

FOREST RECLAMATION GUIDELINES

(The Regulation of The Minister of Forestry of Republic of Indonesia Number P. 4/Menhut-II/2011, 14 January 2011)

BY THE GRACE OF ONE AND ALMIGHTY GOD

THE MINISTER OF FORESTRY OF
THE REPUBLIC OF INDONESIA,

Considering:

That to implement the law of Article 51 number 6 Government Regulation Number 76 Year 2008 on Forest Rehabilitation and Reclamation, it is necessary to stipulate Regulation of the Minister of Forestry on Forest Reclamation Guidelines.

In view of:

1. Law Number 5 Year 1990 (BN No. 5000 page 1B-12B) on Natural Resources and Their Ecosystem (State Gazette of the Republic of Indonesia Year 1990 Number 49, Supplementary State Gazette of the Republic of Indonesia Number 3419);
2. Law Number 41 Year 1999 (BN No. 7140 page 31B-32B) on Forestry (State Gazette of The Republic of Indonesia Year 1999 Number 167, Supplementary State Gazette of the Republic of Indonesia Number 3888), which has been changed with the Law Number 19 Year 2004 on the Enactment of Government Regulation in Lieu of Law Number 1 Year 2004 on the Amendment of Law Number 41 Year 1999 on Forestry to become Law;
3. Law Number 32 Year 2004 on Regional Government (State Gazette of The Republic of Indonesia Year 2004 Number 125, Supplementary State Gazette of the Republic of Indonesia Number 4437), which has been changed for several times, the last one with the Law Number 12 Year 2008 (State Gazette of the Republic of Indonesia Year 2008 Number 59, Supplementary State Gazette of the Republic of Indonesia Number 4844);
4. Law Number 26 Year 2007 (BN No. 7556 page 13B-22B and so on) on Spatial Order (State Gazette of the Republic of Indonesia Year 2007 Number 68, Supplementary State Gazette of the Republic of Indonesia Number 4725);
5. Law Number 4 Year 2009 (BN No. 7865 page 9B-10B) on Mineral and Coal Mining (State Gazette of the Republic of Indonesia Year 2009 Number 4, Supplementary State Gazette of the Republic of Indonesia Number 4959);
6. Law Number 32 Year 2009 on Environment Protection and Management (State Gazette of the Republic of Indonesia Year 2009 Number 140, Supplementary State Gazette of the Republic of Indonesia Number 5059);
7. Government Regulation Number 27 Year 1999 (BN No. 6436 page 1B-9B) on Analysis on Environmental Impact (State Gazette of the Republic of Indonesia Year 1999 Number 132, Supplementary State Gazette of the Republic of Indonesia Number 3174);
8. Government Regulation Number 6 Year 2007

