	45.8	48.6
4	Night	18-22	41.2	43.4
5		22-02	36.6	38.7
6		02-06	37.2	39.5

Richardson & Cruddas (1972) Ltd.

NOISE LEVEL DATA

Season : Summer 2006
 Location Name : Bijori Village (N7)
 Sampling Date : 28.05.2006

Sl. No.	Time (Hrs.)		L _{eq} Noise Level, dB(A)	Peak Noise Level, dB(A)
1	Day	06-10	41.8	43.4
2		10-14	42.7	45.3
3		14-18	44.8	47.5
4	Night	18-22	40.9	42.6
5		22-02	36.4	37.8
6		02-06	37.2	38.9

Richardson & Cruddas (1972) Ltd.

NOISE LEVEL DATA

Season : Summer 2006
 Location Name : Junardey Village (N8)
 Sampling Date : 28.05.2006

Sl. No.	Time (Hrs.)		L _{eq} Noise Level, dB(A)	Peak Noise Level, dB(A)
1	Day	06-10	41.4	42.8
2		10-14	42.9	45.5
3		14-18	44.6	47.7
4	Night	18-22	40.8	42.3
5		22-02	36.5	38.2
6		02-06	37.1	39.6

Richardson & Cruddas (1972) Ltd.

NOISE LEVEL DATA

Season : Summer 2006
 Location : Minoriya Village (N9)
 Sampling Date : 28.05.2006

Sl. No.	Time (Hrs.)		L _{eq} Noise Level, dB(A)	Peak Noise Level, dB(A)
1	Day	06-10	41.7	42.3
2		10-14	42.9	44.6
3		14-18	45.6	47.9
4	Night	18-22	40.7	42.6
5		22-02	36.7	38.5
6		02-06	37.3	39.8

Richardson & Cruddas (1972) Ltd.

NOISE LEVEL DATA

Season : Summer 2006
 Location : Markadhana Village - (N10)
 Sampling Date : 27.05.2006

Sl. No.	Time (Hrs.)		L_{eq} Noise Level, dB(A)	Peak Noise Level, dB(A)
1	Day	06-10	42.9	44.7
2		10-14	43.3	46.5
3		14-18	45.4	48.6
4	Night	18-22	41.3	42.8
5		22-02	36.7	38.9
6		02-06	37.2	39.4

Richardson & Cruddas (1972) Ltd.

NOISE LEVEL DATA

Season : Summer 2006
 Location : Biripura Village (N11)
 Sampling Date : 27.05.2006

Sl. No.	Time (Hrs.)		L _{eq} Noise Level, dB(A)	Peak Noise Level, dB(A)
1	Day	06-10	41.4	43.4
2		10-14	42.4	45.3
3		14-18	46.3	48.3
4	Night	18-22	39.2	41.3
5		22-02	36.9	38.3
6		02-06	38.3	40.1

Richardson & Cruddas (1972) Ltd.

NOISE LEVEL DATA

Season : Summer 2006
 Location : Chikalbarri Village (N12)
 Sampling Date : 28.05.2006

Sl. No.	Time (Hrs.)		L _{eq} Noise Level, dB(A)	Peak Noise Level, dB(A)
1	Day	06-10	41.0	45.1
2		10-14	42.0	46.9
3		14-18	43.5	46.5
4	Night	18-22	39.5	41.3
5		22-02	38.5	40.3
6		02-06	40.1	42.3

Richardson & Cruddas (1972) Ltd.

NOISE LEVEL DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC
YEAR : 2006
Q.E. : JUNE

Name of the Location : Manager Office - KGON-1

Month	Date of Data collection	Noise Level in dB(A)		Remarks
		Day Time	Night Time	
MAY 2006	23.05.06	57.1	51.2	
JUNE 2006	09.06.06	62.6	51.0	
JUNE 2006	25.06.06	64.7	55.0	
Noise Level Standard as per Env. (Protection) Amendment rule 2000		75	70	

Name of the Location : Colony - KGON-2

Month	Date of Data collection	Noise Level in dB(A)		Remarks
		Day Time	Night Time	
MAY 2006	23.05.06	52.6	44.2	
JUNE 2006	08.06.06	53.1	42.6	
JUNE 2006	26.06.06	54.3	44.1	
Permissible Limit		55	45	

NOISE LEVEL DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC

YEAR : 2006
Q.E. : SEPT.

Name of the Location : Manager Office - KGON-1

Month	Date of Data collection	Noise Level in dB(A)		Remarks
		Day Time	Night Time	
JUL. 2006 JUL. 2006	10.07.06 24.07.06	52.3 60.0	45.8 52.0	
AUG. 2006 AUG. 2006	10.08.06 24.08.06	62.6 51.3	56.9 48.2	
SEP. 2006 SEP. 2006	11.09.06 23.09.06	51.3 51.3	43.8 48.2	
Noise Level Standard as per Env. (Protection) Amendment rule 2000		75	70	

Name of the Location : Colony - KGON-2

Month	Date of Data collection	Noise Level in dB(A)		Remarks
		Day Time	Night Time	
JUL. 2006 JUL. 2006	10.07.06 24.07.06	51.8 53.0	43.9 44.0	
AUG. 2006 AUG. 2006	09.08.06 24.08.06	51.2 53.1	40.5 44.1	
SEP. 2006 SEP. 2006	10.09.06 22.09.06	53.6 53.1	44.2 44.3	
Permissible Limit		55	45	

NAME OF THE COMPANY : WCL YEAR : 2006
NAME OF THE AREA : KANHAN Q.E. : DEC.
NAME OF THE PROJECT : GHORAWADI OC

Name of the Location : **Manager Office - KGON-1**

Month	Date of Data collection	Noise Level in dB(A)		Remarks
		Day Time	Night Time	
OCT. 2006	08.10.06	56.3	50.4	
OCT. 2006	26.10.06	61.6	55.9	
NOV. 2006	08.11.06	51.3	44.8	
NOV. 2006	22.11.06	61.3	56.4	
DEC. 2006	10.12.06	51.2	44.6	
DEC. 2006	23.12.06	55.1	49.3	
Noise Level Standard as per Env. (Protection) Amendment rule 2000		75	70	

Name of the Location : Colony - KGON-2

Month	Date of Data collection	Noise Level in dB(A)		Remarks
		Day Time	Night Time	
OCT. 2006	08.10.06	53.3	48.3	
OCT. 2006	26.10.06	51.2	42.8	
NOV. 2006	08.11.06	54.2	43.8	
NOV. 2006	25.11.06	54.2	43.5	
DEC. 2006	10.12.06	54.2	43.6	
DEC. 2006	23.12.06	54.3	42.3	
Permissible Limit		55	45	

NOISE LEVEL DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC

YEAR : 2007
Q.E. : MAR.

