

**Government of India
Ministry of Mines
Indian Bureau of Mines
TMP Division**

No. 296/7/2000/MRC

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Dated 16th May, 2011

To,
All State Directorate of Mining & Geology,
All stake Holders, Minor Mineral Mines owners

Subject : Environmental aspects of quarrying of minor minerals – Evolving of Model Guidelines

The Environment Impact Assessment Notification, 1994 did not apply to mining of minor minerals. Realizing the potential of such projects to adversely affect the different components of environment, minor minerals were brought under the ambit of the new re-engineered environment Impact Assessment Notification 2006. As per the provision of this notification, mining of minerals with lease area of 5 ha and above require prior environmental clearance under the provision thereof. Ministry of Environment and Forest had constituted a group under chairmanship of Secretary,(Ministry of Environment & Forest) to evolve guidelines for sustainable mining of Minor Minerals. The group submitted the report which was placed on their web site www.envfor.nic.in for implementation by the all State Government. In the report, it is mentioned that Union Ministry of Mines along with Indian Bureau of Mines and respective state Governments should therefore make necessary provisions in this regard under Minor Mineral Concession Rules framing under MMRD Act 1957, and adopt model guidelines to be followed by all the States.

In light of the above, Ministry of Mines directed Indian Bureau of Mines to prepare the draft guidelines on “**Environmental aspects of quarrying of minor minerals – Evolving of Model Guidelines**” on following topics

- Mining frame-work of minor minerals
- Frame-work on cluster of mining
- Guidelines for reclamation & rehabilitation

Accordingly, Indian Bureau of Mines constituted a committee under chairmanship of Dr. B.P.Sinha Controller of Mines and other three members to draft the framework and guidelines for Minor mineral. The committee after detailed deliberation and discussions drafted the document and submitted to Ministry of Mines. Ministry of Mines viewed that the report should be placed on website for the perusal of stake holders and state Governments and sought their suggestions/comments if any in this regard.

Therefore, Draft report on “Environmental aspects of quarrying of minor minerals – Evolving of Model Guidelines” covering all the three aspects mentioned above is placed on website www.ibm.gov.in. Comments if any may please be sent at e:mail com.tc@ibm.gov.in or to the office of Controller of Mines (TMP), Indian Bureau of Mines, Civil line Nagpur by 30th June 2011, for finalizing the draft model guidelines.

Yours Faithfully,

(Dr.B.P. Sinha)
Controller of Mines

1.0 MINING FRAMEWORK FOR MINOR MINERALS

1. Short title and commencement:-

- (i) These rules may be called the Minor Minerals Conservation and Development Rules, 2010.
- (ii) They shall come into force from the date of their publication in the Official Gazette.

2. Application :- These rules shall apply to prospecting and quarrying of minor minerals.

3. Definition :

a). In these rules, unless the context otherwise requires;-

“Minor Mineral” : According to section 3(e) of the Mines and Minerals Development and Regulation Act, 1957 “Minor Minerals” means building stones, gravel, ordinary clay, ordinary sand other than sand used for prescribed purposes, and any other mineral which the Central Government may, by notification in the Official Gazette, declare to be a minor mineral.

The term ordinary sand used in clause (e) of Section-3 of the MMDR Act, 1957 has been further clarified in rule 70 of the MCR, 1960 as sand shall not be treated as minor mineral when used for any of the following purposes namely; (i) purpose of refractory and manufacturer of ceramic, (ii) metallurgical purposes, (iii) optical purposes, (iv) purposes of stowing in coal mines, (v) for manufacture of silvitrete cement, (vi) manufacture of sodium silicate and (vii) manufacture of pottery and glass.

Additionally, the Central Government has declared the following minerals as minor minerals: (i) boulder, (ii) shingle, (iii) chalcedony pebbles used for ball mill purposes only, (iv) lime shell, kankar and limestone used in kilns for manufacture of lime used as building material, (v) murrum, (vi) brick-earth, (vii) fuller’s earth, (viii) bentonite, (ix) road metal, (x) reh-matti, (xi) slate and shale when used for building material, (xii) marble, (xiii) stone used for making household utensils, (xiv) quartzite and sandstone when used for purposes of building or for making road metal and household utensils, (xv) saltpeter and (xvi) ordinary earth (used or filling or leveling purposes in construction or embankments, roads, railways, building).

It may thus be observed that minerals have been classified into major and minor minerals based on their end use rather than level of production, level of mechanization export and import etc. Specific mineral criteria for classifying to Minor Mineral, based on end use for industrial purpose is given below.

Classification of major & minor minerals on the basis of end uses

Mineral	Major mineral	Minor mineral
Ordinary sand	Further clarified in rule 70 of MCR 1960 Sand ,not be treated as minor minerals a)for use for stowing purpose in coal mines. b)for purpose of refractory and manufacture of ceramics; c) for optical purposes; d) for metallurgical purposes; e) for manufacture of silvitrete cement f)for manufacture of sodium-silicate; g) for manufacture of pottery and glass.	a) According to section 3(e) of the Mines and Minerals Development and Regulation Act, 1957 “ minor minerals” means building stones, gravel, ordinary clay, ordinary sand other than sand used for prescribed purposes, and any other mineral which the Central Government may, by notification in the Official Gazette, declare to be a minor mineral. b) Ordinary sand other than sand used for prescribed purpose.
Limestone	Iron & Steel, Cement manufacturing Chemicals, Paper etc.	a) Limestone , lime shell & Kankar used in kiln for manufacturing of lime used as building materials. *b)Limestone used for manufacturing of road metals & bajri or other construction purpose. *c) High silica containing limestone used for stone dusting in coal mines to avoid spontaneous heating of the coal.
Dolomite	Iron & Steel, (blast furnace & sintering), Refractory grade, Glass grade.	*a) Dolomite used as building materials. *b) Dolomite used for manufacturing of road metals & bajri or other construction purpose. *c) High silica containing Dolomite used for stone dusting in coal mines to avoid spontaneous heating of the coal.

Mineral	Major mineral	Minor mineral
Quartzite	Iron & Steel, Refractory grade, ferrosilicon, BF grade, Ceramics & Pottary Grade	*a) Quartzite used as building materials. *b) Quartzite used for manufacturing of road metals & bajri or other construction purpose. *c) High silica containing Dolomite used for stone dusting in coal mines to avoid spontaneous heating of the coal.
Quartz	Glass grade, ferrosilicon, Sodium silicate, Ceramics & Pottery Grade. Foundry & moulding	*a) Quartz used as building materials. *b) Quartz used for manufacturing of road metals & bajri or other construction purpose. *c) High silica containing Quartz used for stone dusting in coal mines to avoid spontaneous heating of the coal.
Felspar	Glass grade, Ceramics & Pottery Grade.	*a) Felspar, used as building materials. *b) Felspar used for manufacturing of road metals & bajri or other construction purpose. *c) High silica containing Felspar used for stone dusting in coal mines to avoid spontaneous heating of the coal.
Granite	-----	a) Granite used as building materials. b) Granite used for manufacturing of road metals & bajri or other construction purpose. c) Used for slab making & tiles manufacturing
Marble	-----	a) Marble used as building materials. b) Marble used for manufacturing of road metals & bajri or other construction purpose. c) Used for slab making & tiles manufacturing

(1) "Act " means the / Mines and Minerals (Development and Regulation) Act, 1957(Central Act 67 of 1957)

(ii) "Appellate Authority" means the Government or any authority vested with such powers under these rules or any other authority empowered by the government to perform such functions;

(iii) "Assessee" means a person/ Lessee holding a mining lease or a short term permit and includes any other person who has excavated, removed or used or is excavating, removing, processing or using minor mineral or minerals.

(iv) "Assessing Authority" means Director/ Dy. Director(Mining / Geology) of the Department of Mines & Geology.,

(v) "Assessment Year" means the period beginning from the first day of April and ending on the thirty first day of March of the following year or part thereof;

(vi) "Director/Dy Director" means Director/Dy Director of the Department of Mines & Geology, of all State Governments having jurisdiction over the area concerned as may be fixed by the Government from time to time;

(vii) "Brick earth" means earth used for making bricks, Kavelus and earthen pots and shall include all types of earth used for construction of dams, canals, roads, rail embankments and other identical purposes;

(viii) "Building stone" means any rock or mineral which is used as building or construction material and includes such Minerals as specified in the schedule ;

(ix)"Competent Authority" means the Government or any other authority authorized by the Government to carry out the provisions of these rules;

(x)"Dead Rent" means the minimum guaranteed amount of royalty per year payable as per rules of agreement under a mining lease;

(xi)"Department" means the Department of Mines & Geology, Government of all state governments.

(xii)"Excavation" means digging and / or collecting of miner minerals from any land;

(xiii) "Forms" means forms appended to these rules;

(xiv)“Government” means the Government of all state governments

(xv) “Quarry Licence/ Lease” means a licence granted under these rules wherein a licensee is required to pay fixed annual licence fee exclusive or inclusive of royalty, as the case may be;

(xvi)“Royalty” means the charge payable to the Government in respect of the ore or mineral excavated, removed or utilized from any land as prescribed in Schedule-I

(xvii)“Royalty Collection Contract” means a contract for the specified mineral or minerals given to collect royalty (with or without permit fee as the case may be) on behalf of the Government from the quarry licensees and short term permit holders who excavate minor minerals from the lands specified under the contract where under the contractor undertakes to pay fixed amount annually to the Government. “

(xviii)“Schedule” means the schedule appended to these rules;

(xix)“Short Term Permit” means a permit granted restricted to sand under these rules for excavation and removal of a specified quantity within a specified period and from a specified area;

Words and expressions used but not defined in these rules shall have the meaning respectively assigned to them in the Act and the Mineral Concession Rules, 1960 made by the Central Government under Section-15 of the Act, provided that word “Mineral” wherever used in these rules shall mean “Minor Mineral”. For introduction of concept of mining plan in Minor Mineral Concession Rules, Section 14 of MM (DR) Act needs to be amended suitably for its applicability to minor minerals also.

4. Prospecting to precede mining operation: - No lease shall be granted by the State Government unless it is satisfied that there is evidence to show that the area for which the lease is applied for has been prospected earlier for minor minerals or the existence of minor minerals therein has been established otherwise.

5. Period for which prospecting licence may be granted or renewed:- The period for which a prospecting licence may be granted shall not exceed two years.

6. Period for which leases may be granted or renewed:-

(1) (a) The minimum period for which a lease may be granted shall be 10 years.

(b) Provided that the maximum period for which any such lease may be granted shall not be less than twenty years.

(2) A lease may be renewed for a period not exceeding ten years.

(3) Notwithstanding anything contained in Sub-rule (2), if the State Government is of the opinion that in the interest of development of minor minerals it is necessary to do so, it

may, for reasons to be recorded, authorize the renewal of a lease for a further period or periods not exceeding ten years in each case.

7. Minimum and maximum area for grant of a mining lease :-

(1)The minimum area that may be granted under a mining lease shall not less than -

- (a) One hectare, in respect of small deposits (not fragmented portions of larger ones), shallow in nature, isolated and not exceeding more than 200 metres in strike length. These deposits are small by virtue of either origin or mode of emplacement or dislocation due to geological disturbance.

Small deposits shall also include float deposits (transported) formed due to mechanical weathering and deposition, alluvial or eluvial (buried or otherwise), which generally have peculiar configuration excepting beach sands or placers:

- (b) Two hectares, in respect of beach sands or placers. Beach sands or placers are mono or multi mineral concentrations, including the dunes occurring on and off the coastal shore line. These deposits are the products of ebb and flow of tides, waves and inshore current, and at places semi-consolidated to consolidated in nature;

“Provided that in the case of renewal of mining lease, the restrictions of minimum area for grant of mining lease shall not be applicable “.

Provided that the State Government, if it is satisfied on the basis of proposed production level, Geological or topographical conditions may for the reasons to be recorded in writing, for granting mining lease not exceeding 50 hectare.

8. Scheme of prospecting: - (1) Every holder of a prospecting licence for minor mineral shall submit to the State Government or any person authorized in this behalf by that Government within a period of sixty days from the date of execution of the prospecting licence a scheme of prospecting indicating the manner in which he proposes to carry out the prospecting operation in the area covered by the licence and the scheme shall incorporate the following namely :-

- (a) particulars of the area:
- (b) the scale of the plan and the area of geological mapping:
- (c) the number of pits, trenches, and bore holes which he proposes to put in the area and the locations thereof:
- (d) the particulars of the machines to be used:
- (e) the details of exploratory mining to be undertaken:

- (f) the number of samples proposed to be drawn and tested:
- (g) baseline information of prevailing environmental conditions before the beginning of the prospecting operations:
- (h) any other matter relevant for the preparation of a scheme of prospecting, as directed by the State Government or any person so authorized from time to time by a general or specific order.