- (BN No. 7487 page 12B-16B and so on) on Forest Arrangement and Forest Management Plan Organization as well as Forest Utilization (State Gazette of The Republic of Indonesia Year 2007 Number 22, Supplementary State Gazette of the Republic of Indonesia Number 4696), which has been changed with the Law Number 3 Year 2008 (State Gazette of the Republic of Indonesia Year 2008 Number 16, Supplementary State Gazette of the Republic of Indonesia Number 4814);
9. Government Regulation Number 38 Year 2007 (BN No. 7576 page 1B-6B) on Division of Governmental Affairs among Government, Province Government and District/City Government (State Gazette of the Republic of Indonesia Year 2007 Number 82, Supplementary State Gazette of the Republic of Indonesia Number 4737);
 10. Government Regulation Number 2 Year 2008 (BN No. 7629 page 11B-15B and so on) on Tariff Type Upon Non-Tax Revenue Comes From Forest Area Utilization For Development Interest of Non-Forestry Activities Occurred in Ministry of Forestry (State Gazette of the Republic of Indonesia Year 2008 Number 15, Supplementary State Gazette of the Republic of Indonesia Number 4813);
 11. Government Regulation Number 26 Year 2008 on Spatial Planning of National Region (RTRWN) (State Gazette of the Republic of Indonesia Year 2008 Number 48, Supplementary State Gazette of the Republic of Indonesia Number 4833);
 12. Government Regulation Number 76 Year 2008 (BN No. 7781 page 18B-22B) on Forest Rehabilitation and Reclamation (State Gazette of the Republic of Indonesia Year 2008 Number 201, Supplementary State Gazette of the Republic of Indonesia Number 4947);
 13. Law Number 24 Year 2010 on Forest Area Utilization (State Gazette of the Republic of Indonesia Year 2010 Number 201, Supplementary State Gazette of the Republic of Indonesia Number 5112);
 14. Presidential Regulation Number 5 Year 2006 on National Energy Policy;
 15. Presidential Decree Number 41 Year 2004 on Licensing or Agreement on Mining Sector Available in Forest Area;
 16. Presidential Instruction Number 1 Year 1976 on Synchronization on the Implementation of Duties in Agrarian Sector with Forestry, Mining, Transmigration, and Public Work;
 17. Regulation of the Minister of Forestry Number P.43/Menhut-II/2008 on Guidelines for Forestry Area Borrow-Use;
 18. Regulation of the Minister of Forestry Number P.40/Menhut-II/2010 on Organization and Management of Ministry of Forestry (State Gazette of the Republic of Indonesia Year 2010 Number 405);
 19. Regulation of Minister of Energy and Mineral Resources Number 18 Year 2008 on Mine Reclamation and Closure;
- D E C I D E D :**
- To stipulate :
- REGULATION OF THE MINISTER OF FORESTRY ON FOREST RECLAMATION GUIDELINES.**

CHAPTER I
GENERAL

First Part

Definition

Article 1

In this Regulation there are definitions as follows:

1. Acid-forming material is material that can create acid when reacted with air.
2. Waste rock is rockery unearthed in mining process, but not processed due to the absence or lack of wanted minerals.
3. Cover crop is dense plant grew especially to protect and to repair soil between periods of staple crops or between trees and creepers.
4. Holding Dam is a permeable small dam with rocks in concertina wire cage construction, twigs netting, or bamboo/wood made at ravine's line with 4 meters maximum height.
5. Control Dam is a non-permeable small dam that can holds water with land fill construction with waterproof layer or concrete/arc type for erosion control and surface runoff made at a stream/riv-
erine with 8 meters maximum height.
6. Numeric data is data in the form of number or number system.
7. Spatial data is data with geo-reference in which many attribute data put in spatial units.
8. Drop structure is a structure built at every certain length at Water Disposal Line (WDL) depends on land inclination, made of stone, wood/bamboo.
9. Erosion is a process of exfoliation or transfer of soil or stone particles due to kinetic energy of water, snow, wind.
10. Environmental damage is direct or indirect change towards physical nature and/or biological of environment that exceeds standard criteria of environmental damage.
11. Measurable means can be measured, in quantity as well as in quality.
12. Reportable means the result that can be reported or informed.
13. Verifiable means the fact that can be proved.
14. Minister is the minister appointed for duties and liabilities in forestry field.
15. Technical Minister is the minister appointed for duties and liabilities in energy and mineral resources field.
16. Mining is a part of mining business activities to produce mineral, coal, and /or accessory minerals.
17. Environmental pollution is living things, substance, energy, and/or other components that enter or entered the environment by human activities that exceeds decided environmental quality standard.
18. Mining is partly of or whole of activities stages for research, management, and exertion of mineral or coal concerning general research, exploitation, feasibility study, construction, mining, processing and purification, transportation and selling as well as post-mining activities.
19. Environmental damage is action that causes direct or indirect change towards physical nature and/or biological of environment to exceed standard criteria of environmental damage.
20. Forest and Land Rehabilitation is effort to recov-

er, to maintain, and to increase functions of forest and land so that carrying capacity, productivity, and roles in keeping life support system to last.

21. Land rehabilitation and soil conservation, next abridged as LRSC is effort to repair/recover, to increase, and to keep land condition to function at optimum as production element, water management control media, as well as element of environmental protection.

22. Forest reclamation is effort to repair or to recover damaged land and vegetation to function at optimum accordingly to its allocation.