Name of the Location : Manager Office - KGON-1

Month	Date of Data collection	Noise Level in dB(A)		Remarks
		Day Time	Night Time	
JAN. 2007 JAN. 2007	08.01.07 21.01.07	57.1 50.1	51.3 43.2	
FEB. 2007 FEB. 2007	09.02.07 22.02.07	57.2 57.3	46.3 46.3	
MAR. 2007 MAR. 2007	08.03.07 23.03.07	50.2 63.2	43.3 58.9	
Noise Level Standard as per Env. (Protection) Amendment rule 2000		75	70	

Name of the Location : Colony - KGON-2

Month	Date of Data collection	Noise Level in dB(A)		Remarks
		Day Time	Night Time	
JAN. 2007 JAN. 2007	07.01.07 21.01.07	52.5 51.8	44.1 42.6	
FEB. 2007 FEB. 2007	09.02.07 23.02.07	51.8 51.6	43.0 43.2	
MAR. 2007 MAR. 2007	08.03.07 22.03.07	51.7 53.8	42.5 44.2	
Permissible Limit		55	45	

NOISE LEVEL DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC

YEAR : 2007
Q.E. : JUNE

Name of the Location : Manager Office - KGON-1

Month	Date of Data collection	Noise Level in dB(A)		Remarks
		Day Time	Night Time	
APR. 2007	06.04.07	57.1	51.2	
APR. 2007	22.04.07	58.0	52.0	
MAY 2007	06.05.07	57.8	51.0	
MAY 2007	22.05.07	60.1	52.3	
JUN. 2007	10.06.07	53.4	50.4	
JUN. 2007	26.06.07	59.0	54.0	
Noise Level Standard as per Env. (Protection) Amendment rule 2000		75	70	

Name of the Location : Colony - KGON-2

Month	Date of Data collection	Noise Level in dB(A)		Remarks
		Day Time	Night Time	
APR. 2007	06.04.07	52.5	43.1	
APR. 2007	22.04.07	53.0	42.3	
MAY 2007	06.05.07	52.0	43.0	
MAY 2007	22.05.07	52.3	40.1	
JUN. 2007	10.06.07	49.6	40.8	
JUN. 2007	26.06.07	50.0	41.0	
Permissible Limit		55	45	

NOISE LEVEL DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC

YEAR : 2007
Q.E. : SEP.

Name of the Location : Manager Office - KGON-1

Month	Date of Data collection	Noise Level in dB(A)		Remarks
		Day Time	Night Time	
JUL. 2007	11.07.07	53.8	48.7	
JUL. 2007	23.07.07	55.0	50.0	
AUG. 2007	04.08.07	67.0	62.2	
AUG. 2007	21.08.07	62.0	57.0	
SEP. 2007	07.09.07	68.9	63.8	
SEP. 2007	24.09.07	66.0	60.0	
Noise Level Standard as per Env. (Protection) Amendment rule 2000		75	70	

Name of the Location : Colony - KGON-2

Month	Date of Data collection	Noise Level in dB(A)		Remarks
		Day Time	Night Time	
JUL. 2007	11.07.07	53.6	40.7	
JUL. 2007	23.07.07	53.0	41.0	
AUG. 2007	04.08.07	50.2	43.0	
AUG. 2007	21.08.07	52.0	42.5	
SEP. 2007	07.09.07	52.4	43.7	
SEP. 2007	24.09.07	51.8	43.0	
Permissible Limit		55	45	

NOISE LEVEL DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC

YEAR : 2007
Q.E. : DEC.

Name of the Location : Manager Office - KGON-1

Month	Date of Data collection	Noise Level in dB(A)		Remarks
		Day Time	Night Time	
OCT. 2007 OCT. 2007	05.10.07 24.10.07	65.9 64.0	60.8 60.0	
NOV. 2007 NOV. 2007	04.11.07 24.11.07	55.2 64.7	50.3 60.3	
DEC. 2007 DEC. 2007	08.12.07 24.12.07	62.0 63.0	57.0 58.0	
Noise Level Standard as per Env. (Protection) Amendment rule 2000		75	70	

Name of the Location : Colony - KGON-2

Month	Date of Data collection	Noise Level in dB(A)		Remarks
		Day Time	Night Time	
OCT. 2007 OCT. 2007	05.10.07 24.10.07	52.2 52.0	43.1 43.0	
NOV. 2007 NOV. 2007	04.11.07 24.11.07	54.1 53.6	43.9 44.8	
DEC. 2007 DEC. 2007	08.12.07 24.12.07	53.0 52.6	44.0 43.2	
Permissible Limit		55	45	

NOISE LEVEL DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC

YEAR : 2008
Q.E. : MAR.

Name of the Location : Manager Office - KGON-1

Month	Date of Data collection	Noise Level in dB(A)		Remarks
		Day Time	Night Time	
JAN. 2008	05.01.08	51.3	45.6	
JAN. 2008	17.01.08	59.2	52.3	
FEB. 2008	07.02.08	55.1	48.2	
FEB. 2008	22.02.08	56.0	47.0	
MAR. 2008	07.03.08	56.8	50.3	
MAR. 2008	26.03.08	64.2	60.6	
Noise Level Standard as per Env. (Protection) Amendment rule 2000		75	70	

Name of the Location : Colony - KGON-2

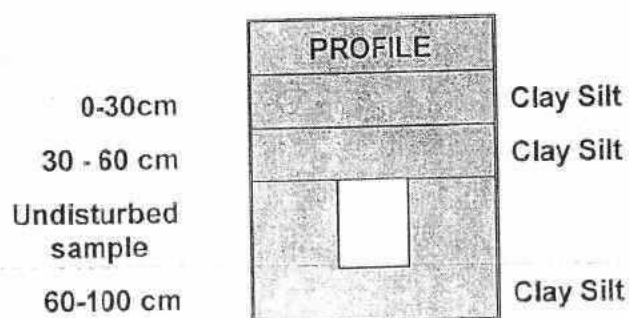
Month	Date of Data collection	Noise Level in dB(A)		Remarks
		Day Time	Night Time	
JAN. 2008	06.01.08	53.6	42.9	
JAN. 2008	17.01.08	48.4	40.3	
FEB. 2008	07.02.08	53.7	42.9	
FEB. 2008	22.02.08	52.0	42.2	
MAR. 2008	07.03.08	54.8	43.9	
MAR. 2008	28.03.08	52.4	42.8	
Permissible Limit		55	45	

SOIL QUALITY DATA

Location: Barren land, Core Zone (S₁)

Season : Summer
Sampling Date : 21.05.2006

Sl. No.	Parameter	Depth, cm		
		0-30	30-60	60-100
1.	pH	7.86	7.92	7.96
2.	Electrical conductivity (m-mhos/cm at 20°C)	0.389	0.394	0.398
3.	Nitrogen, mg/kg	0.116	0.118	0.128
4.	Phosphorus, mg/kg	0.671	0.676	0.682
5.	Potassium, mg/kg	0.002	0.002	0.002
6.	Total magnesium, mg/kg	1.84	1.86	1.92
7.	Organic carbon (%)	2.45	2.37	2.21
8.	Grain size distribution			
	Sand(%)	7.25	6.27	4.38
	Silt (%)	21.84	23.46	21.72
	Clay (%)	70.91	70.27	73.29
9.	Textural class	Clay silt		
10.	Bulk density (g/cc)	1.18	1.21	1.19
11.	Liquid limit (%)	13.8	13.1	13.2
12.	Plastic limit (%)	10.9	10.3	10.2
13.	Infiltration rate (cm/hr)	-	2.3	-
14.	Field capacity (%)	8.6	8.4	9.1
15.	Wilting co-efficient (%)	0.5	0.5	0.5
16.	Available water storage capacity (%)	8.1	7.8	8.6

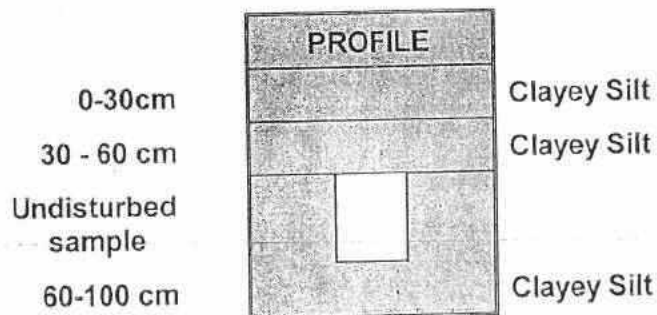


Richardson & Cruddas (1972) Ltd.