(2) The prospecting scheme under sub-rule (1) shall be prepared by a recognized person or a geologist or a mining engineer employed under the rule..

9. Modification of scheme of prospecting :- (1) A prospecting scheme prepared and submitted under Rule-8 may be modified at any time on geological considerations by the holder of a prospecting licence during continuance of the prospecting licence.

(2) Any modification carried out under sub-rule (1) shall be intimated to the State Government or any person authorized in this behalf by that Government, by the holder of a prospecting licence within a period of fifteen days.

10. Prospecting operations to be carried out in accordance with scheme of prospecting:- Every holder of a prospecting licence for minor mineral shall carry out the prospecting operations in accordance with the scheme of prospecting submitted under Rule-8 or with such modifications, if any, as intimated under Rule-9 or as directed by the State Government or any person authorized by that Government in this behalf.

11. Report of prospecting operations :- (1) Every holder of a prospecting licence for Minor mineral – specified or ornamental stones or non specified mineral shall submit to the State Government or any person authorized in the behalf by that Government an annual report in Form A so to reach them by 30th April for the previous year.

Provided that a report in Form-A shall be submitted within a period of three months after the completion of abandonment of the prospecting operations or the expiry of the prospecting licence, whichever is earlier..

(2)The State Government or any person authorized in this behalf by that government shall forward a copy, each of the Annual Report in Form–A, received under Sub-rule (1) to the Director of Mines & Geology of concerned State Governments within thirty days from the date of such receipt.

Mining Plan :

While mining plan is being prepared for the minor minerals the following issues may also seriously taken into consideration :-

- (a) Level of production,
- (b) Level of mechanization,
- (c) Type of machinery used in the mine of minor mineral,
- (d) Quantity of diesel consumption
- (e) Numbers of trees uprooted due to mining operation and
- (f) Export and import of the minor mineral etc.

12. Mining plan as a pre-requisite to the grant of lease :- No lease shall be granted or renewed by the State Government unless there is a mining plan duly approved by the State Government or any person authorized in this behalf by that Government for the development of the minor minerals deposit in the area concerned under the control of the state government.

13. Mining plan to be prepared by a Recognized Qualified Person :- (1) No mining plan shall be approved unless it is prepared by a qualified person recognized in this behalf by the State Government or any person authorized by that Government or by a recognized person under Rule-22(B) of the Mineral Concession Rules, 1960.

14. Grant of recognition by State Government:- (1) any person possessing the qualifications and experience required under Sub-rule (2) of Rule-13 may apply for recognition to the competent authority designated by the State Government for this purpose.

(2) The competent authority after making such enquiry as it deems fit, may grant or refuse to grant recognition and where recognition is refused the competent authority shall record the reasons in writing and communicate the same to the applicant.

(3) A recognition shall be granted for an initial period of ten years and may be renewed for further periods not exceeding ten years at a time.

Provided that the competent authority may refuse to renew recognition for reasons to be recorded in writing after giving an opportunity of hearing to the person concerned.

15. Approval and submission of Mining Plan: -- On receipt of the application for grant of mining lease for undertaking mining operations for minor minerals . The State government shall take decision to grant precise area for the said purpose and communicate such decision to the applicant and on receipt of the communication from the state Government of the precise area to be granted, the applicant shall submit a mining plan within a period of three months from the date on which such communication is received or such other period as may be allowed by the State Government for the approval and the said mining plan shall incorporate:-

- (i) (a) the plan of the precise area showing the nature and extent of the minor minerals body ;
- (b) spot or spots where the excavation too be done in the first five year plan period and its extent ;
- (c) a detailed cross-section and detailed plan of spots of excavation based on prospecting data gathered by the applicant ;
- (d) a tentative scheme of mining for the second five year plan period of the lease;

- (ii) details of the geology and lithology of the precise area including minor mineral reserves of the minor mineral area;
- (iii) the extent of manual mining or mining by the use of machinery and mechanical devices on the precise area;
- (iv) the plan of the precise area showing natural water courses, limits of reserved and other forest areas and density of trees, if any, assessment of impact of mining activity on forest land surface and environment including air and water pollution; details of scheme for restoration of the area by afforestations, land reclamation, use of pollution control devices and of such other measures under Mine Closure Plan – Progressive & Final Mine Closure Plan (Guidelines given in Annexure-III).
- (v) Annual programme and plan for excavation on the precise area from year to year for five years;
- (vi) Environmental clearance for cluster of minor mineral leases from the core area of mining for 5 km radius having area less than 50 hect. may be required from the State Environmental Appraisal Committee.
- (vii) Any other matter which the State Government or any person so authorized may require the applicant to provide in the mining plan.

MINING OPERATIONS

16. Mining Plan as a pre-requisite to the commencement of mining operations:-

- (1) No person shall commence mining operations for minor minerals in any area except in accordance with a mining plan approved under these rules;
- (2) The State Government or any person authorized in this behalf by that Government may require the holder of a lease to make such modifications in the mining plan referred to in Sub-rule (1) or impose such conditions as it considers necessary by an order in writing if such modifications or imposition of conditions are considered necessary in the light of the experience of operation of mining plan or in view of the change in the technological development.
- (3) A holder of a lease, desirous of seeking modifications in the approved mining plan as are considered expedient, in the interest of safe and scientific mining, conservation of minor minerals and for the protection of environment, shall apply to the State Government or any person authorized in this behalf by that Government setting forth the intended modifications and explaining the reasons for the same.

- (4) The State Government or any person authorized in this behalf by that Government may approve the modifications under Sub-rule (3) or approve with such alterations as it may consider expedient.

17. Mine Closure Plan – Every mine shall have Mine Closure Plan which shall be of two type -

- i) Progressive Mine Closure Plan; and
- ii) Final Mine Closure Plan.

17A Submission of Progressive Mine Closure Plan :- (1) The owner, agent, manager or mining engineer shall, in case of fresh grant or renewal of mining lease, submit a Progressive Mine Closure Plan as a component of mining plan to the officer authorized by the State Government in this behalf as the case may be.

(2) The owner, agent, manager or mining engineer shall, in case of existing mining lease submit a progressive mine closure plan to the officer authorized by the State Government in this behalf, as the case may be, for approval within a period of one year from the date of commencement of this rule.

(3) The owner, agent, manager or mining engineer shall review the progressive mine closure plan every five years from the date of its approval in case of existing mine or from the date of opening of the mine in case of fresh grant or from the date of renewal of mining lease, as the case may be, and shall submit to the officer authorized by the State Government in this behalf, as the case may be, for its approval.

(4) The officer authorized by the State Government in this behalf, as the case may be, shall convey his approval or refusal of the progressive mine closure plan within ninety days of the date of its receipt.

(5) If approval or refusal of the progressive mine closure plan is not conveyed to the owner, agent, manager or mining engineer of the mining lease within the period as specified in Sub-rule (4), the progressive mine closure plan shall be deemed to have been provisionally approved, and such approval shall be subject to final decision whenever communicated.

17.B Submission of Final Mine Closure Plan :-

(1) The owner, agent, manager or mining engineer shall submit a final mine closure plan to the officer authorized by the State Government in this behalf, as the case may be, for approval one year prior to the proposed closure of the mine.

(2) The officer authorized by the State Government in this behalf, as the case may be, shall convey his approval or refusal of the final mine closure plan within ninety days of the date of its receipt to the owner, agent, manager or mining engineer.

(3) If approval or refusal of the final mine closure plan is not conveyed to the owner, agent, manager or mining engineer of the mining lease within the period as specified in Sub-rule (2), the final mine closure plan shall be deemed to have been provisionally approved and such approval shall be subject to final decision whenever communicated.

17.C The modification of mine closure plan:- (1) The holder of a mining lease desirous of seeking modifications in the approved mine closure plan, shall submit to the officer authorized by the State Government in this behalf, as the case may be, for approval setting forth the intended modifications and explaining the reasons for such modifications.

(2) The officer authorized by the State Government in this behalf, as the case may be, may approve the modifications as submitted under clause (1) or approve with such alterations as he may consider expedient.

17.D Responsibility of the holder of mining lease :- (1) The owner, agent, manager or mining engineer shall have the responsibility to ensure that the protective measures contained in the mine closure plan referred to in this rule including reclamation and rehabilitation work have been carried out in accordance with the approved mine closure plan or with such modifications as approved by the officer authorized by the State Government in this behalf under this rule.

(2) The owner, agent, manager or mining engineer shall submit to the officer authorized by the State Government in this behalf, as the case may be, a yearly report before 1st July of every year setting forth the extent of protective and rehabilitative works carried out as envisaged in the approved mine closure plan, and if there is any deviation, reasons thereof.

17.E Financial assurance:- (1) Financial assurance, has to be furnished by every leaseholder. The amount of financial assurance shall be rupees 15 thousand per hectare of the mining lease area put to use for mining and allied activities. However, the minimum amount of financial assurance to be furnished in any of the forms referred to in Clause (2) shall be rupees 50 thousand..

Provided that a leaseholder shall be required to enhance the amount of financial assurance with the increase in the area of mining and allied activities.

Provided further that where a leaseholder undertakes reclamation and rehabilitation measures as part of the progressive closure of mine, the amount so spent shall be reckoned as sum of the financial assurance already spent by the leaseholder and the total amount of financial assurance, to be furnished by the lessee, shall be reduced to that extent;

(2) The financial assurance shall be submitted in one of the following forms to the officer authorized by the State Government in this behalf, as the case may be, or any amendment to it ,

- (a) Letter of Credit from any Scheduled Bank;
- (b) Performance or surety bond;
- (c) Trust fund build up through annual contributions from the revenue generated by mine and based on expected amount sum required for abandonment of mine or
- (d) Any other form of security or any other guarantees acceptable to the authority;

(3) The lessee shall submit the financial assurance to the officer authorized by the state government in this behalf, as the case may be, before executing the mining lease deeds. In case of an existing mining lease, the lessee shall submit the financial assurance along with the progressive mine closure plan.

(4) Release of financial assurance shall be effective upon the notice given by the lessee for the satisfactory compliance of the provisions contained in the mine closure plan and certified by the officer authorized by the State Government in this behalf, as the case may be.

(5) If the officer authorized by the State Government in this behalf, has reasonable grounds for believing that the protective, reclamation and rehabilitation measures as envisaged in the approved mine closure plan in respect of which financial assurance was given has not been or will not be carried out in accordance with the mine closure plan, either fully or partially, the officer authorized by the State Government in this behalf, shall give the lessee a written notice of his intention to issue the orders for forfeiting the sum assured at least thirty days prior to the date of the order to be issued.

(6) Within thirty days of the receipt of notice referred to in Sub-rule (5), if no satisfactory reply has been received in writing from the lessee, the officer authorized by the State Government in this behalf as the case may be, shall pass an order for forfeiting the surety amount and a copy of such order shall be endorsed to the concerned State Government.

(7) Upon the issuance of order by the officer authorized by the State Government in this behalf, as the case may be, the concerned State Government may realize any letter of credit or bond or any other surety, guarantee provided or obtained as financial assurance for the purpose of performance of protective, reclamation, rehabilitation measures and shall carry out those measures, or appoint as agent to do so.

18. Mining Plan to be submitted by the existing lessee:-

(1) Where mining operations for minor minerals have been undertaken before the commencement of these rules without an approved mining plan, the holder of such lease shall submit a mining plan within a period of one year from the date of commencement of these rules, to the State Government or any person authorized in this behalf by that Government for its approval.

(2) If a holder of a lease has not been able to submit the mining plan within the specified time for reasons beyond his control, he may apply for extension of time giving reasons to the State Government or any person authorized in this behalf by that Government.

(3) The State Government or any person authorized in this behalf by that Government on receiving an application made under Sub-rule (2) my, on being satisfied, extend the period for submission of the mining plan for a period which may not exceed four years.

(4) The State Government or any person authorized in this behalf by that Government may approve the mining plan submitted by the lessee under Sub-rule (1) or any require modifications to be carried out in the mining plan and the lessee shall carry out such modifications and resubmit the modified mining plan for approval of the State Government or the person so authorized as the case may be.

(5) The State Government or any person authorized in this behalf by that Government shall, within a period of ninety days from the date of receipt of the mining plan or the modified plan convey its or his approval or disapproval to the applicant and in case of disapproval it or he shall also convey the reasons for disapproving the said mining plan or the modified mining plan.