23. Revegetation is effort to repair and to recover damaged vegetation through planting and maintenance activities on the land former used for forest area utilization.

24. Baseline is early/basic situation or condition at location plan acreage for activities of forest area utilization.

25. Closure condition is the condition after the activities of forest area utilization that caused change to baseline.

26. Water Disposal Line, next abridged as WDL, is water line made perpendicular contour direction with specific measure in accordance to rainfall condition, inclination, and hydraulic conductivity/type of soil, strengthen with sodding.

27. Sedimentation is amount of soil materials in form of mud content in water by river water flow coming from erosion process at headstream, settled at some area at downstream in which settlement speed of suspension material grains has become

less than the travel speed.

28. Tailing is soft grained compact substance as waste of processing result of mineral dressing extraction that contains minerals without economic value.

29. Surface mining is activities on mining and excavation of mining material done with direct contact to open air.

Second Part

Principles, Purposes, and Objectives

Article 2

Basic principle of reclamation activities concerns:

- a. a holistic mining activities; and
- b. done as early as possible without waiting for whole mining process to finish.

Article 3

- (1) Forest reclamation guidelines is meant to provide reference for the performers in doing forest reclamation activities at the land former used as forest area utilization.
- (2) Forest reclamation guidelines has objectives for the carrying out of forest reclamation to be done in accordance to general patterns, standards and criteria in order to recover the forest to re-function at optimum accordingly to its allocation.

Third Part

Scope

Article 4

The scope of Forest Reclamation Guidelines includes:

- a. location inventory;
- b. decision on location;
- c. planning;
- d. execution;
- e. institution;
- f. technical monitoring and assistance,
- g. reporting mechanism of forest reclamation implementation; and
- h. sanction.

CHAPTER II

LOCATION INVENTORY

Article 5

- (1) Location inventory as meant in Article 4 point a is activity of data and information collection on condition of whole forest area to get disturbed as effect of forest area utilization.
- (2) Data and information as meant at paragraph (1) consists of primary and secondary data that concerns:
 - a. Physical Condition of Borrow-Use Acreage; and
 - b. Economic Social condition.
- (3) Physical Condition of Borrow-Use Acreage as meant at paragraph 2 point d involves:
 - a. forest area function;
 - b. land closure;
 - c. flora and fauna;
 - d. types of land;
 - e. solum thickness;
 - f. topography;
 - g. climate;
 - h. water management;

- i. erosion or sedimentation;
- j. location altitude; and
- k. types of vegetation.
- (4) Economic social condition as meant at paragraph (2) point b involves:
 - a. demography;
 - b. income level;
 - c. livelihood;
 - d. education;
 - e. community institution;
 - f. land ownership; and
 - g. community's culture;
- (5) Area scope for economic social data as meant paragraph (1) includes surrounding villages of the mining area influenced intentionally/unintentionally by mining activities.

Article 6

- (1) Based on location inventory result as meant in Article 5, obtained:
 - a. numeric data and spatial data of whole forest area to get disturbed; and
 - b. numeric data and spatial data of whole forest area disturbed.
- (2) Numeric data and spatial data of area to get disturbed as meant at paragraph (1) point a are used as baseline data for forest area utilization.
- (3) Numeric data and spatial data of whole forest area disturbed are used as base to decide on location.
- (4) Numeric data and spatial data as meant at paragraph (1) is main data originated from Feasibility Study documents, AEI, Environmental Man-

agement Effort (UKL), Environmental Monitoring Effort (UPL), plan on forest area utilization, and Mine Closure Plan.

CHAPTER III DECISION ON LOCATION

Article 7

- (1) Location is decided based on location inventory result as meant in Article 6;
- (2) Decision on location is activities of selecting and pointing forest area disturbed as effect of forest area utilization ready to get reclamation.

Article 8

Decision on location as meant in Article 7 is carried out by doing analysis and evaluation on spatial and numeric data of disturbed forest area.