SOIL QUALITY DATA

Location : Agriculture Land, Nimdhana (S₂) Season : Summer
Sampling Date : 21.05.2006

Sl. No.	Parameter	Depth, cm		
		0-30	30-60	60-100
1.	PH	8.37	8.42	8.46
2.	Electrical conductivity (m-mhos/cm at 20°C)	0.031	0.036	0.029
3.	Nitrogen, mg/kg	0.904	0.914	0.918
4.	Phosphorus, mg/kg	1.26	1.31	1.35
5.	Potassium, mg/kg	0.031	0.034	0.036
6.	Total magnesium, mg/kg	1.26	1.25	1.29
7.	Organic carbon (%)	2.42	2.53	2.49
8.	Grain size distribution			
	Sand (%)	9.86	8.49	6.94
	Silt (%)	32.71	30.29	29.31
	Clay (%)	57.43	61.22	63.75
9.	Textural class	Clayey Silt		
10.	Bulk density (g/cc)	1.29	1.31	1.33
11.	Liquid limit (%)	20.64	21.72	21.76
12.	Plastic limit (%)	14.36	14.42	14.92
13.	Infiltration rate (cm/hr)	-	4.6	-
14.	Field capacity (%)	8.2	8.3	8.4
15.	Wilting co-efficient (%)	0.6	0.6	0.6
16.	Available water storage capacity (%)	7.6	7.7	7.8

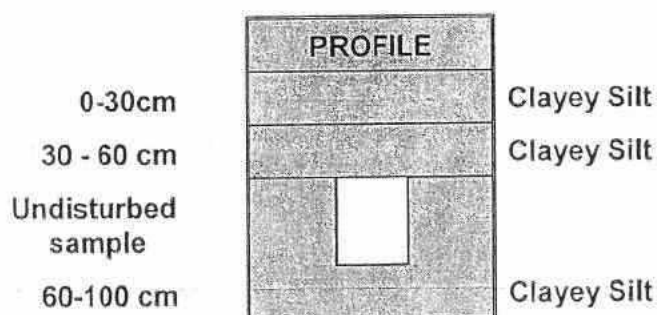


Richardson & Cruddas (1972) Ltd.

SOIL QUALITY DATA

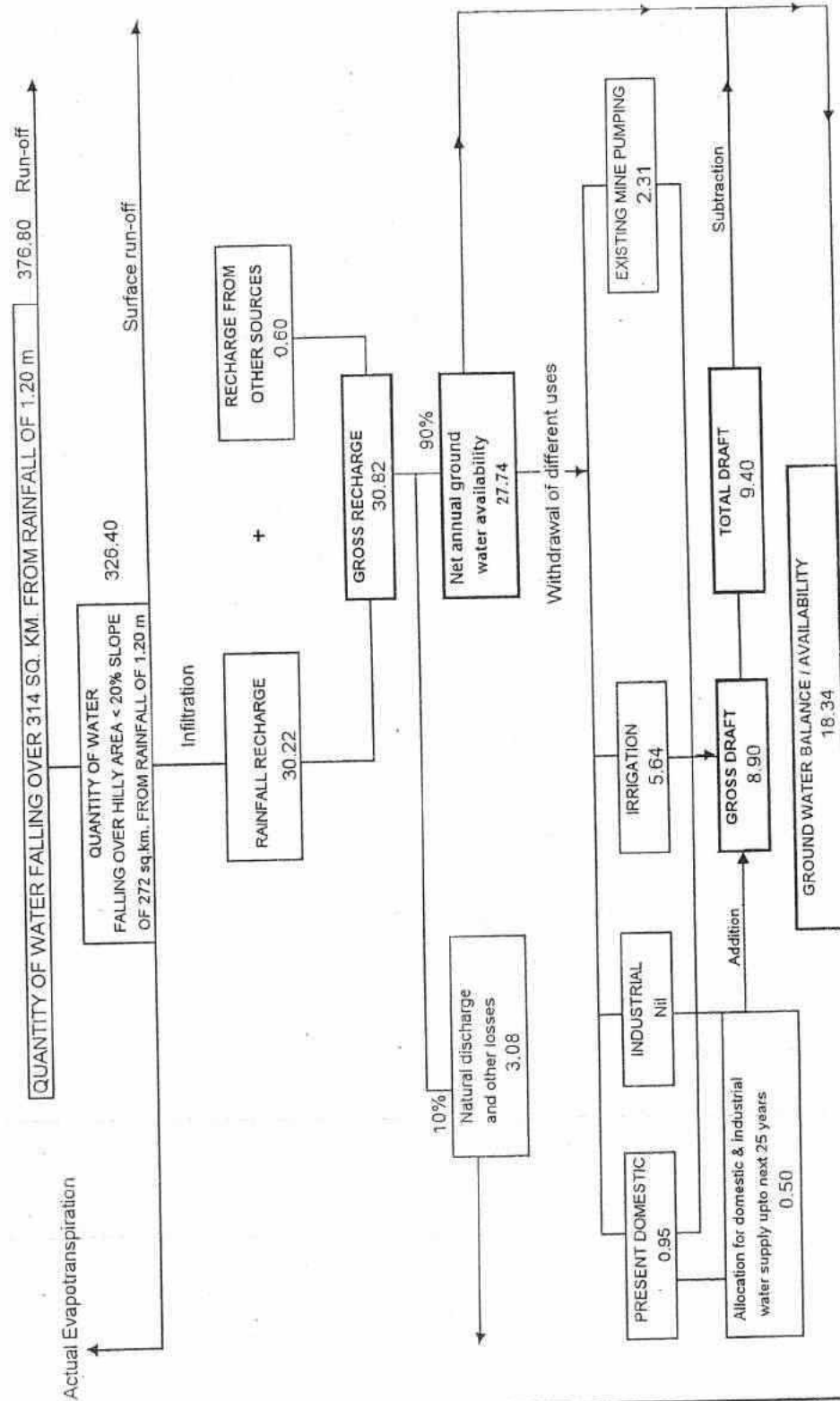
Location : Forest Land, Bandi (S₃) Season : Summer
Sampling Date : 21.05.2006

Sl. No.	Parameter	Depth, cm		
		0-30	30-60	60-100
1.	pH	7.81	7.83	7.85
2.	Electrical conductivity (m-mhos/cm at 20°C)	0.394	0.392	0.394
3.	Nitrogen, mg/kg	0.086	0.092	0.096
4.	Phosphorus, mg/kg	0.681	0.684	0.688
5.	Potassium, mg/kg	0.002	0.002	0.003
6.	Total magnesium, mg/kg	2.16	2.38	2.41
7.	Organic carbon (%)	2.38	2.53	2.62
8.	Grain size distribution			
	Sand (%)	6.82	8.97	6.37
	Silt (%)	24.92	21.26	20.73
	Clay (%)	68.26	69.77	72.90
9.	Textural class	Clayey Silt		
10.	Bulk density (g/cc)	1.12	1.15	1.19
11.	Liquid limit (%)	13.8	14.3	14.6
12.	Plastic limit (%)	11.6	11.8	11.9
13.	Infiltration rate (cm/hr)	-	2.9	-
14.	Field capacity (%)	8.9	9.1	9.3
15.	Wilting co-efficient (%)	0.5	0.5	0.5
16.	Available water storage capacity (%)	8.4	8.6	8.8



Richardson & Cruddas (1972) Ltd.