(6) If no decision is conveyed within the period stipulated under Sub-rule (5), the mining plan or the modified mining plan as the case may be, shall be deemed to have been provisionally approved and such approved shall be subject to the final decision whenever communicated.

(7) The mining plan submitted under Sub-rule (1) shall be prepared by a recognized qualified person.

19. Review of Mining Plan:-

(1) Every mining plan duly approved under these rules shall be valid for the entire duration of the lease.

(2) The owner, agent, mining engineer or manager of every mine or quarry shall review the mining plan as prescribed under Sub-rule (1) and submit a scheme of mining for the next five years of the lease to the State Government or any person authorized in this behalf by that Government for approval.

(3) The scheme of mining shall be submitted to the State Government or any person authorized in this behalf by that Government at least one hundred twenty days before the expiry of the five years period for which it was approved on the last occasion.

(4) The State Government or any person authorized in this behalf by that Government shall convey its or his approval or refusal to the scheme of mining within ninety days of the date of its receipt.

(5) If approval or refusal of the scheme of mining is not conveyed to the holder of the lease within the stipulated period, the scheme of mining shall be deemed to have been provisionally approved and such approval shall be subject to final decision whenever communicated.

(6) The provisions of Rule-13 shall apply to the scheme of mining in the same way as they are applicable to the mining plan.

(7) Every scheme of mining submitted under Sub-rule (2) shall be prepared by a recognized qualified person or a person under Sub-Rule (1) Rule (13).

20. Mining operations to be in accordance with mining plan :-

(1) Every holder of a lease shall carry out mining operations for minor minerals in accordance with the mining plan with such conditions as may have been prescribed under Sub-rule (2) of Rule-16 or with such modifications, if any, as permitted under Sub-rule (4) of Rule-16 or the mining plan or the scheme approved under rule 12 or 18 or 19 as the case may be.

(2) If the mining operations are not carried out in accordance with the mining plan as referred to under sub-rule (1), the State Government or any person authorized in this behalf by that Government may order suspension of all or any of the mining operations and permit continuance of only such operations as may be necessary to restore the conditions in the quarry as envisaged under the said mining plan.

21. Prospecting and mining operations:- The prospecting and mining operations shall be carried out in such a manner so as to ensure systematic development and conservation of minor minerals deposits and protection of environment.

22. System of working :-

(1) System of working in minor minerals quarries in sheet rock shall be performed by formation of benches as per MMR Regulation-115.

(2) Such benches in minor minerals and overburden including weathered minor minerals shall be formed separately and the benches in overburden shall be kept sufficiently in advance so that their working does not interfere with the working of minor minerals and inter mixing of minor minerals with overburden may be avoided.

23. Separate stacking of non-saleable or low grade minor minerals :-

(1) The non-saleable minor mineral rejects at quarry bottom should regularly be collected and transported to the surface and the quarry floor kept reasonably clear of debris.

(2)Such non-saleable minor minerals suitable for possible use by small scale industries sector shall be properly recovered.

(3)The ground selected for dumping of top soil overburden waste material or non-saleable minor mineral shall be away from working quarry.

(4)Before starting mining or quarrying operations, conceptual ultimate limits of the quarry shall be determined and dumping ground shall be so selected that dumping is not carried out within the limits of the ultimate size of the quarry except where simultaneous back filling is proposed.

24. Notice for opening of a mine and intimation of existence of a mine :- The owner, agent, mining engineer or manager of every minor mineral quarry shall send to the State Government or any person authorized in this behalf by that Government an intimation in Form-B of the opening of a mine so as to reach them within fifteen days of such opening or of the existence of a mine at the time of the commencement of the rules within ninety days from such commencement, as the case may be.

25. Abandonment or surrender of quarries :-

(1) The owner, agent, mining engineer or manager of every minor mineral quarry shall not abandon or surrender a minor mineral quarry or a part of such quarry during the subsistence of the lease except with prior permission in writing of the State Government or any person authorized in this behalf by that Government.

(2) Notice for abandonment or surrender of a minor mineral quarry or a part thereof shall be given in Form-C and shall be accompanied by plans and sections on a scale of not less than 1 cm=10 metres showing accurately the work done in such quarry up-to the date of submission of the notice.

(3) The State Government or any person authorized in this behalf by that Government may by an order in writing prohibit abandonment or refuse surrender or allow the abandonment or surrender of a minor mineral quarry or a part thereof with such conditions as he may specify in the order.

(4) Where an abandonment of a minor mineral quarry or part thereof takes place as a result of the occurrence of a natural calamity beyond the control of the owner, agent, mining engineer or manager of a such quarry, or the lease is terminated in compliance of any order or directions issued by any statutory authority established under any law for the time being in force or any tribunal or a court, an intimation shall be sent to the State Government or any person authorized in this behalf by that Government within a period of twenty-four hours of such abandonment or termination and the notice of abandonment as provided in Sub-rule (2) shall be submitted to the State Government or any person in this behalf by that Government authorized within a period of fifteen days of such abandonment or termination.

26. Notice of temporary discontinuance of work in quarries:- The owner, agent, mining engineer or manager of every minor mineral quarry shall send to the State Government or any person authorized in this behalf by that Government a notice in Form-D when the work in such quarry is discontinued for a period exceeding sixty days so as to reach them within seventy five days from the date of such temporary discontinuance.

27. Intimation of reopening of a quarry :- The owner, agent, mining engineer or manager of every minor mineral quarry shall send to the State Government or any person authorized in this behalf by that Government an intimation in Form-E of reopening of such quarry after temporary discontinuance so as to reach them within fifteen days from the date of such reopening.

28. Copies of plans and sections to be submitted :- The owner, agent, mining engineer or manager of every minor mineral quarry shall submit to the State Government or any person authorized in this behalf by that Government , a copy of the plans and sections maintained under these rules, as and when required by that Government or such person, as the case may be.

29. Preparation of plans :-

(1) All plans, sections and tracings or copies thereof kept at the minor mineral quarry shall be serially numbered or suitably indexed.

(2) Every plan, section or part thereof prepared under these rules shall carry thereon a certificate for its correctness and shall be signed by the Mining Engineer / Geologist with date.

(3) Every copy of a plan and section or part thereof submitted or maintained under these rules shall bear a reference to the original plan or section from which it was copied and shall be certified thereon by the owner, agent, mining engineer or manager or geologist.

SYSTEMATIC AND SCIENTIFIC MINING

30. Protection of environment:- Every holder of a prospecting licence or a lease shall take all possible precautions for the protection of environment and control of pollution while conducting prospecting, mining or processing of minor mineral in the area for which such licence or lease is granted.

31. Removal and utilization of top soil :-

(1) Where top soil exists and is to be excavated for prospecting or mining operations for minor mineral, it should be removed separately.

(2) The top soil so removed shall be utilized for restoration and rehabilitation of the land which is no longer required for prospecting or mining operations or for stabilizing or landscaping the external dump.

(3) Where top soil cannot be used concurrently, it shall be stored separately for future use, keeping in view that the bacterial organism should not die and should be spread nearby area.

32. Storage of overburden, waste rock etc.:-

(1) The overburden, waste rock and non-saleable minor mineral generated during prospecting or mining operations for minor mineral shall be stored separately in properly formed dumps on grounds earmarked.

(2) Such dumps shall be properly secured to prevent the escape of material in harmful quantities which may cause degradation of the surrounding land or silting of water courses.

(3) Wherever possible, such waste rock or overburden or other rejects, shall be backfilled into the worked out minor mineral quarry, where minor has been recovered up to the optimum depth, with a view to restore the land to its original use or desired alternate use, as far as possible and where the backfilling is not feasible, the waste dumps shall be suitable terraced and stabilized by planting vegetation or otherwise.

33.(i) Reclamation and Rehabilitation of lands :- Every holder of prospecting licence or mining lease shall undertake the phased restoration, reclamation and rehabilitation of land affected by prospecting or mining operation and shall complete this work before the conclusion of such operations and abandonment of prospect of mine.

(ii) Restoration, Reclamation and rehabilitation in a cluster :- Where large numbers of small mines are situated and worked out in clusters, at such places the provisions of quarrying of minor minerals should be done in a systematic and scientific manner. The programme of restoration and reclamation of the mined out area and rehabilitation must be made jointly in phased manner in the abandoned areas in a entire cluster of the minor minerals. Environmental clearance may be obtained by corporate body or the concept of Regional Environmental Assessment (REA) and Regional Environmental Management Plan(REMP) prepared accordingly.

34. Precaution against air pollution :- Air pollution due to dust, exhaust emissions or fumes during prospecting, mining or processing operations for minor mineral and related activities shall be controlled and kept within permissible limits specified under any environmental laws for the time being in force.

35. Discharge of effluents:- Every holder of a prospecting licence or a lease shall take all possible precautions to prevent or reduce to a minimum the discharge of toxic and objectionable liquid effluents from minor mineral quarry, workshop or processing plant

into surface of ground water bodies and usable lands. These effluents shall conform to the standards laid down in this regard.

36. Precaution against noise:- Noise arising out of prospecting, mining and processing operations for minor mineral shall be abated or controlled by the holder of prospecting licence or a lease at the source so as to keep it within the permissible limit.

37. Permissible limits and standards:- The standards and permissible limits of all pollutants, toxins and noise referred to in Rule-33, 34 and 35 shall be those notified by the concerned authorities under the provisions of the relevant statutes from time to time.

38. Restoration of flora :-

(1) Every holder of prospecting licence or a mining lease shall carry out prospecting or mining operations as the case may be, in such a manner so as to cause least damage to the flora of the area held under prospecting licence and the nearby area or mining lease

(i) Take immediate measures for planting in the same area or any other area selected by concerned authority or Regional Office of MOEF or the authorized officer not less than twice the number of trees destroyed by reason of any prospecting or mining operation,

(ii) Look after them during the subsistence of the licence / leasee after which these trees shall be handed over to the state Forest department or any other authority as may be nominated by the State Government.

(iii) Restore, to the extent possible, other flora destroyed by prospecting or mining operation.

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FORM – A
(Yearly Report of Prospecting Operations carried out)
(See rule 11(1) and 11(2))

IMPORTANT

This report duly filled in must reach the Concerned authorities by 30 th April for the previous year or within 30 days from the date of abandonment or within three months after the expiry of prospecting licence or completion of prospecting operation, which ever is earlier

To

The state government concerned or any person so authorized.

1.Type of the minor mineral for which :
(a) prospecting operation has been granted

2. Name and address of the licence
3.particulars of the prospecting licensee :

- (i) Date of execution :
- (ii) Period : Years From to :
- (iii) Area under licence : Hectares
- (iv) No. and date assigned by State Government to Prospecting Licenced No. : Date:

4. Location of the prospecting licenced area :

- (i) Topo sheet Number :
- (ii) Cadastral Survey or Khasra Nummber :
- (iii) Village: Taluka/Tehsil: District: State:
- (iv) Post Office : Police Station:
- (v) Nearest railway station : Distance:
- (vi) Nearest Rest House/ Dak Bungalow :

5.Particulars of the Mining Engineer or Geologist employed optionally, if any, for the prospecting licenced area :

- (i) Name and address :
- (ii) Qualification :
- (iii) Date of appointment :
- (iv) Status of employment : Whole time: Part time :

6. Status of Prospecting Operation : In Progress :
Please tick mark on the boxes Completed :
Whichever is applicable Abandoned :

7. Total surface area covered by prospecting work (hectare) :

8. Prosecting work completed during the year :

- a. Geological mapping : Area in Hectare Scale :
- b. Pitting (i) No. of Pits :
(ii) Grid pattern :
(iii) Depth (Mts.) Average :
Maximum :
Minimum :
- c. Trenching (i) No. of trenches (with interval) :
(ii) Length (Mts.) Average :
Maximum :
Minimum :
- d. No. and size of samples :
- e. Drilling :
No. of boreholes completed during the year (with size of core):
(ii) No of boreholes in progress :
(iii) Total yearly drilling (Mts.) :
Particulars of drilling machines Type Make Capacity No. of drills
- g. Details of samples tested:
(i) No. of samples tested :
(ii) Complete report :
(Testing the suitability as per market requirement)

Place :

Date :

Signature :

Name in full :

Designation :

Note: Please enclose a geological report describing the prospecting operations undertaken so far accompanied by the detailed geological plans and sections showing structural details such as joints, fractures, folds, faults, grain size, texture etc. and also showing locations of (a) bore holes (b) pits, (c) trenches, (d) sample positions etc. The report shall also contain the bore hole logs and the inferences drawn as a results of the study of the geology of the area and the interpretation of the bore hole core, pits, trenches, reserves of minor mineral and complete report of at least two representative samples indicating quality and suitability of mineral as per market requirements.