Article 9

- (1) Reclamation wide and location are decided based on the result of analysis and evaluation on spatial and numeric data as meant in Article 8.
- (2) Result of analysis as meant at paragraph (1) is mapped on reclamation plan map using the smallest scale 1:25.000 as material for 5 (five) year or annual reclamation plan.

CHAPTER IV PLANNING

First Part

General

Article 10

- (1) Reclamation planning is done to produce forest

reclamation plan that consist of:

- a. 5 (five) year plan; and
 - b. annual plan.
- (2) In case the mine lasts less than 5 (five) years, reclamation plan is arranged accordingly to the life of mine.

Second Part

Five-Year Reclamation Plan

Article 11

- (1) Five year reclamation plan is arranged by the holder of license for forest area borrow-use based on the result of location inventory and decision on location.
- (2) Five-Year Reclamation Plan consists as follows:
 - a. forest area condition, pre- and post-activities;
 - b. forest area opening plan;
 - c. forest reclamation program;
 - d. reclamation technical plan (T-0);
 - e. implementation time frame;
 - f. cost plan; and
 - g. Location map and reclamation activities plan map.

Article 12

- (1) In case the mine lasts less than 5 (five) years, 5 (five) year plan is arranged accordingly to the life of mine;
- (2) Plan contents adjusted to life of mine refers to 5 (five) year plan.

Article 13

- (1) Forest area condition pre- and post-activities as

meant in Article 11 paragraph (2) point a, consists information on quantitative and qualitative condition of baseline and closure.

- (2) Qualitative and quantitative condition as meant at paragraph (1) concerns stand density, types of plant, topography, inclination, land closure, and flora & fauna.

Article 14

Forest area opening plan as meant in Article 11 paragraph (2) point b, consists information on wide and location of forest area utilization to be executed.

Article 15

- (1) Forest reclamation program as meant in Article 11 paragraph (2) point c consists of:
- a. forest area preparation;
 - b. land form arrangement/land management;
 - c. erosion and sedimentation control;
 - d. management of top soil layer;
 - e. revegetation; and
 - f. effort for security;
- (2) Forest area preparation as meant at paragraph (1) includes activities of:
- a. relocation or clearance of all instruments and infrastructure that no longer in use;
 - b. disposal of toxic/hazardous waste/garbage;
 - c. scrap disposal or burial; and
 - d. opening management and installation of prohibition, signs, or closing entrance to mine location.

Article 16

Implementation time frame as meant in Article 11 paragraph (2) point e concerns time frame for implementation and completion of forest reclamation activities.

Article 17

- (1) Cost plan as meant in Article 11 paragraph (2) point f concerns whole cost, direct or indirect cost paid in the implementation of forest reclamation activities.
- (2) Direct cost consists of:
- a. forest area preparation cost;
 - b. land form arrangement/land management cost;
 - c. erosion and sedimentation control cost;
 - d. management of top soil layer cost;
 - e. revegetation cost; and
 - f. maintenance and security cost;
- (3) Indirect cost consists of mobilization and demobilization cost, reclamation plan cost, reclamation administration cost, and monitoring cost.

Article 18

Location map and forest reclamation activities plan as meant in Article 11 paragraph (2) point g is made using smallest scale 1:25.000.

Third Part

Annual Reclamation Plan Arrangement

Article 19

- (1) Five year plan as meant in Article 11 is described further in annual plan.

(2) Annual plan consists:

- a. forest reclamation site/location;
- b. Types of reclamation activities include:
 - 1. Land management;
 - 2. Ex-mine hole refilling;
 - a) Land surface arrangement; and
 - b) Top soil dissemination/management,
 - 3. Erosion and sedimentation control;
 - a) Erection of soil conservation building (check dam, holding dam, ravine control, drop structure, water disposal line, etc.)
 - b) Planting of cover crops to lessen run off and to increase infiltration.
 - 4. Revegetation (planting acreage width, number of plant per hectare and plant type composition);
- c. Width/volume of every type of reclamation activities;
- d. Schedule for reclamation activities implementation;
- e. cost needed for every reclamation activity;
- f. Annual Reclamation Plan Map smallest scale 1:10.000, consists:
 - 1. width of borrow-use are/ width of total concession;
 - 2. width plan for mine opening;
 - 3. width plan of reclamation/revegetation acreage.