GHORAWARI OPEN CAST PATCHES MINE
GROUND WATER BALANCE COMPUTATION
 (All Values are in MCM)



Note :- Proposed Mine Draft 0.38 MCM at final quarry depth of 80 m, thereby balance reduces to 17.96 MCM

WELFARE WORKS DONE UNDER WCL COMMUNITY DEVELOPMENT & SC/ST PROGRAMME

KANHAN AREA.

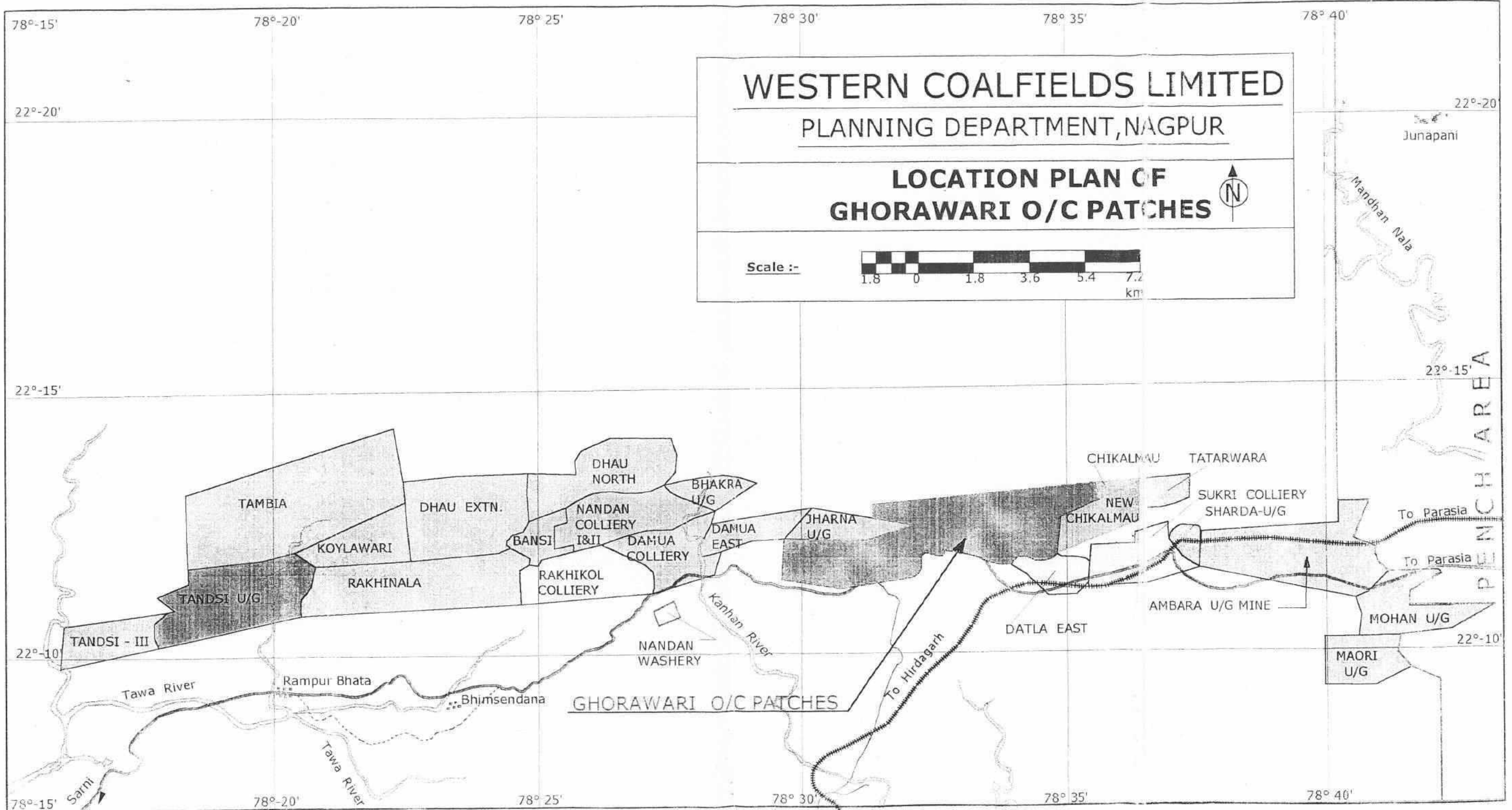
S.N.	ACTIVITY / WORK	COMPLETION COST (Rs. Lakhs)	NAME OF MINE	NAME OF VILLAGE	DISTANCE OF VILLAGE FROM MINE(KM)
2000 - 01 (KAN)					
COMMUNITY DEVELOPMENT WORKS					
1	Construction of Rest Shelter at Kali Mati Tahsil parisar near Junnardeo	0.68	Ambara	Kali Mati	8
2	Construction of one class room at Khapa Swamy village near CGM office	0.76	CGM Office	Khapa Swamy	-
3	Construction of one KIOSK (Cold Water Pyau at Junnardeo)	0.29	Ambara	Junardeo	8
4	Financial assistance to district authority for repairing of Parasia - Damua road	2.50	Damua	Damua	3
SC / ST DEVELOPMENT WORKS					
1	Construction of 2 nos. additional class room at Nandan village	3.09	Nandan UG	Nandan	1
2	Construction of approach road of Moari village	2.42	Moari UG	Moari	1
2001 - 02(KAN)					
COMMUNITY DEVELOPMENT WORKS					
1	Construction of Rest Shelter near Hinglaga mandir near Moari colliery	2.00	Moari colliery	Moari	1
2	Repair works (Latrine, Bathroom) of various schools at Ghorawari, Datla & Dungaria schools	0.33	Ghorawari UG Datla OC	Ghorawari, Datla & Dungaria	7
SC / ST DEVELOPMENT WORKS					
1	Construction of approach road of Moari village	2.00	Moari colliery	Moari	1

S.N.	ACTIVITY / WORK	COMPLETION COST (Rs. Lakhs)	NAME OF MINE	NAME OF VILLAGE	DISTANCE OF *VILLAGE FROM MINE(KM)
2002 - 03 (KAN)					
COMMUNITY DEVELOPMENT WORKS					
1	Construction of community hall at Khapa Swamy village	3.10	Jharna UG	Khapa Swamy	7
2	Rest shelter at Tandsi village	0.48	Tandsi UG	Tandsi	1
3	Eye camp for villagers	0.70	-	-	-
4	Funeral shed at Datla village	0.46	Jharn UG	Datla	7
SC / ST DEVELOPMENT WORKS					
1	Construction of 2 class rooms at Tribal School Moari village	1.10	Moari /Mohan colliery	Moari	2
2	Boundary wall for Khapa Swamy tribes school	0.50	Gharawari OC	Khapa Swamy	7
3	Steel furniture for Nandan tribal school	0.83	Nandan	Nandan	1
4	Latrine & Bathroom at community hall of CGM office	1.41	Ghorawari OC	Khapaswamy	7
5	Misc. Expenditure	0.50			
2003 - 04 (KAN)					
COMMUNITY DEVELOPMENT WORKS					
1	Construction of 3 nos. funeral sheds at Jharna, Damua & Ambara villages	1.50	Jharna, Damua & Ambara	Jharna, Damua & Ambara	2
2	Construction of 50 nos. slogan boards from CGM office to Damua	0.53	-	GM o to Damua	
3	Construction of Bus Stop shed at Jannardeo -Tamiya road.	0.50	Ambara OC	Juneradeo	8
4	Construction of retaining wall at Kanhan Valley school ground	0.97	Ghorawari OC	Dungariya	7
5	HDPE pipeline at Ambara	7.00	Ambara OC	Ambara	2
6	Misc. Expenditure	0.50			