FORM – B
(Notice of Intimation of Opening of Mine Quarry)
(See Rule-24)

IMPORTANT

Notices in this form shall reach the concerned authorities within concerned or 15 days of the date of opening of the quarry or within 90 days of coming into force of these rules to intimate existence of a quarry,

To
1. State Government
any person so authorized.
(as the case may be)

1. (i) Name of minor mineral worked :
(ii) Name of other mineral(s) worked, if any :
2. Name of the quarry/mine :
3. Date of opening of quarry / mine :
4. Letter No. and Date through which the mining plan was approved :
(Specify Authority)
5. Name and address of the Lessee/Owner :
6. Ownership of the quarry :
 - a. Public sector :
 - b. Joint sector :
 - c. Private sector :(In case of joint sector, specify percentage share of each company)
7. In case the lessee is a Company or a partnership firm or Co-operative indicate name and address of the Director-in-Charge and the Registered Office :
8. Particulars of Quarry/Mining Lease (ML) :
 - (i) Date of execution :
 - (ii) Period : Years From: to:
 - (iii) Area under licence : Hectares
9. Location of the lease :

- (i) Topo Sheet Number :
- (ii) Cadastral Survey or Khasra Number :
- (iii) Village : Taluka/Tehsil: District : State :
- (iv) Post Office : Police Station :
- (v) Nearest railway station : Distance :
- (vi) Nearest Rest House/Dak Bungalow :
- 10. Name and address of previous owner, if any, and the date of abandonment :

11. Particulars of Agent :

- a. Name and address :
- b. Date of appointment :

12. Particulars of Mining Engineer :

- a. Name and address :
- b. Qualifications :
- c. Date of appointment :
- d. Status of employment :
 - Whole time : Part time :

13. Particulars of manager:

- a. Name and address :
- b. Date of appointment :

Place:
Date :

Signature :
Name in full:

Designation: Owner / Agent/ Mining
Engineer Manager

FORM-C

V (Notice of Intention of Abandonment/Surrender of Mine/Quarry or part of the Mine Quarry)

{See rule 25(2) and rule 25(4)}

IMPORTANT

Notice in this Form shall be sent under Registered cover. If the abandonment/ concerned

**To,
State Government**

Surrender is due to reasons beyond the control of any person so authorized . the lessee, this notice shall be sent within 15 Days of such abandonment /surrender.

1. (i) Type of the minor mineral worked :
(ii) Name of other mineral(s) worked, if any :

2. Name of the mine quarry :
- 3 Name and Address of the Lessee/Owner:
- 4 Particulars of Mining/ Quarry Lease(OML) :
 - (i) Date of execution :
 - (ii) Period: Years From: to:
 - (iii) Area under lease.....Hectares

5. Location of Quarry/Mine :
 - (i) Topo Sheet number :
 - (ii) Cadastral Survey or Khasra Number :
 - (iii) Village: Taluka/Tehsil: District: State
 - (iv) Post Office: Police Station:
 - (v) Nearest railway station:
 - (vi) Nearest Rest House/Dak Bungalow :

6. Name and address of Agent :

7. Particulars of Mining Engineer :
 - (a) Name and Address :
 - (b) Qualifications :

8. Date by which mining operations are to be abandoned or mine to be surrendered:

9. Reasons for abandonment/surrender

Exhaustion of minor mineral: Lack of Demand:
Uneconomic operations: Non availability of labour:
Land slide: Flooding of quarry:
Other calamity (specify): Other reasons (specify):
(Please tick whichever is applicable)

10. If the abandonment is due to natural calamities or order/directions issued by any statutory authority/tribunal/Court for abandoning mining operations the date of such abandonment.

11. Reserve of the mineral a) Proved:
Proved in the area. b) Probable:
c) Possible:
12 Total production of the mineral since first opening of quarry/mine:

13. Number of workers employed in the Quarry: Male: Female:

Company Labour (Direct) :
Contract Labour

Place :
Date :

Signature:
Name in full:
Designation: Owner/Agent/Mining Engineer/Manager

Note : 1. In cases where part of the lease area is proposed to be abandoned/surrendered, information relating only to such part shall be given in columns 11, 12 and 13.
2. Please enclose plans/sections of the lease areas on a scale not less than 1:1000 (1 centimeter = 10 meter) indicating accurately the work done in the quarry upto the time of submission of this notice including measures envisaged for protection of abandonment/surrendered quarry and approaches there to and the environment.

FORM-D

(Notice of Temporary Dis-continuance of Quarry Mine)

(See Rule-26)

MINE QUARRY CODE-----

IMPORTANT

**Notice in this Form shall be sent
So as to reach the concerned
Authorities mentioned within 75
Days of temporary discontinuance
For the period exceeding 60 days.**

**To,
1. State Government concerned
or any person so authorized.**

1. (i) Type of the minor mineral worked :
(ii) Name of the other mineral(s) worked, if any :
2. Name of the mine quarry :
3. Name and Address of the lessee/Owner :
4. Particulars of quarry mine Lease :
(i) Date of execution :
(ii) Period years from: to:
(iii) Area under lease..... Hectares
5. Location of Quarry Mine :
(i) Topo Sheet Number :
(ii) Cadastral Survey or Khasra Number :
(iii) Village Taluka/Tehsil: District: State:
(iv) Post Office: Police Station :
(v) Nearest Railway station : Distance:
(vi) Nearest Rest House Dak Bungalow:
5. Name and Address of Agent:
6. Name and Address of the Mining Engineer:

7. Reasons for discontinuance:
Lack of demand :
Non availability of Labour :
Rains :
Transport bottleneck :
Strike :
Lock out :
Operation becoming uneconomic:
Other reasons (specify) :
(Please tick whichever is applicable)

9. Date of discontinuance of mining operation :

10. Probable date of reopening :

Place :

Date :

Signature:

Name in full:

Designation: Owner/Agent/Mining Engineer/Manager

FORM-E

(Notice of Intimation of Reopening of Quarry Mine)

(See Rule-27)

MINE QUARRY CODE.....

IMPORTANT

Notice in this Form shall reach the Concerned authorities within 15 days of the date of reopening Of the quarry.

**To,
1. State Government concerned
or any person so authorized**

- (i) Type of the minor mineral worked :
- (ii) Name of other mineral(s) worked, if any :

1. Name of the quarry/ mine:

2. Name and address of the Lessee/Owner:

3. Particulars of Quarry/Mining Lease(QML):

iii) Date of execution:

iv) Period: _____ years from: _____ to:

iii) Area under lease.....Hectares

4. Location of Quarry/Mine

- (i) Topo Sheet Number _____ :
- (ii) Cadastral Survey or Khasra Number _____ :
- (iii) Village: _____ Taluka/Tehsil: _____ District: _____ State: _____
- (iv) Post Office: _____ Police Station: _____
- (v) Nearest railway station: _____ Distance: _____
- (vi) Nearest Rest House/Dak Bungalow: _____

5. Name and Address of Agent:

6. Name and Address of the Mining Engineer:

7. Date on which the quarry/mine was

- a) Abandoned:
- b) Discontinued:

8. Date of reopening:

Place:

Signature:

Date:

Name in full:

Designation: Owner/Agent/Mining Engineer/Manager

MINING PLAN FORMAT

INTRODUCTORY NOTES	
2. If more space is needed to fill out a block of information, use additional sheets and attach to form. All the plans and sections should be in accordance with MCDR,1988 and or MMR,1961.	
1.GENERAL	
a) Name of the applicant	
Address	
District	
State	
Pin Code	
Phone	
Gram	
Telex	
e-mail	
b) Status of the applicant	
Private individual	
Cooperative Association	
Private Company	
Public Company	
Public Sector Undertaking	
Joint Sector Undertaking	
Other (pl.specify)	
c) Mineral(s) which are occurring in the area and which the applicant intends to mine	
d) Period for which the mining lease is granted / renewed / proposed to be applied	
e) Name of the RQP preparing the mining plan	
Address	
Phone	
Fax	
e-mail	
Telex	
Registration No.	
Date of grant / renewal	
Valid upto	
f) Name of the prospecting agency	
Address	
Phone	
g) Reference no. and date of grant /communication received form the State Govt.	
2. LOCATION AND ACCESSIBILITY	
a) Details of area (with location map)	
District and State	

Taluka				
Khasra No./ Plot No./ Block Range / Felling Series etc.				
Lease Area (hectares)				
Whether the area is recorded to be in forest (please specify whether protected , reserved etc.)				
Ownership / Occupancy				
Existence of public road / railway line, if any nearby and approximate distance				
Toposheet No. with latitude and longitude				
Land Use Pattern (Forest, Agricultural, Grazing, Barren etc.)				
b) Attach a general location and vicinity map showing area boundaries and existing and proposed access routes. It is preferred that the area to be marked on a Survey of India topographical map or a cadastral map or forest map as the case may be. However if none of these are available, the area should be shown on an accurate sketch map on scale of 1 : 5000.				
PART - A				
3. GEOLOGY AND EXPLORATION				
a) Briefly describe the topography and general geology and local / mine geology of the mineral deposit including drainage pattern.				
b) The topographic plan of the lease area prepared on a scale of 1 : 1000 or 1 2000 with contour interval of 3 to 10 m. depending upon the topography of the area should be taken as the base plan for preparation of geological plan. The details of exploration already carried out including evidences of mineral existence should be shown on the geological plan.				
c) Geological sections should be prepared at suitable intervals on a scale of 1:1000 / 1 : 2000.				
d) Broadly indicate the year wise future programme of exploration, taking into consideration the future production programme planned in next five years as in table below :-				
Year	No. of boreholes	Total meterage	No. of Pits and Dimensions	No. of Trenches and Dimensions
First				
Second				
Third				
Fourth				
Fifth				
e) Indicate geological and recoverable reserves and grade, duly supported by standard method of estimation and calculations along with required sections (giving split up of various categories i.e. proved, probable, possible). Indicate cutoff grade. Availability of resources should also be indicated for the entire leasehold.				

f) Indicate mineable reserves by slice plan / level plan method, as applicable, as per the proposed mining parameters.

4. MINING

a) Briefly describe the existing / proposed method for developing / working the deposit with all design parameters.

Note : In case of pocket deposits, sequence of development / working may be indicated on the same plan.

b) Indicate quantum of development and tonnage and grade of production expected pitwise as in table below :-

Year	Pit No.(s)	Overburden	ROM Ore/mineral	Saleable Ore/mineral	Sub grade Ore/mineral	Mineral Rejects	Ore to Overbuden ratio
First							
Second							
Third							
Fourth							
Fifth							

Composite plans and year wise sections

d) Attach supporting composite plan and section showing pit layouts, dumps, stacks of sub-grade mineral, if any, etc.

e) Indicate proposed rate of production when the mine is fully developed, and the expected life of the mine and the year from which effected.

f) Attach a note furnishing a conceptual mining plan for the entire lease period based on the geological, mining and environmental considerations.

g) Opencast mines :

i) Describe briefly giving salient features of the mode of working (mechanised, semi-mechanised, manual)

ii) Describe briefly the layout of mine workings, the layout of faces and sites for disposal of overburden / waste. A reference to the plans enclosed under 4(b) and 4 (d) will suffice.