Article 20

- (1) From annual reclamation plan as meant in Article 19 for every location there is technical design arranged to be used as detail reference on site

location.

- (2) Site location is site to be used for reclamation activities by applying reclamation technique accordingly to technical design.

Article 21

- (1) Technical design as meant in Article 20 paragraph (1) is a detail design of every activity to be done in reclamation activities, whether it is land management design, plan design, or soil conservation building design.
- (2) Technical design as meant at paragraph (1) consists:
- a. forest reclamation site/location;
 - b. Types of reclamation activities;
 - c. Width or volume of every type of reclamation activities;
 - d. Planting pattern (planting stages, planting range, types of plants, etc.);
 - e. Needs for materials and tools;
 - f. Needs for worker;
 - g. Needs for cost;
 - h. Time frame;
 - i. Planting lay out; and
 - j. Design picture of soil conservation building.

Article 22

- (1) Technical Design is arranged based on analysis result:
- a. biophysical condition; and
 - b. economic social condition.
- (2) Biophysical condition as meant at paragraph (1) point a includes:

- a. topography or land form;
- b. climate;
- c. hydrology;
- d. soil fertility;
- e. condition of early vegetation; and
- f. native vegetation.

(3) Economic social condition as meant at paragraph

(1) point b involves:

- a. Demography;
- b. facility and infrastructure; and
- c. accessibility.

Article 23

- (1) Biophysical condition as meant in Article 22 paragraph (2) as first step to decide planting activities stages;
- (2) On certain location, planting activities must be preceded by pre-condition by planting pioneer plants or fast growing species before enrichment done by planting permanent vegetation types that is local plant type with long cycle.
- (3) For other locations, can be done direct planting with long cycle local plant types;
- (4) Selected plant types is focused on native plant planting that local plant types suitable to local

soil and climate condition.

Article 24

- (1) Selected plant types/species also depend on the land utilization/forest function in the future.
- (2) For protection forest, plant types must meet the requirements as follows:
 - a. possesses long cycle;
 - b. deep-rooted;
 - c. low evapotranspiration;
 - d. produce wood, latex, skin, or fruit; and
 - e. heterogeneous.
- (3) For production forest, plant types must meet the requirements as follows:
 - a. fast growth;
 - b. high commercial value;
 - c. its silviculture has been mastered;
 - d. easy to get quality seed; and
 - e. adjusted to market's needs/demand.

Article 25.....

to be continued

(A)

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 Correspondents : Expert from Business & Scientific world
 Published/Printed by : PT. Business News, Member of SPS/SGP
 Address : Jl. Puri Kencana No. 38 Jakarta Selatan 12410

Press Publication License (SIUPP)
 No. 012/SK/MENPEN/SIUPP/F.5/1985,
 November 19, 1985

www.businessnews.co.id

ISSN 1410 - 2501

English Edition : Wednesday and Friday,
 Except holidays
 Indonesia Edition : Monday, Wednesday and Friday,
 Except holiday
 Subscription : In the city Rp150,000/
 Outside city/by Mail Rp180,000/
 month plus VAT
 Circulation : 759 20 117, 759 20 118
 Fax : 769 55 07
 Documentation : 759 20 116
 New subscriber : Minimally 3 (three) months,
 without restitution

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[Continued from Business News No. 8109 page 40-48]

Article 25

Besides referring to Article 24, in selecting species it is necessary to pay attention to the following:

- a. Identification of classification and growth of plant species grow naturally at reclamation location.
- b. Soil and drainage condition in which different local species can adapt to ex-mine location.
- c. Plant type that can produce seeds and has ability to multiply.
- d. Plant type with economic value/commercial can be used by considering land allocation accordingly to General Spatial Planning (GSP) or Forest

Function Management.

- e. Consideration on habitat requirements, the possibility of wild animal to return to that area is an important element of post mining land use.
- f. Consideration on cutting plant (trubus) because this plan most of the time is good plant group and will repair soil fertility.