S.N.	ACTIVITY / WORK	COMPLETION COST (Rs. Lakhs)	NAME OF MINE	NAME OF VILLAGE	DISTANCE OF 'VILLAGE FROM MINE(KM)
2003-04 (KAN)					
SC / ST DEVELOPMENT WORKS					
1	One bore hole at Ambara	1.50	Ambara OC	Ambara	2
2	Const on one class room at Hanotiya Gram	1.47	Old Sukri	Hanotiya	6
3	To provide dual desk at ghorawari & Dungaria school	1.00	Ghorawari oc	Dungariya/Ghorwa	7
4	Const of boundary wall and toilet at girls school, Dungariya	0.90	Ghorwarai OC	Dungariya	7
5	One borewell at Rampur village	0.54	Tandsi UG	Rampur	4
6	Misc	0.48			
2004-05(KAN)					
COMMUNITY DEVELOPMENT WORKS					
1	Construction of 2 nos. funeral sheds at Tandsi & Ambara	1.01	Tandsi & Ambara	Tandsi & Ambara	3
2	Construction of boundary wall at Girls Govt. School at Dungaria	2.14	Jharna UG	Dungaria	5
3	Construction of 2 class rooms at Gouri - Palachourai school	2.29	Ambara	Palachouri	3
4	Construction of 2 class rooms at Saraswati Shisu Mandir Dungaria	2.45	Jharna UG	Dungaria	5
5	Construction of 2 additional class rooms at Tandsi - Kanhan Valley school	3.68	Tandsi	Tandsi	2
6	Misc. & Last Year payment	1.02	-	-	
SC / ST DEVELOPMENT WORKS					
1	Construction of Retaining Wall at Nandan School's Play ground (1st phase)	0.96	Nanda UG	Nandan	2
2	One Bore hole at nandan Village	0.97	Nandan UG	Nandan	2
3	To provide school furniture for tribble schools of Rampur & Ambara Village	1.00	Ambara & Tandsi	Rampur & Ambara	2
4	Construction of Urnills for girls & Boys at Govt School of Bawanwara Village	0.39	Jharna UG	Bawanwara	6
5	Misc & Last year payments	0.53			

S.N.	ACTIVITY / WORK	COMPLETION COST (Rs. Lakhs)	NAME OF MINE	NAME OF VILLAGE	DISTANCE OF * VILLAGE FROM MINE(KM)
2005-06(KAN)					
COMMUNITY DEVELOPMENT WORKS					
1	Const of One class room for Dungariya	186	JharnaUG	Dungariya	7
2	Const of Toilet t Palachouri school	0.47	Ambara	Palachouri	3
3	Const of Toilet at Junardeo School	1.00	Ambara	Junerdeo	8
4	Const of Boundary wall of ghorawari kabristan	1.47	Jharna UG	Ghorawari	2
5	Const of 2 class room at Primary school Sukri gram	2.14	Ambara	Sukri	7
6	Const of 2 class room at urdoo School, Damua	2.15	Damua	Damua	3
7	Const of Remaining boundary wall of HSS Dungariya	1.57	Jharna UG	Dungariya	7
8	To provide steel Dual desk to Sukri and Damua school	1.00	Ambara & Damua	Sukri & Damua	8-3
SC / ST DEVELOPMENT WORKS					
1	Const of retaining wall cum galary of nandan play ground	1.75	Nandan UG	Nandan	2
2	Const of 2 class room at Amadhana school	2.37	Ghorawari OC	Amadhana	8
3	Const of 2 class room at Bamanwara school	2.78	Jharna UG	Bamanwara	8
4	Const of 2 class room at Girls school, Dmua	2.76	Damua	Damua	3
5	Const of 2 class room at Girls school, Junerdeo	2.77	Ambara	Junerdeo	8
6	Const of 2 class room at nandan school	2.20	Nandan	Nandan	3
7	Spill over	1.22	-		

S.N.	ACTIVITY / WORK	COMPLETION COST (Rs. Lakhs)	NAME OF MINE	NAME OF VILLAGE	DISTANCE OF VILLAGE FROM MINE(KM)
2006-07(KAN)					
COMMUNITY DEVELOPMENT WORKS					
1	Const of 2 class room at Kanhan velly school Dungariya	4.13	Jharna UG	Dungariya	7
2	Const of Boundary wall at Panara Kabristan	1.62	Jharna UG	Panara	6
3	To provide Dual Desk foir Rampur Dungariya School	1.00	Tandsi UG	Rampur	2
4	Const of retaining wall cum galary at Tandsi Ply gropund	1.82	Tandsi UG	Tandsi	1
5	Const of yatree Partikshalaya at Reampur bus stand	1.00	Tandsi UG	Rampur	4
6	100 mtr RCC Road at maori Village	1.00	Mohan	Maori	2
7	Last year spill over & other payments	2.26			
SC / ST DEVELOPMENT WORKS					
1	Const of retaining wall of nandan Ply ground	2.74	Nandan UG	Nandan	2
2	Musical Instruments to Adivasi Mandal	1.00	-	--	
3	Const of boundary wall of Tribe hostel, Rampur	1.05	Tandsi UG	Rampur	3
4	Const of 2 class room at Ambara School	1.99	Ambara	Ambara	1
5	One bore hole at Khapaswami village	2.05	Jharna UG	Khapaswamy	8
6	One bore hole at Datla Badi village	1.00	Datla	Datal Basti	8
7	Last year spill over	3.37			