5. BLASTING

a) broad blasting parameters like charge per hole, blasting pattern, charge per delay, maximum number of holes blasted in a round, manner and sequence of firing, etc.

b) type of explosives used / to be used

c) powder factor in ore and overburden / waste / development heading / stope			
d) whether secondary blasting is needed, if so describe it briefly			
e) storage of explosives (like capacity and type of explosive magazine)			
6.MINE DRAINAGE			
a) likely depth of water table based on observations from nearby wells and water bodies			
b) workings expected to be _____ m. above / reach below water table by the year _____ .			
c) quantity and quality of water likely to be encountered, the pumping arrangements and places where the mine water is finally proposed to be discharged			
7. STACKING OF MINERAL REJECTS AND DISPOSAL OF WASTE			
a) indicate briefly the nature and quantity of top soil, overburden / waste and mineral rejects likely to be generated during the next five years :			
Year	Top Soil	Overburden / waste	Mineral Rejects*
First			
Second			
Third			
Fourth			
Fifth			
b) land chosen for disposal of waste with proposed justification			
c) attach a note indicating the manner of disposal and configuration, sequence of build up of dumps along with the proposals for the stacking of sub-grade ore, to be indicated year wise.			
8. USE OF MINERAL			
a) describe briefly the end-use of the mineral (sale to intermediary parties, captive consumption, export, industrial use)			
b) indicate physical and chemical specifications stipulated by buyers			
c) give details in case blending of different grades of ores is being practiced or is to be practiced at the mine to meet specifications stipulated by buyers.			
9.OTHER			
Describe briefly the following :			
a) Site services :			
b) Employment potential :			
Highly Skilled			
Skilled / Semi-Skilled/ Un-Skilled			

10. MINERAL PROCESSING
a) If processing / beneficiation of the ore or minerals mined is planned to be conducted on site or adjacent to the extraction area, briefly describe the nature of the processing / beneficiation.
b) Explain the disposal method for tailings or waste from the processing plant (quantity and quality of tailings proposed to be discharged, size and capacity of tailing pond , toxic effect of such tailings, if any, with process adopted to neutralise any such effect before their disposal and dealing of excess water from the tailing dam).
c) A flow sheet or schematic diagram of the processing procedure should be attached.
d) Specify quantity and type of chemicals to be used in the processing plant.
e) Specify quantity and type of chemicals to be stored on site / plant.
f) Indicate quantity (cu.m. per day) of water required for mining and processing and sources of supply of water. Disposal of water and extent of recycling.
PART - B
11. ENVIRONMENTAL MANAGEMENT PLAN
a) Attach a note on the status of baseline information with regard to the following :
- existing land use pattern indicating the area already degraded due to quarrying / pitting, dumping, roads, processing plant, workshop, township etc in a tabular form.
- water regime
- flora and fauna
- quality of air, ambient noise level and water
- climatic conditions
- human settlements
- public buildings, places of worship and monuments
- attach plans showing the locations of sampling stations
- does area (partly or fully) fall under notified area under Water (Prevention & Control of Pollution), Act, 1974
b) Attach an Environmental Impact Assessment Statement describing the impact of mining and beneficiation on environment on the following over the next five years (and up to conceptual plan period for 'A' category mines)
i) Land area indicating the area likely to be degraded due to quarrying / pitting, dumping, roads, workshop, processing plant, township etc.
ii) Air quality
iii) Water quality
iv) Noise levels
v) Vibration levels (due to blasting)

vi) Water regime
vii) Socio-economics
viii) Historical monuments etc.
c) Attach an Environmental Management Plan (supported by appropriate plans and sections) defining the time bound action proposed to be taken with sequence & timing in the following areas (or diagrams should be used) :
- temporary storage and utilisation of topsoil
- year wise proposal for reclamation of land affected by abandoned quarries and other mining activities during first five years clarifying the extent of back filling and re-contouring and / or alternative use of unfilled / partially filled excavations / road sides / slopes and mine. In case abandoned quarries / pits are proposed to be used as reservoir, their size , water holding capacity and proposal for utilisation of such water be given.
- programme of afforestation, year wise for the initial five years indicating the number of plants with name of species to be afforested under different areas in hectares.
- stabilisation and vegetation of dumps along with waste dump management year wise for the first five years.
- measures to control erosion / sedimentation of water courses.
- treatment and disposal of water from mine.
- measures for minimising adverse effects on water regime.
- protective measures for ground vibrations / air blast caused by blasting,
- measures for protecting historical monuments and for rehabilitation of human settlements likely to be disturbed due to mining activity.
-socioeconomic benefits arising out of mining.
d) Monitoring schedules for different environmental components after the commencement of mining and other related activities. (for 'A' category mines only)
Note : Ground vibration studies are to be carried out for virgin area / new leases after one year from the commencement of mining activities.

OUTLINE OF SCHEME OF MINING

The scheme shall be depicted as far as possible on mine plans and sections duly supplemented by tabular statements / charts / diagrams or sketches in support, keeping the descriptive matter to the minimum essential.
PART-I
1.0 REVIEW OF MINING PLAN
1.1 Name of Mine
1.2 Particulars of approval of mining
1.3 Date of commencement of mining operations.
1.4 (a) Deficiencies , if any, that existed in the approved mining plan to be taken note of and rectified by incorporating suitable proposals for implementation in the scheme of mining.
(b) Review of compliance position of salient features of the mining plan on chapter wise basis bringing out marked deviations, if any, and justifications / reasons thereof. Items to be covered may include exploration, mine development, exploitation, afforestation programme, reclamation & rehabilitation, control of dust, noise & ground vibrations and any other significant feature.
(c) Review of the compliance position of conditions and stipulations imposed, if any, while approving the mining plan. In case of non- compliance / partial compliance, detailed justifications / reasons thereof may be furnished along with proposal for compliance in the ensuing period.
(e) Any other points requiring attention in the interest of proper mine design, development & conservation and environment & ecology of the area.
PART-II
2.0 PROPOSAL UNDER SCHEME OF MINING FOR THE NEXT FIVE YEARS
2.1 Name and address of the applicant.
2.2 Name and address, registration number of the recognised qualified persons together with validity date / person employed.
2.3 Mineral(s) to be mined
2.4 Area and date of expiry of lease.
2.5 Date of expiry of 5 years period for which approved on the last occasion

3.0 RESERVES
3.1 Category wise (UNFC) reserves estimated in the earlier mining plan with grade.
3.2 Depletion of reserves
3.3 Additional reserves established category wise (with basis and parameters considered).
3.4 Category wise updated reserve with grade (indicate end use grade with analysis) as well as marginal grades.
Please furnish the following :
i) An updated surface geological plan showing quarry limits and exploration carried out so far including exploration carried out during the last five years as well as exploration proposed to be carried out in next five years (different colours / standard codes to be used).
ii) Updated transverse sections at suitable intervals and longitudinal section showing geology of the deposits and extent of mining operations
Salient features of an updated / modified conceptual plan of the mine covering the period of anticipated life of the mine, depicted on mine geological plans and sections with necessary statement annexed supported by essential text, covering the basic & long term design features of mine covering exploration, mine development, optimum exploitation & utilisation of the mineral, waste & subgrade mineral management, and environmental aspects. The ensuing five year detailed programme should but be a part of the conceptual overall mining plan.
5.0 MINING
5.1 Salient description of the present mining methods
5.2 Yearly pit-wise development plan proposed for the next five years, depicted on plans and sections (ore and overburden to be shown clearly along with geological formations encountered depicting also the design and layout of the mine benches in case of opencast mining).
5.3 Yearwise production plan proposed for next five years along with grade.
5.4 Any change in proposed method of mining and deployment of machinery, together with reasons thereof
Please also furnish the following :
A list of mining machinery under use / proposed along with projected norms of performance / output for individual main items of equipment / machinery.
6.1 Rate of yearly generation of waste and proposals for disposal of waste for next five years. (indicate sequence of dumping with necessary plans and sections).

6.1.1 Build up of dumps from year to year to be shown in yearly plans and sections with description of the method & manner of disposal of waste rock, designed capacity & height of individual dump and precautions envisaged for confinement of the dumps together with design details of the protective works.			
6.2 Rate of yearly generation of sub-grade mineral with reference to threshold values and proposals for stacking for next five years, (submit necessary plans / sections).			
6.3 Quantity and grade of sub-grade material available at the mine as on date duly supported by plans and sections and descriptive statement inclusive of the precautions adopted for storage			
7.0 USE OF MINERAL			
7.1 Changes proposed in the use of mineral, if any, with reasons.			
7.2 Changes in the specification, if any, imposed by the user industries and / or specifications required in the case of new user industries, if any, to be given			
7.3 Efforts made for utilisation of the sub-grade mineral including fines.			
8.0 MINERAL BENEFICIATION			
8.1 Results of any beneficiation investigations conducted and changes made in existing mineral beneficiation plant and tailing disposals , if any, with benefits expected.			
8.2 Beneficiation test done, if any, on sub-grade mineral including fines and proposals for installation of new or additional beneficiation facility, if any (furnish process details in brief along with expected tailings loss).			
9.0 ENVIRONMENTAL MANAGEMENT PLAN			
1. Salient items to be covered under column nos. 2, 3 & 4 are as under	Proposed as per approved mining plan	Position at the end of the 5 years of the mining plan	Proposal for next 5 years plan period
- Top soil storage, preservation and utilisation			
- Land reclamation and rehabilitation			
- Waste dump management			
- Afforestation			

programme with precautions proposed for survival & protection of plantation			
- Quality of air -			
- Quality & make of water including surface & ground water			
Sources of noise to be identified. Pattern of blast holes & design of blast with details of sufficient number of experimental blasts conducted to be given			
- Noise level			
- Vibration			
10. ANY OTHER INFORMATION			
Results of any investigation carried out for scientific mining, conservation of minerals and protection of environment; future proposals, if any			

GUIDELINES FOR MINE CLOSURE PLAN FOR MINOR MINERALS

OBJECTIVES

- i) The mine closure plan should focus on the ultimate end use of the affected land surface in terms of short, medium and long term goals and should be covered in it.
- ii) To ensure the mineral conservation through improvement in mining methods, minimizing waste, utilization of low grade and rejects.
- iii) To ensure that mining is undertaken within the parameters of a '**Sustainable Development Framework**'.
- iv) To ensure complete, relevant, correct and concise information on the mining proposal.

1. Introduction

Mine closure encompasses rehabilitation process as an ongoing programme designed to restore physical, chemical and biological quality disturbed by the mining to a level acceptable to all concerned. It must aim at leaving the area in such a way that rehabilitation does not become a burden to the society after mining operation is over. It must also aim to create as self-sustained ecosystem.

Mine closure operation is a continuous series of activities starting from day one of the initiation of mining project. Therefore, progressive mine closure plan should be an integral process of mining and quarrying for minerals and need review every five years. As progressive mine closure is a continuous series of activities, it is obvious that the proposals of scientific mining have had included most of the activities to be included in the progressive mine closure plan.

2. Closure Plan preparation

- 2.1 The name of the lessee, the location and extent of lease area, the type of lease area (forest, non-forest etc) the present land-use pattern, the method of mining & mineral processing operations, should be given. The names and addresses of the applicant and recognized qualified person who prepared the Mine Closure Plan and the name of the executing agency should be furnished.

Details of area (with location map)

District & State _____

Taluka _____ Village _____

Khasra No./Plot No./Block Range/Felling Series, etc. _____

Lease area (Hectares) _____

Details of the area recorded under forest land, if any, type of forest.

Whether the area is notified as tribal area ? If yes, details thereof.

Whether the area falls under Coastal Regulation Zone(CRZ)? If yes, details thereof, _____

Ownership/Occupancy _____

Existence of public road/railway line, if any nearby and approximate distance _____

Toposheet No. with latitude & longitude _____

Land Use Pattern (Forest, Agricultural, Grazing, Barren, etc.) _____

2.2 Review of Implementation of Progressive Closure Plan

Indicate in detail the various proposals committed with special emphasis on the proposals for protection of environment in the approved including five years Progressive Closure Plan upto the closure of mine vis-a-vis their status of implementation. Highlight the areas, which might have been contaminated by mining activities and type of contaminants that might be found there. The reasons for deviation from the proposals if any with corrective measures taken should also be given.

3. Geology and Reserve

Briefly describe the topography and general geology indicating rock types available, the chemical constituents of the rocks/ minerals including toxic elements if any, at the mine site. Indicate the quantity of mineral reserves available in the lease area including its quality. Also state the quantity available for mining, excluding barrier pillar, safety zone, road etc.

4. Mining and Processing

4.1 Describe in brief the mining method, extent of mechanization, mining machinery deployed, production level etc and expected mine life. Indicate year-wise quantum of waste material and production in table below :

Year	Over-burden	ROM	Saleable ore	Mineral Rejects
1 st				
2 nd				
3 rd				
4 th				
5 th				

4.2 Describe briefly giving salient features of the mode of working (mechanized, semi-mechanized, manual)

4.3 Extent of mechanization - describe briefly including the type of machinery and equipment proposed to be used.

a) Drilling Machines.

Type	Nos.	Dia. of hole	Size / capacity	Motive Power	H.P.
1					
2					

b) Compressors

Type	Nos.	Size / capacity	Motive Power	H.P.
1				
2				

c) Loading Equipment

Type	Nos.	Bucket capacity	Motive Power	H.P.
1				
2				

d) Haulage and Transport Equipment within the ML and from mine head to the destination

Type	Nos.	Size / capacity	Motive Power	H.P.
1				
2				

4.4 Describe requirement of work force of different skill level indicating their pattern of engagement, i.e., whether on piece rated on daily wages etc.

4.5 Describe what is waste and scope for reduction of waste /mineral reject with the help of suitable processing of the ROM. Give details of initiatives taken to explore such possibility.

The following information should be provided on waste storage.