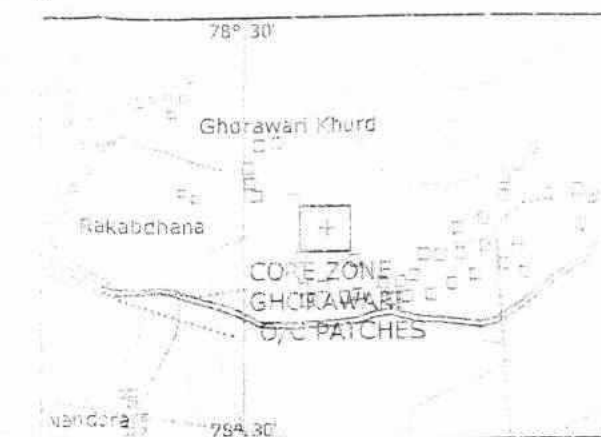
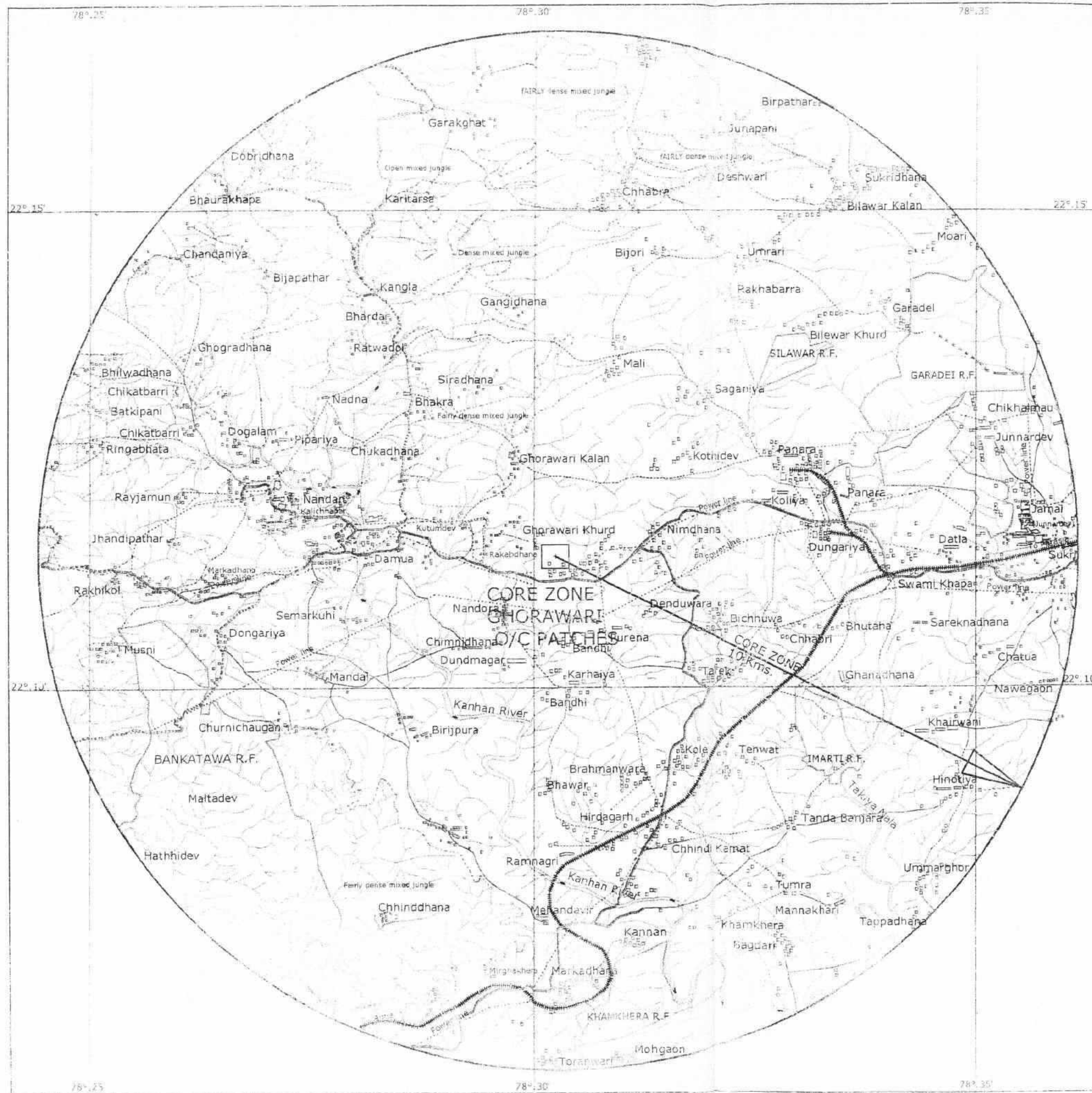


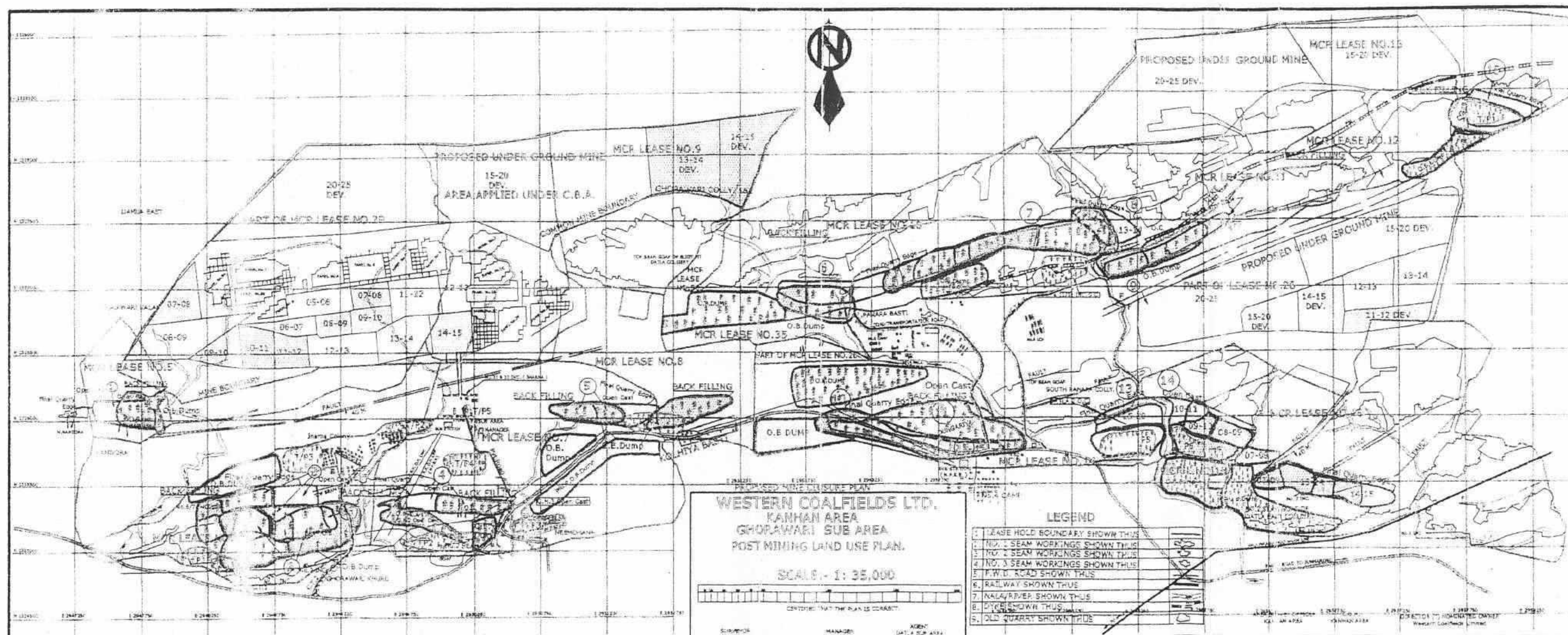
PLATE NO. II

GHORAWARI O/C PATCHES

Index plan showing Core Zone and Buffer Zone

SCALE 1: 1,00,000

PLATE No. - IV





Western Coalfields Limited

(A Government of India Undertaking)
Regd. Office: 'Coal Estate', Civil Lines, Nagpur - 440 001.
Telephone: 91-0712-2510151, Fax: 91-0712- 2510151

Ref No. WCL/HQ/ENV/4 -11/1373

Dt: 18/11/2008

To,
Dr. T. Chandini,
Director,
Government of India, Ministry of Environment & Forests,
Paryavaran Bhavan, CGO Complex,
New Delhi - 110510.

Sub: -Submission of documents for environmental Clearance for Ghorawari OC
Expansion Project (From 0.45 MTPA to 1.50 MTPA) under clause 7(ii) of EIA
Notification, 2006.

Ref :- Telephonic discussion on 18.11.2008.

Madam,

Kindly refer to your telephonic directions on the subject matter. As directed the details have been prepared and placed below for your kind perusal.

The scenario of the project in respect of the mining and allied parameters during proposed expansion of production capacity vis - a vis the scenario of the existing project is summarised as below :-

The project proposal is to mine coal from the patches of old UG workings by Opencast operations and expansion in production of coal from **0.45 MTPA to 1.50 MTPA which is the maximum achievable production capacity.**

The total lease area is 1296.011 ha of which 178.10 ha is agriculture land, 593 ha is forest land, 192 ha is grazing land, and 332.911 ha is government land. Forest clearance has been applied for the renewal of lease.

There is no National Park, Wild Life Sanctuary, Biosphere Reserves found in the 10 Km Buffer Zone.

River Kanhan flows at a distance of 6-7 Km from the ML. It is not proposed to modify the existing natural drainage.

Ultimate working depth is 45 m bgl (average) and present working depth is 40 m bgl.

Contd ..2

Of the total lease area, area for excavation is 750.36 ha, area for OB dumps 217.86 ha, infrastructure is 12.34 ha, roads is 2.65 ha, area for green belt is 497.049 ha, area for township is 140 ha, and area for rationalisation is 172.80 ha.

It may be noted here that there is no change in the above mentioned mine specific parameters (except for production capacity and schedule of production) in the expansion proposal in comparison to the earlier EC granted vide letter no . J - 11015/382/2007. IA. II(M) dated 19.02.2008.

The proposal is to mine coal from patches of old UG workings by opencast operations is as given below.

Sl. No	Name of OC PATCHES	Quarry Area(ha)	Total		Quarry (m)		Depth		Balance		OB Excavated till date in lakh Cum.	Final Backfilled Area(ha)	Final Void Area(ha)
			Coal In Lakh Tonnes	OB In Lakh Cum.	Present	Maximum			Coal in Lakh Tonnes	OB in Lakh Cum.			
A) Present Working Patches													
1.	No. 16/17 OC Patch Ph - II Start - 06/06 Finish - 07/08 Completed.	17.00	4.95	31.53	45	50		NIL		NIL	31.53	9.50 Which is being technically reclaimed	7.50
2.	No. 6A & 6B OC Patch Ph - VI Start - 08/07 Finish - 05/2011	20.00	3.77	33.57	30	52		0.89		17.45	16.12	10.00 Backfilled till date is 10.00 ha Which is being technically reclaimed	2.00
TOTAL (A)		37.0	8.72	65.10				0.89		17.45	47.65	19.50	
B) Proposed upto 2011 - 12													
1.	No. 16/17 OC Patch Ph - III	40.50	8.57	60.75	--	54		8.57		60.75	--	40.50	NIL
2.	Ghogra OC Patch	8.0	2.99	13.13	--	53		2.99		13.13	--	6.0	2.0
3.	Kothideo OC Patch	12.50	5.12	17.63	--	34		5.12		17.83	--	10	2.50
Total (B)		61.0	16.68	91.71	--	--		16.68		91.71	--	56.50	4.50
C) Proposed upto 2015 - 16													
1.	Ghorawari Kalan OC Patch	15.00	4.50	28.45	-	30		4.50		28.45	--	10.44	4.50
2.	Dungariya OC Patch	39.00	10.00	109.50	--	50		10.60		109.50	-	27.13	11.87

No	Name of OC PATCHES	Quarry Area(ha)	Total		Quarry Depth (m)		Balance		OB Excavated till date in lakh Cum.	Final Backfilled Area(ha)	Final Void Area(ha)
			Coal in Lakh Tonnes	OB in Lakh Cum.	Present	Maximum	Coal in Lakh Tonnes	OB in Lakh Cum.			
3.	Panara OC Patch	12.50	4.25	39.75	--	54	4.25	39.75	-	3.70	3.80
4.	Bharat Colliery OC Patch	79.20	24.0	198.0	-	48	24.0	198.0	-	35.10	24.10
5.	Chikalmau OC Patch	21.00	6.55	61.58	-	67	6.55	61.58	--	14.61	6.39
6.	South Panara OC Patch	21.25	7.69	81.29	-	62	7.69	81.29	-	14.776	6.472
Total (C)		187.95	57.50	518.62	-	-	57.50	518.62	-	130.768	57.192

D) Proposed beyond 2015 - 16

1.	Virgiri Patch	168.0	Individual schemes will be firmed up after 2014- 15. Estimated backfilled area would be 297.500 ha and void would be 127.094 ha								
	Between GH 16/17 & Ghorawari Kalan OC	136.594									
2	Dalla East	120.0									
Total (D)		424.594									

E) Abandoned Patches :

1	No. 16 & 17 OC patch PH-I	12.50	Not Applicable.							12.50	NIL
2	No. 6 & 7 OC Patch. Ph-I & II	7.50								7.50	NIL
3	GH-2 OC Patch	6.0								6.0	NIL
4	GH-3 OC Patch	4.5								4.5	NIL
5	Kolhiya OC Patch	4.0								4.0	NIL
6	DQ-3 OC Patch	5.316								5.316	NIL
Total (E)		39.816								39.816	NIL
Grand Total (A+B+C+D+E)		750.36	82.90	679.11			75.07	627.78		254.574 + 297.500 = 552.074	71.192 + 127.094 = 198.286

There is no change in geo - mining parameters of the above mentioned patches during the proposed expansion of production capacity up to maximum achievable capacity of the mine except for the mine life due to change in production capacity.

Mineral transportation of 3636 TPD of coal is by road to railway siding covering a distance of 12 Kms and the balance 909 TPD is by road at the time of maximum production of 1.50 MTPA.

Present working depth is 40 m bgl. Water table is in the range of 4.05 m - 17.20 m. during pre-monsoon season and 0.05 - 8 m bgl during post-monsoon. Mining has intersected water table. Peak water requirement is 440 m3 per day which will be met from mine pit water.

Contd...4

Presently a total of 16.68 Mm³ of OB has been generated of which 12.86 Mm³ has been used for backfilling and 0.82 Mm³ has been dumped in external OB dump. An estimated 62.778 Mm³ of OB would be generated in the balance life of the mine which will be backfilled simultaneously.

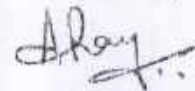
The total quarry area of 750.36 ha of which 552.074 ha would be backfilled and plantation developed thereon.

Sl.NO	Area(ha)	Existing	Status up to 11-12	Status up to 15-16	Status beyond 15-16	Status at the end of Mine Life
1.	Excavation	83.36	81.00	187.95	424.594	750.36
2.	Backfilled	59.316	64.50	130.758	297.500	552.074

Balance life of the mine considering the maximum achievable capacity of 1.50 MTPA is 12 years. A void of 198.286 ha with a maximum depth of 10-15 m would be left at the end of mine life which would be converted into a reservoir.

There is no change in the final land use pattern of the mine at the end of mine life.