- a. location, size, shape and height of permanent and temporary waste storage facilities,
- b. dimension and status of waste dumps at the commencement of plan period,
- c. method of dumping, stabilisation and erosion control,
- d. slope stability assessment to ensure acceptable safety,
- e. surface water runoff control on disturbed and rehabilitated areas

4.6 Miscellaneous - **Describe** briefly any allied operations and machineries related to mining of the deposit not covered earlier.

4.7 Mineral Beneficiation: Describe in brief the mineral beneficiation practice if any indicating the process description in short. Indicate discharge details of any tailings/ middlings and their disposal/utilization practice followed

4.8 Blasting - describe briefly the following,

- a) broad blasting parameters like charge per hole, charge per delay, maximum number of holes blasted in a round etc.
- b) type of explosives used / to be used
- c) whether secondary blasting is needed, if so describe it briefly
- d) storage of explosives (like capacity and type of explosive magazine)

5. **Closure Plan:**

5.1 Describe simultaneous reclamation of already mined out areas showing proposed schedule of progressive rehabilitation

5.2 Describe the steps proposed for early completion of excavation work at one end of the deposit so as to enable reclamation /rehabilitation from that end alongwith justification for choosing the proposed site to commence excavation. Also describe the possibility of commencing excavation at site other than that proposed.

5.3 Give a summary of all dumps/ dump-areas, its height, existing volume, degraded area for different purposes, its age, appropriately showing on appropriate plan and sections

5.4 Give details of steps proposed for phased restoration, reclamation of lands already degraded by pits separately for each 5 years with a view to complete such reclamation /rehabilitation works before expiry of lease

- 5.5 Mined-Out Land: Describe the proposals to be implemented for reclamation and rehabilitation of mined-out land including the manner in which the actual site of the pit will be restored for future use. The proposals should be supported with relevant plans and sections depicting the method of land restoration/ reclamation/rehabilitation
- 5.6 Water Quality Management: State and deal with as to whether runoff and seepage from the waste storage area or lease area will flow outside and the runoff will be sampled and tested to verify the quality. Describe in detail the existing surface and ground water bodies available in the lease areas and the measures to be taken for protection of the same including control of erosion, sedimentation, siltation, water treatment, diversion of water courses, if any, measures for protection of contamination of ground water from leaching etc. Quantity and quality of surface water bodies should also be indicated and corrective measures proposed to meet the water quality conforming the permissible limits should also be described. Report of hydrological study carried out in the area may also be submitted. The water balance chart should be given. If there is potential of Acid Mine Drainage the treatment method should be given
- 5.7 Air Quality Management: Describe the existing air quality status. The corrective measures to be taken for prevention of pollution of air should be described
- 5.8 Waste Management: Describe the type, quality and quantity of overburden, mineral reject etc. available and their disposal practice. If no utilization of waste material is proposed, the manner in which the waste material will be stabilized should be described. The protective measures to be taken for prevention of siltation, erosion and dust generation from these waste material should also be described. If toxic and hazardous elements present in the waste material the protective measures to be taken for prevention of their dispersal in the air environment, leaching in the surface and ground water etc should be described
- 5.9 Topsoil Management: The topsoil available at the site and its utilization should be described
- 5.10 Tailing Dam Management: The steps to be taken for protection and stability of tailing dam, stabilization of tailing material and its utilization, periodic desilting measures to prevent water pollution from tailings etc, arrangement for surplus water overflow along with detail design, structural stability studies, the embankment seepage loss into the receiving environment and ground water contaminant if any should be described
- 5.11 Infrastructure: The existing infrastructural facilities available such as roads, aerial ropeways, conveyer belts, railways, power lines, buildings & structures, water treatment plant, transport, water supply sources in the area etc. and their future utilization should be evaluated on case-to-case basis
- 5.12 Safety & Security: Explain the safety measures implemented to prevent access to surface openings, excavations etc and arrangements proposed during the mine abandonment and upto the site being opened for general public should be described.
- 5.13 Disaster Management and Risk Assessment: This should deal with action plan for high risk accidents like landslides, etc. and emergency plan proposed for quick evacuation, ameliorative measures to be taken etc. The capability of lessee to meet such eventualities and the assistance to be required from the local authority should also be described

6. Economic Repercussions of closure of mine and manpower retrenchments

Manpower retrenchment, compensation to be given, socio-economic repercussions and remedial measures consequent to the closure of mines should be described, stating the following.

- 6.1 Number of local residents employed in the mine, status of the continuing family occupation and scope of joining the occupation back.
- 6.2 Compensation given or to be given to the employees connecting with sustenance of himself and family members.
- 6.3 Satellite occupations connected to the mining industry - number of persons engaged therein - continuance of such business after mine closes.
- 6.4 Continued engagement of employees in the rehabilitated status of mining lease area and any other remnant activities.
- 6.5 Envisaged repercussions on the expectation of the society around due to closure of mine.
- 6.6 Describe consequences of sudden closure due to economic or market downturns or technical problems, perhaps few years before its scheduled closure

7. Financial Assurance

- 7.1 The financial assurance should be submitted in different forms as stated in Rule 23(F)(2) of Mineral Conservation and Development (amendment) Rules, 2003
- 7.2 Closure costs : One of the primary aims of estimating accurate closure costs is to allow the operation to accrue the funds required to bring about successful closure. It is important that accurate closure costs are developed as they impact the overall financial analysis of the operation. Cost estimation, from pre-mining to construction, should be done at the site level with projected expenditures being considered into annual operating activities. Closure costs may vary depending on a number of factors and it is important in managing the risks of closure costs. Therefore this may be considered as a variable cost

8. Plans, sections etc

The chapters at 2, 3, 4 and 5 should be supported with Plans and Sections. The Closure plan may also be submitted depicting photographs wherever possible

FRAMEWORK ON CLUSTER OF MINING OF MINOR MINERAL

Mineral occurrences in several cases found to shallow depth, isolated, detached and fragmented in nature in virtue of either origin or mode of emplacement or dislocation due to geological disturbances or mechanical weathering, transportation by wind, water and wave actions and deposited in shorter distance. . In such conditions mining activities are undertaken in small scales in cluster of mines on regional levels. It is necessary to define cluster of mining.

1.0 Cluster of Mining: The sum total of Minor Mineral leases granted in an area of 5km radius from the core zone of mining, less than 50 hectares area may be defined as cluster of minor mineral mining for which environmental clearance is to be required on regional level by a separate corporate body whose composition is given in under mentioned Para. Regional environmental impact assessment for cluster of mining is to be assessed and its mitigation measures need to be tackled in the **Regional Environmental Management Plan**. The environmental clearance for such environmental management plan for cluster of minor mineral may be given by **State Environmental Appraisal Committee** since the area is less than 50 hectares.

1.1 Base Maps of the Area: The prime requirement for environmental baseline data generation is the preparation of base map showing core zone and surrounding area covering 10 km radius i.e. the buffer zone. These maps are very much essential to know the surrounding Eco-system with respect to mining activity, so that the environmental impacts of mining on these Eco-systems can be clearly brought out for assessing the mitigation measures.

2.0 Regional Environmental Management Programme for Cluster of Mining:

The objective would be to manage the Regional Environmental risk by –

- Increasing awareness of environmental issues at the regional scale,
- Agreeing upon the planning, implementation and programme of actions that will help understand and improve the environmental situation at the regional scale,
- Elaborating an environmental fund to support the regional environmental actions
- Enforcing the regional environmental monitoring
- Pooling and communicate the results of the regional environmental monitoring
- Proposing mitigation measures based on the results of the regional monitoring
- Introducing environmental education programme among the workers and the villagers.

2.1 The Regional Environmental Committee should be a separate corporate body involves representatives from:

- All mines involved in the area
- Villages and colonies at Panchayat level

- District Collector
- District Forest officer
- District Industries Officer
- District Environmental and Ecological Officer
- Representative of DMG office
- Representative of Ministry of Planning
- Representative of Ministry of Infrastructures
- Representative of Central Ground Water Board
- Representative of MOEF at State Level
- Representative of IBM at Regional Level
- Representative of DGMS at Regional Level

2.2 Action Proposed:

Priority List - On Regional scale solutions are to be found concerning issues that are not directly under the responsibility of a mine owner such as

2.2.1. Water Treatment at the Regional scale

At the regional scale, investigate the possibility of setting up a (or a few) regional waste water treatment plant(s) that will treat the effluents collected from a number of mines, and that will discharge a treated water of acceptable quality.

The characteristics of the flows of water discharged from each mine to nalas has to be investigated in details in order to evaluate the feasibility study of a (or a few) regional waste water treatment plants.

2.2.2. Improvement of Infrastructure

- Tap un-polluted ground water supply
- There is a need for a specific geohydrological study in order to define the best location for a good quality water and a high yield
- Improvement of road :

2.2.3. Regional actions related to geotechnical engineering for EMP

- Regional hydrogeology
- Regional geology
- Meteorological data
- Related techniques and specific materials

Communication and training for above techniques applied to mining industry has to be promoted by mining associations, educational system as well as regional government levels.

2.2.4. . Development of Green Belts

- This helps in prevention of dust and screening noise
- maintaining ecological balance

- increasing aesthetic value
- Plantation to be carried out on both sides of the roads. Saplings will be planted at an interval of 2 m.

2.2.5. Management of paddy field sediments

All paddy field sediments tested for deleterious contamination exceeding the prescribed limits for protection of fertility of paddy field and soil quantity.

2.2.6. Environmental Monitoring

Items for monitoring based on observation:

- Slope failure on mine faces, dumps, and barrier,
- Land erosion in mined out areas, dumps, and flood protection barrier,
- Blockage due to silting or loose material,
- Plantation.
- Monitoring based on sampling and chemical analysis:
 - Surface water
 - Groundwater, to determine scale of contamination.

Ambient air quality be monitored by High Volume Sampler (HVS) for effectiveness of the dust prevention and control actions.

When mining ceases, a serious economic decline in the area is inevitable unless alternative employment is available for the displaced mine workers. However, proposals for alternative industrial activities do not form part of the rehabilitation plan, although opportunities for re-use of the site or its facilities may have to be identified by the appropriate government agencies under final mine closure plan. Copy of guidelines of mine closure plan is enclosed as Annexure-III in the previous chapter of Mining Framework Minor Mineral

GUIDELINES FOR RECLAMATION & REHABILITATION PRACTICES FOR MINOR MINERALS

1.0 Introduction:

1.1 Land reclamation & rehabilitation is the single broad based environmental management system, which will provide protection and control for most of the adverse environmental impacts of mining and also improves the aesthetics of the area. India, being a developing country, the problems faced with respect to mine reclamation and rehabilitation are not purely of economic concern but rather the use and familiarity with proper techniques, management policies and practices to reduce the environmental impact, for a sustainable development. It is now realised that exploitation of the mineral deposit in eco-friendly manner is possible with suitable reclamation and rehabilitation measures. Reclamation is the process by which pre-mining land use can be re-established under similar conditions, where as the rehabilitation is the process used to mitigate impacts of mining on the environment.

1.2 Mining is one of the industrial enterprises that are known to have in advance a finite life. It is, therefore, necessary to plan and design the new mines that are coming up with their reclamation & rehabilitation in mind and in case of existing mines to revise their operational procedures to allow the reclamation & rehabilitation easier to achieve; that is, "to design for a closure". It is expected that all areas disturbed by the operations will be rehabilitated. This will include the removal of all plant, facilities, rubbish and the restoration of the land surface for proper land use.

2.0 Existing Mineral Policy & Legislation on Mine Reclamation & Rehabilitation:

2.1 Indian mineral policy was amended in the year 1993, to include minimisation of adverse effects on forest, environment and ecology with due regards to safety and health of all concerned people and rehabilitation of mine closures and displaced persons. Specific to metalliferous mines the Mineral Conservation & Development Rules (MCDR) was amended in 1988, to include the environmental protection & pollution control aspects, reclamation & rehabilitation of land and restoration of flora. As per these rules, all the metalliferous mines in India are statutorily required to prepare and submit the environmental management plan as an integral part of the mining plan to Indian Bureau of Mines (IBM).

2.2 Such provisions do not prevail for minor mineral. Minor mineral activities are huge which is many folds higher than major minerals in terms of number of mining leases and area leased out. Therefore reclamation and rehabilitation activities are essential for minor mineral also and incorporated in proposed model minor mineral frame work as follows:

"Rule 23 of proposed MCR, deals with abandonment of mines or part thereof. As per this Rule, for a case other than a natural calamity, the mine owner/agent/mining engineer/manager has to submit to DMG the notice of 90 days prior to the proposed date of abandonment, accompanied by updated plans and sections of the mine, including

measures envisaged for protection of the abandoned mine or part thereof, the approach thereto and the environment. The authorised officer by state DMG, before the proposed date, prohibit abandonment or allow it to be done with such conditions as specified therein. However, there is no precise definition on abandonment of a mine or part thereof and always confusion arises between the closure and an abandonment of a mine”.