Yours faithfully



Officer on Special Duty (Environment)

F. No. S-112/2006-FC (vol.)

Government of India

Ministry of Environment, Forest and Climate Change

(Forest Conservation Division)

Indira Paryavaran Bhawan

Aliganj, Jorhugh Road

New Delhi - 110003

Dated: 17th January, 2015

To,

The Principal Secretary (Forests),
Government of Madhya Pradesh,
Bhopal.

Sub: Diversion of additional 19,500 hectares of forest land to M/s Western Coalfields Limited in Kanhan area for open cast mining in Compartment No. 454 C.F.D. under West Chhindwara Division.

Sir,

I am directed to refer to the Government of Madhya Pradesh's letter No. F-1/406/06/10-11/1567 dated 30.06.2008 on the above mentioned subject, on the above mentioned subject, wherein prior approval of the Central Government for the diversion of additional 19,500 hectares of forest land to M/s Western Coalfields Limited in Kanhan area for open cast mining in Compartment No. 454 C.F.D. under West Chhindwara Division, was sought, in accordance with section-2 of the Forest (Conservation) Act, 1980. After careful consideration of the proposal by the Forest Advisory Committee constituted under section 3 of the said Act, in-principle approval under the Forest (Conservation) Act, 1980 for diversion of the said forest land was accorded vide this Ministry's letter of even number dated 7th November 2013, subject to fulfilment of certain conditions. The State Government has furnished compliance report in respect of the conditions stipulated in the stage-I approval and has requested the Central Government to grant final approval.

2. In this connection, I am directed to say that on the basis of the compliance report furnished by the Addl. Principal Chief Conservator of Forests (Land Management) and Nodal Officer, the Forest (Conservation) Act, 1980, Government of Madhya Pradesh vide letters No. F-1/406/2006/10-11/2927 dated 5th November 2014 and User Agency's letter No. WCL/KAN/AGM/SUR/, 2014-291 dated 24th December 2014 approval of the Central Government is hereby granted under section-2 of the Forest (Conservation) Act, 1980 for diversion of 19,500 hectares of forest land to M/s Western Coalfields Limited in Kanhan area for open cast mining in Compartment No. 454 C.F.D. under West Chhindwara Division, subject to fulfilment of the following conditions:

- (i) Legal status of the diverted forest land shall remain unchanged;
- (ii) State Forest Department shall create and maintain from funds realised from the user agency the compensatory afforestation over the degraded forest land double in extent to the forest land being diverted shall be raised and maintained by the State Forest Department from the funds to be provided by the user agency;
- (iii) Following activities shall be undertaken by the User Agency at the project cost:
 - (a) Implement the plan containing appropriate mitigative measures to minimize soil erosion and erosion of streams shall

- (b) Planting of adequate drought hardy plant species and sowing of seeds in the appropriate area within the mining lease to arrest soil erosion;
 - (c) Construction of check dams, retention / toe walls to arrest sliding down of the excavated material along the contour;
 - (d) Stabilize the overburden dumps by appropriate grading/benching so as to ensure that that angles of repose at any given place is less than 28° ; and
 - (e) Strict adherence to the prescribed top soil management.
- (iv) The State Government shall realise from the user agency the additional amount of NPV, if so determined, as per the final decision of the Hon'ble Supreme Court of India and transfer the same to the ad-hoc CAMPA under intimation to this Ministry;
 - (v) User agency shall obtain the Environment Clearance as per the provisions of the Environmental (Protection) Act, 1986, if required;
 - (vi) State Forest Department shall undertake fencing, protection and afforestation of the safety zone area (7.5 meter strip all along the outer boundary of the area identified to undertake mining) from funds already realised from the user agency;
 - (vii) State Forest Department shall undertake afforestation on degraded forest land, one and half time in extent to the area used for safety zone from funds already realised from the user agency;
 - (viii) For evacuation of the coal to be extracted from the forest land proposed for diversion, the user agency shall not seek diversion of any additional forest land;
 - (ix) The user agency shall contribute on proportionate basis the amount required for implementation of the plans to be prepared by the NTCA for rejuvenation and restocking of the viable corridor and the mitigative measures to eliminate/minimize the adverse impacts of the transportation of the coal to be extracted from the Pench-Kanhan coalfield on the viable corridor;
 - (x) For the purpose of apportioning the cost to be recovered from the user agency for rejuvenation and restocking of the migratory corridor and to implement the mitigative measures to eliminate/minimize the adverse impacts of the transportation of the coal on the said migratory corridor, in case of open cast mining the entire area of lease may be taken into account. In case of underground mining project, half of the area of the mining lease may be taken into account to calculate the amount to be recovered from the user agency;
 - (xi) The Chief Wildlife Warden, Government of Madhya Pradesh shall monitor the implementation of mitigative measures against the impact of project on wildlife.
 - (xii) The period of diversion of the said forest land under this approval shall be for a period co-terminus with the period of the mining lease proposed to be granted under the Mines and Minerals (Development & Regulating) Act, 1957, or Rules framed there under, subject to a maximum period of 30 years;
 - (xiii) State Forest Department shall undertake gap planting and soil & moisture conservation activities to restock and rejuvenate the degraded open forests (having crown density less than 0.4), if any, located in the area within 100 m. from outer perimeter of the mining lease from funds already realised from the user agency;

- (xiv) User agency shall undertake de-silting of the village tanks and other water bodies located within five km from the mine lease boundary so as to mitigate the impact of siltation of such tanks/water bodies, whenever required;
- (xv) The user agency shall undertake mining in a phased manner after taking due care for reclamation of the mined over area. The concurrent reclamation plan shall be executed by the User Agency from the very first year, and an annual report on implementation thereof shall be submitted to the Nodal Officer, Forest (Conservation) Act, 1980, Government of Madhya Pradesh and the Addl. Principal Chief Conservator of Forests (Central), Ministry of Environment & Forests, Regional Office (Western Zone), Bhopal. If it is found from the annual report that the activities indicated in the concurrent reclamation plan are not being executed by the User Agency, the Nodal Officer or the Chief Conservator of Forests (Central) may direct that the mining activities shall remain suspended till such time, such reclamation activities are satisfactorily executed;
- (xvi) No labour camp shall be established on the forest land;
- (xvii) User agency shall provide firewood preferably alternate fuel to the labourers and the staff working at the site so as to avoid any damage and pressure on the adjacent forest areas;
- (xviii) Boundary of the mining lease and safety zone shall be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars, each inscribed with its serial number, forward and back bearing and distance from pillar to pillar;
- (xix) The forest land shall not be used for any purpose other than that specified in the proposal;
- (xx) Any other condition that the concerned Regional Office of this Ministry may stipulate, from time to time, in the interest of conservation, protection and development of forests & wildlife;
- (xxi) User agency shall submit annual report on compliance to conditions stipulated in this approval to State Government and concerned Regional Office of this Ministry;
- (xxii) User Agency and the State Government shall ensure compliance to provisions of the all Acts, Rules, Regulations and Guidelines, for the time being in force, as applicable to the project.

Yours faithfully,

S.
(H.C. Chaudhary)
Director

Copy to:-

1. The Principal Chief Conservator of Forests, Government of Madhya Pradesh, Bhopal.
2. The Nodal Officer, the Forest (Conservation) Act, 1980, Government of Madhya Pradesh, Bhopal.
3. The Addl. Principal Chief Conservator of Forests (Central), Regional Office (Western Zone), Bhopal.
4. User Agency.
5. Monitoring Cell, FC Division, MoEF, New Delhi.
6. Guard File.

(H.C. Chaudhary)
Director