2.3. Objectives of Mine Reclamation & Rehabilitation:

While formulating the rehabilitation objectives for the site, it is important to consider the existing or the pre-mining land use of the site and how the operation will effect this activity. Some operations such as mining in agricultural areas have clearly defined this objective of returning the land to viable agricultural purposes. In forested areas the aim may be to re-establish a self-supporting forest community. The primary aim is to ensure that the Reclamation & rehabilitation along with the abandonment of the mine can be successfully achieved while satisfying the following broad objectives:

- To create a productive and sustainable after-use for the site, acceptable to mine owners, regulatory agencies and the public;
- To protect public health and safety of the surrounding habitat;
- To minimise environmental damage;
- To conserve valuable attributes & aesthetics
- To overcome adverse socio-economic impacts.

2.3.1 While these objectives can be accepted and agreed between the parties concerned (primarily between the mine owners and regulatory agencies) as desirable endpoints for mine reclamation & rehabilitation, each has a slightly different perspective. The priorities for the regulatory agencies are that the future environmental conditions should not be compromised and that no financial liability falls upon them in the event of inadequate rehabilitation. They, therefore, require evidence that all important environmental, safety & health issues have been realistically addressed in these plans/programmes, which have to be successfully implemented and that adequate financial provisions have been made for this to be completed to an acceptable environmental standard.

2.3.2 Mine owners and operators also wish to eliminate future financial liabilities and long-term environmental management as far as possible. However, their immediate priority is to ensure that the quality of the rehabilitation undertaken is adequate to enable regulatory agencies to release them from any further obligations and so allow legal surveillance of their continuing interests in the mine site. Furthermore, an acceptable record of mine Reclamation & rehabilitation is now an important consideration for all international mining companies in their search for project finance.

2.4 Mine Reclamation & Rehabilitation criteria:

The criteria involve determination of the required actions to meet the objectives and also the monitoring required in terms of physical, chemical & biological stability of various environmental parameters, in order to show that the abandonment has been successfully implemented.

2.4.1 Physical stability: All anthropogenic structures, which include mine workings, waste dumps, buildings etc., remaining after mine abandonment should be physically stable. They should present no hazard to public health and safety as a result of failure or physical deterioration and they should continue to perform the functions for which they were designed. The design periods and factors of safety proposed should take full account of extreme events such as floods, winds or earthquakes etc. and other natural perpetual forces like erosion etc.

2.4.2 Chemical stability: The resources within the mine site should be chemically stable. This means that the consequences of chemical changes or conditions leading to leaching of metals, salts or organic compounds should not endanger public health and safety nor result in the deterioration of environmental resources. If contaminated discharges likely to cause impacts are predicted in advance, appropriate mitigatory measures like settlement of suspended solids or passive treatment to improve water quality as well as quantity etc. should be employed. Monitoring should demonstrate that there are no adverse effects of pollutant concentrations exceeding the statutory limits on the water, soil and air qualities in the area around the closed mine.

2.4.3 Biological stability: The stability of the surrounding environment is primarily dependent upon the physical and chemical characteristics of the site, whereas the biological stability of the mine site itself is closely related to rehabilitation and final land use. Nevertheless, biological stability can significantly influence physical or chemical stability by stabilising soil cover, preventing erosion & leaching etc.

Establishment of a vegetation cover over the disturbed site is usually one of the main objectives of the rehabilitation programme, as vegetation cover is the best long-term method of stabilising the site. When the major earthwork components of the rehabilitation programme have been completed, the process of establishing a stable vegetation community begins. If top soiling of the areas and adequate erosion control has been achieved, then this phase may simply require undertaking a seeding and fertilising programme and monitoring the performance of re-vegetation.

For re-vegetation, management of soil nutrient levels is an important consideration. Additions of nutrients are useful in three situations.

- Where the nutrient level of spread topsoil is lower than material in situ e.g. development of social forestry.
- Where it is intended to grow plants with a higher nutrient requirement than those occurring naturally e.g. planning for agriculture.
- Where it is desirable to get a quick growth response from the native flora during those times when moisture is not limiting e.g. Development of green barriers.

One or more of the above situations often apply and good responses have been achieved on natural soils with the use of fertilisers containing phosphorus. Fertiliser applications are cheap and a single application at the time of rehabilitation will suffice in all areas except those prone to artificially high soil leaching like tailing material.

2.5 Planning for Mine Reclamation & Rehabilitation:

Integrating mine reclamation & rehabilitation aspects under the regular mine developmental planning has significant benefits. It minimises adverse environmental effects after the abandonment and avoids the need for a long-term environmental management of a closed mine site. The best means of mitigation of these environmental impacts is to address them well in advance and to incorporate them in the abandonment programme. Therefore, whenever feasible, progressive reclamation should be encouraged which provides the following advantages:

- Closure measures are integrated into daily mining operations in **Progressive Mine closure plan**;
- Implementation and monitoring are incorporated into routine environmental management & monitoring;
- Successful rehabilitation techniques can be incorporated into the Reclamation plan;
- Costs are spread over a longer period and recovered from mine revenues;
- Adverse environmental effects are minimised;
- The final abandonment period is shortened

In some advanced countries a formal closure plan is a pre-requisite before the grant a mining license, which is already implemented in India for major minerals. However, there is no universal agreement on the aspects that should be included in an abandonment plan or on the level of closure performance that can reasonably be expected. While many mine owners and operators understand the technical issues associated with abandonment, the same degree of familiarity may not always be shared by those responsible for examining, regulating or financing the mine abandonment programme. This can lead to difficulties, delays and attendant frustrations on both sides, because after-use of the mine site is often difficult to anticipate in advance, as it depends on the factors prevailing at the time of abandonment. The ultimate land use should be compatible with the surrounding area, but at the same time this should not overlook any future industrial or commercial activities that are coming-up/proposed in this area, because it can avail the infrastructure already available by the earlier mining activity.

The cessation/closure of mining operations should involve the best means of planning and subsequently managing the environmental changes and socio-economic effects that occur when mining operations ceases. Mine Closure planning (Progressive and Final) is therefore dynamic and need to be evolved with the framework of mine design. For this, during the life of a mine, sequences of distinct stages have to be identified and addressed.

- Active care – treatment and reclamation & rehabilitation of the mine site;
- Passive care – monitoring to show the success of active care;

- Closure – regulators approve successful mine closure proposals- in progressive and final mine closure plan;
- Disposal of site – mine owners ceases their interests over the mine site.

2.6 Aspects to be considered in the Mine Reclamation & Rehabilitation Plan

2.6.1 Reclamation Plan: Where appropriate, strategies to address various aspects of the mine components furnished below should included in the Reclamation plan. Each component should be considered in terms of their objectives and criteria as well as the likely effects on the natural resources. The effects of Reclamation operations themselves over the surrounding environment should also be not ignored. These involve activities such as earth moving, demolition of building, treatment plants etc. Under these activities, the potential effects of noise, dust and contaminated run-off should also be taken into account. Also the important part of Rehabilitation plan is the monitoring required to demonstrate that the following remedial and rehabilitation work has been successful. For this, some sampling stations may probably have to be located outside the boundaries of the former mine site, so as to ensure that the surrounding conditions are satisfying the environmental criteria.

2.6.2 Final Mine Closure Plan: In some cases, where the mineral is exhausted, it may be necessary to undertake post-closure measure such as follow up vegetation and groundwater monitoring, repair of eroded surfaces and undertake any activities which reduce the liability of the operator both from environmental and safety view point.

2.6.3 Environmental Impact Assessment: The natural resources in the area around the mine are described in the environmental impact assessment (EIA) so as to characterise the specific natural resources likely to be affected. It is against this 'baseline study' that the success of mine rehabilitation measures will be judged. However, it is unrealistic to expect that the area around the mine site can be restored to the exact pre-mining condition. Mining activities always have some residual impacts that cannot be avoided, such as changes to landform from open pits or tailings impoundment or the waste dumps. Susceptible natural resources reflect local conditions, but should normally include the following possible impacts, from different resources.

- Surface waters: Effects of run-off on quality and quantity,
- Ground Water: Effects of seepage on aquifer quality & recharge,
- Wildlife habitats: Effects on aquatic & adjacent terrestrial habitats & migration routes,
- Flora & fauna: Specific effects on individual species, deterioration in feeding and breeding areas, growth rates, availability of water, changes in climatic conditions
- Land use: Changes in soil cover & land use for agriculture or forestry

2.6.4 Rehabilitation Issues: In India the metalliferous mining sector is mostly confined to rural areas, which are also backward. Therefore, the resettlement of the under mining sector mostly involves resettlement from one village to other village. For the purpose, the quality of life for the ousters may be viewed from the aspects (i) survival or maintenance and (ii) progress or evaluation. For survival, it is required to have unpolluted air, water and land, which are direct gifts to mankind. To ensure this, the immigrated villagers are to be provided with potable water supply, with bore-wells for drinking water and other requirement on infrastructure, health, sanitation and education facilities. The human resettlement proposed should be based on the living habits of the immigrants. Further, a villager's house is not just a place of living alone but also a production asset. These aspects of productivity of the house which are the backbone of our economy have to be integrated in the resettlement planning. It is also necessary to promote the self-employment scheme, which will add to their earnings on agriculture. Thus the motto in these rehabilitation measures should not only to give shelter to oustees, but also to develop self-sustained settlements, which will provide work force to other institutions.

2.7 Costs of Reclamation & Rehabilitation and financial sureties:

For the purpose of above R.R, a cost benefit analysis, which includes the cost on rehabilitation, compensation paid for the oustees, social costs and the value of the land affected, vis-a-vis the value of mineable ore reserves blocked in the area is to be prepared. For implementing RR policy, it is stated that private mining sector and individual companies have developed their own RR Policy and guidelines, which should generally fall within the scope of existing policies of the Government.

There should be a realistic and practical approach while estimating the cost on reclamation and rehabilitation costs. They have been observed to be either too low or too high. Further, in India, there is no provision in the grant mining leases, a financial surety to indemnify the authorities against the reclamation and rehabilitation costs at the time of abandonment of mines. Therefore, a financial surety should come into force if the operators or owners fail to meet their full obligations at the planned time of abandonment or in the event of premature, unplanned closure. These financial provisions should cover both technical and financial failure.

A number of financial options are available for the mining company to provide the necessary financial security like:

- a letter of credit;
- a performance or surety-bond;
- a parent company guarantee;
- the pledging of assets; or
- a trust fund.

The first four are primarily concerned with indemnifying the authorities against the failure of the mining company to properly rehabilitate the mine site, either by guaranteeing funds through company resources or by an arrangement with external financial institutions. However, only the trust fund actually provides funds to the company to undertake closure at the planned time. These are built up through annual contributions based on the expected final sum required for abandonment and any long-term management or maintenance. A legal arrangement is needed in this case so that both the mining company and the controlling authority control the trust fund. Neither can use the fund for any purpose other than abandonment without the arrangement of the other. In the event of unforeseen closure, there are appropriate safeguards to ensure that funds revert to the authority so that it can arrange for proper closure to be completed if necessary. Copy of guidelines of mine closure plan is enclosed as Annexure-III in the previous chapter of Mining Framework Minor Mineral .

RECLAMATION / REHABILITATION GUIDELINES FOR MINOR MINERALS: SAND & GRAVEL

1.0 INTRODUCTION: “Environmental Obligations” of the Mines & Minerals (R&D) 1957 specifies the general requirements for reclamation / rehabilitation in respect of minor minerals. **Under Section-15 (1A)(i):** the manner in which the rehabilitation of flora and other vegetation, such as trees, shrubs and the like destroyed by reasons of any quarrying or mining operations shall be made in the same area or in any other area selected by the State Government (whether by way of reimbursement of the cost of rehabilitation or otherwise) by the person holding the quarrying or mining lease; Thus, the holder of a mineral concession shall ensure that his concession area is rehabilitated from time to time and ultimately reclaimed in so far as it practicable and in a manner acceptable to the Director of Mines.

1.1 The Metalliferous Mines Regulations, 1961: Mines, Quarries, Works and Machinery requires the Mineral Concession holder to fill up, fence or secure all shafts, pits, holes and excavations to the satisfaction of the Chief Inspector on the lapse of the Concession.

115. Fencing and gates – (1)(a) Unless otherwise permitted by the Chief Inspector by an order in writing and subject to such conditions as he may specify the top of every opencast working shall be kept securely fenced.

(b) Where an excavation which has been formed as a result of any mining operation, extends within a distance of 15 metres from a public road or any building, substantial fencing shall be erected and maintained around the excavation.

(c) Where as a result of mining operations, a subsidence of the surface has taken place or is likely to take place and persons are likely to be endangered thereby, the owner, agent or manager shall keep the entire surface area securely and effectively fenced.

(5) (a) Shaft and opencast workings temporarily or permanently out of use and any place in or about an excavation which is dangerous shall be completely filled in or kept securely fenced:

Provided that if in the opinion of the Regional Inspector, any disused trench, pit or other excavation is dangerous, he may, by an order in writing, require the same to be filled in to the level of the adjacent ground.

(b) Before a mine is abandoned or the working thereof discontinued, the owner, agent or manager shall cause the top or entrance of every shaft, incline or other opening into the mine to be fenced by a structure of a permanent character sufficient effectively to prevent persons falling into or entering the same.

2.0 Definitions :

“Acceptable” – Satisfactory Condition

The OBJECTIVE of reclamation / rehabilitation is to restore the site to an acceptable satisfactory condition by –

1. Eliminating unacceptable health hazards and ensuring public safety.
2. Restoring the site to a condition that is visually acceptable to the community.
3. Reclaiming the areas impacted for future use (agricultural for example).
4. Preparing the site to be amenable to support vegetation.
5. Removing any contaminated soils.
6. Ensuring physical stabilization of the soils (a combination of smoothing and contouring slopes, replacing overburden and topsoil and re-vegetating).
7. Ensuring that final drainage of the site does not adversely affect neighboring properties.

Reclamation operations should, wherever possible, be carried out concurrently with extraction and as such a practical after use of the site should be considered in the pre-excitation planning.

3.0 Reclamation Plan : “Reclamation Plan” means the operator’s written proposal as required and approved by the Department of Mines for reclamation of the affected land, which shall include but not be limited to :

- a. Proposed practices to protect adjacent surface resources.
- b. Specifications for surface gradient restoration to a surface suitable for the proposed subsequent use of the land after reclamation is completed and proposed method of accomplishment thereof.
- c. Manner and type of re-vegetation or other surface treatment of the affected areas.
- d. Method of prevention or elimination of conditions that will be hazardous to animal or fish life in or adjacent to the area.
- e. Method of compliance with air and water pollution prevention laws where applicable.
- f. Method of control of contaminants and disposal of mining refuse.
- g. Method of restoration or establishment of stream channels and stream banks to a condition minimizing erosion, siltation and other pollution.
- h. Sketch maps and other supporting documents as may be reasonably required by the Department of Mines.
- i. A time schedule delineating events to meet the requirements.

3.1 Burrow Pits Guideline Specifications : The Department shall approve a reclamation plan (as submitted or as modified) only where it finds that it adequately provides for those actions necessary to achieve the purposes and requirements of Section—15(1A)(i) of the Mines & Minerals (R&D) Act,1957 and Regulation-115 of the Mines, Quarries, Works and Machinery Act and that in addition, the plan meets the following minimum standards :

- (1) The final slopes in all excavations in soil, sand, gravel and other unconsolidated materials shall be at such an angle as to minimize the possibility of slides and be consistent with the future use of the land. The suggested maximum slopes considered suitable for the following land uses are :

Forestry	:	38°
Hill grazing	:	28°
Improved pasture	:	15°
Some buildings and roads	:	12°
Rotational cropping	:	5°
Housing	:	3°

Lesser slopes may be necessary depending on geology, soils and other site specific variables.

- (2) The land will be cleared of rubbish, surplus materials, temporary structures and equipment and all parts of the land shall be left in a condition as close as possible to that prior to use.
- (3) Provisions for safety to persons, animals and to adjoining property must be provided.
- (4) All overburden and spoil shall be left in a configuration which is in accordance with accepted conservation practices and which is suitable for the proposed subsequent use of the land.
- (5) Suitable drainage ditches or conduits shall be constructed or installed to avoid conditions where small pools of water that are or are likely to become noxious, or foul, collect or remain on the mined area. Ponds shall be considered adequately reclaimed lands when approved by the Department of Mines subject to the approval of all other stakeholders. Surface drainage must be designed to minimize erosion during run-off and major rainfall events.
- (6) The type of vegetative cover and methods of its establishment shall be specified and in every case shall conform to accepted and recommended agronomic and re-forestation, restoration practices as established by the Ministry of Agriculture and Department of Environmental Affairs.
- (7) Pits shall be back-filled with clean or inert fill. There shall be no material of deleterious nature (i.e. any material that would be classed as hazardous or waste). Building rubble may only be used with the approval of the Department of Sanitation and Waste Management.
- (8) The site shall be graded to match or blend with existing contours. In the case of hard rock pits should be multi-benched.

- (9) Topsoil stripped from the surface shall be used for final cover to re-contoured slopes where practicable. Non-usable material including overburden, screenings and rocks, should be placed in the pit bottom and covered with the previously stripped topsoil.
- (10) Once the site is reclaimed any fences where they exist shall be removed to permit re-vegetation.
- (11) Access and haul roads to the pit must be restored in a mutually agreeable manner where these are considered unnecessary after extraction has been completed.

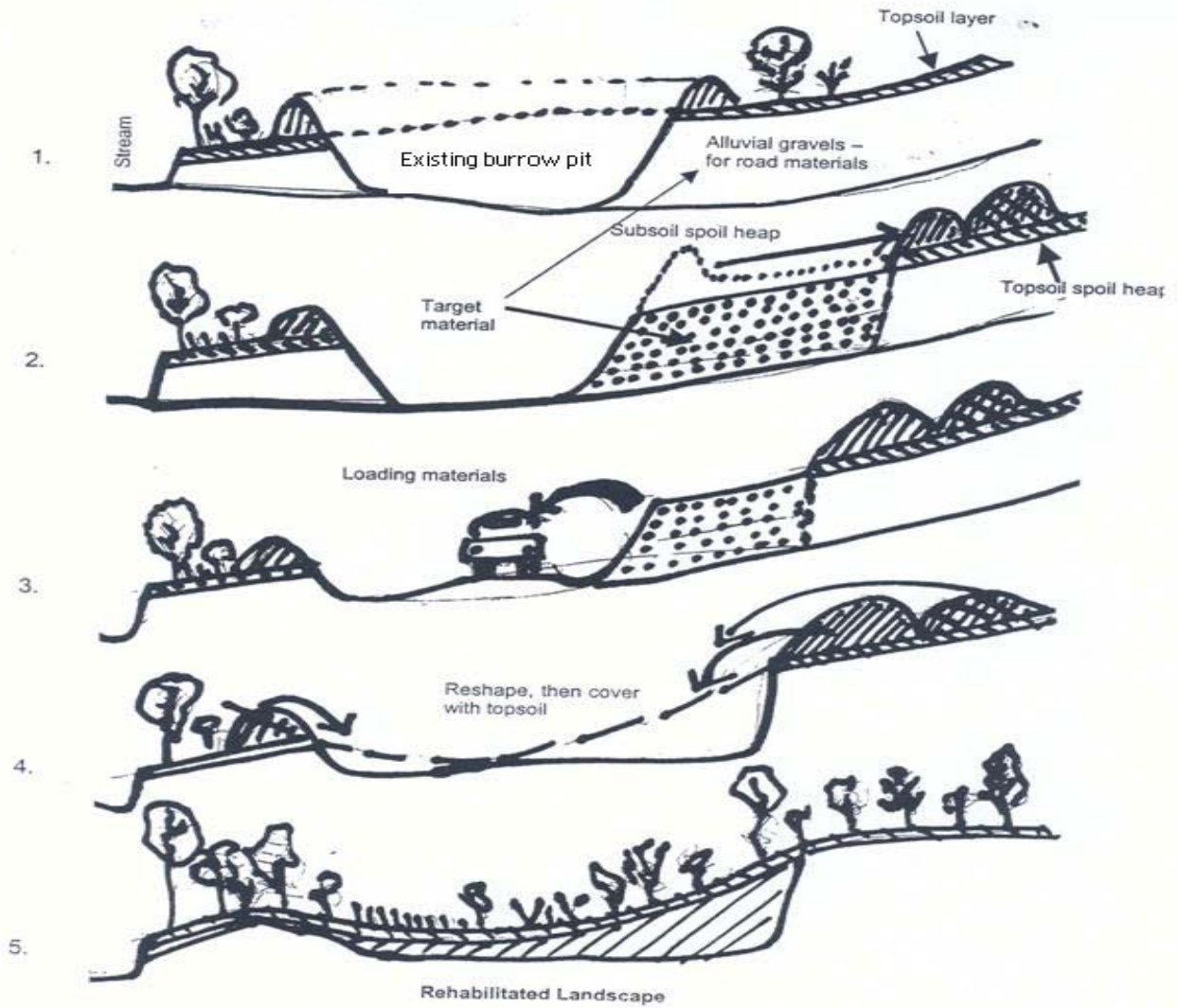


Figure :- 1 A Typical Example of burrow pit rehabilitation

Note: Reclamation / Rehabilitation plans are site specific. The above is intended as an example only.

3.2 River Sand Guideline Specifications:

- (1) Leave the area from which the sand has been extracted leveled and free of any foreign debris or materials.
- (2) Re-vegetate indigenous plants which were removed from areas for the mining of sand as far as is reasonably practical.
- (3) Plant trees along the riverbanks with no or minimal vegetation, irrespective of signs of erosion or not (ensure that species selected are indigenous species).
- (4) The surface of stockpile and sand processing areas outside the riverbed to be scarified to a depth of 500 mm, graded evenly and the topsoil previously stored, returned to its original depth over the area.
- (5) Prepare the area in such a way as to stimulate / ensure the re-growth of vegetation.
- (6) Prepare Sand Traps Emplace gabions (1 m height) at 200 m intervals to functions as sand traps. Boulders dug out during mining should be used for this purpose. Gabions would have to be placed at one kilometer (at the maximum) intervals on the mined out areas. The shorter gabion intervals would induce faster rehabilitation. Gabions are preferred over concrete because they would allow water to flow through, are a more natural solution. Also additional gabions can be easily laid to increase the trap height. Figure-2 is a drawing that illustrates river bed rehabilitation.
- (7) Any access routes, especially if they are not beneficial to the local community would need to be ploughed and replanted with native species.
- (8) Close and restore river bank where access ramps have been restored. Ensure river channel is not obstructed and that repaired bank is adequately fortified.

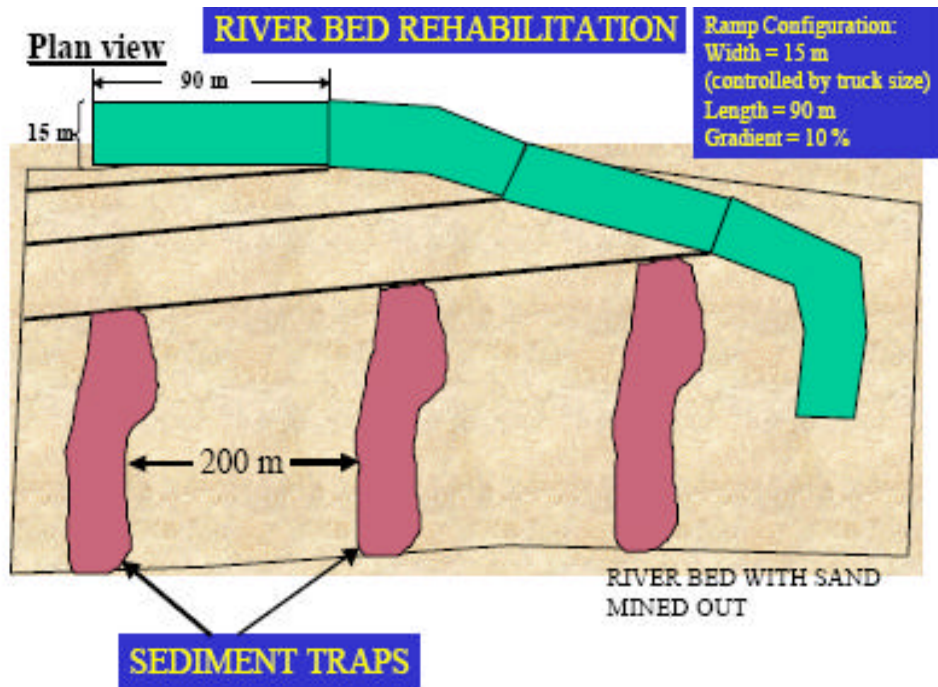


Fig 2: Riverbed Rehabilitation