Fourth Part

Plan Ratification

Article 26

- (1) Arranged 5 (five) year and annual forest reclamation plan are analyzed by Minister of Technical, Governor, or Regent/Major accordingly to their authority by involving Minister.

- (2) In certain case, the assessment of reclamation plan can involve the Minister who works in the field of environmental management.

Article 27

- (1) The assessment of 5 (five) year and annual forest reclamation plan is done by the Director General of Management Guidance for River Flow Area and Social Forestry on behalf of Minister.
- (2) In case assessment is stated fulfilling requirements, Director General Of Management Guidance for RFA and Social Forestry on the behalf of Minister gives recommendation.

Article 28

- (1) Next, assessed and recommended 5 (five) year forest reclamation and annual plan are ratified by Minister of Technical, Governor, or Regent/Major accordingly to their authority.
- (2) In case the mine lasts less than 5 (five) years, reclamation plan is arranged accordingly to the life of mine, next the process of arrangement, recommendation, and ratification refers to 5 (five) years forest reclamation plan.

CHAPTER V

IMPLEMENTATION

First Part

General

Article 29

- (1) Reclamation activities are started accordingly to agreed plan and must be finished on decided time.

- (2) In case of reclamation activities implementation, license holder of forest area utilization is holding accountability until end/closure condition accordingly to ratified plan.

Article 30

- (1) Implementation of reclamation includes these following types of activities:
- civil technique; and
 - vegetation technique.
- (2) Civil technique activities as meant at paragraph (1) point a, involves:
- ex-mine hole refilling;
 - land form arrangement;
 - top soil management;
 - terrace making;
 - water disposal line (WDL);
 - ravine control buildings;
 - check dam making; and/or
 - waste oil catching
- (3) Activities as meant at paragraph (2) are adjusted to local condition.
- (4) Vegetation technique activities as meant at paragraph (1) point b involves selection of:
- planting pattern,
 - planting stages (pre-condition and permanent vegetation planting);
 - planting system (monoculture, multiple cropping);
 - types of plant are adjusted to local condition; and
 - cover crop.

Article 31

Implementation of reclamation includes activity stages as follows:

- a. Land management;
- b. Erosion and sedimentation control.
- c. Revegetation (re-planting); and
- d. Maintenance.

Second Part**Land management****Article 32**

Land management as meant in Article 31 point a consists of:

- a. Ex-mine hole refilling;
- b. Land form arrangement; and
- c. Top soil management;

Paragraph 1**Ex-mine hole refilling****Article 33**

- (1) Ex-mine hole refilling as meant in Article 32 point a, in open mining activities, the ex-mine hole must be closed or adjusted to its AEI.
- (2) The activities for mine hole closure are done progressively accordingly to mining implementation progress.

Paragraph 2**Land form arrangement****Article 34**

- (1) Land form arrangement as meant in Article 32 point b is adjusted to condition of topography, type of soil, and local climate.
- (2) Activities in land form arrangement includes:
 - a. Slope form arrangement;

- b. Water line arrangement; and
- c. Low Grade Arrangement/Placement.

Article 35

- (1) Slope form arrangement as meant in Article 34 paragraph (2) point a is meant to reduce the runoff, erosion, and sedimentation as well as landslide.
- (2) Slope form as meant at paragraph (1) is not too high or steep and formed with terraces, height and inclination of the slope depend on texture and soil structure nature as well as rain fall.
- (3) Types of treatment for terrace making and soil conservation activities in slope form arrangement are as stated on attachment 1.

Article 36

- (1) Water line arrangement as meant in Article 34 paragraph (2) point b is meant to manage water to flow to specific places and can reduce land damage.
- (2) Amount and density as well as form of water line depend on land form/topography, types of soil, rain fall, and wide of acreage for reclamation.

Article 37

- (1) Low grade arrangement/placement in the form of mining material with low economic value as meant in Article 34 paragraph (2) point c is meant for the mining material not to get erosion/lost if buried in long time because it is not yet utilized.
- (2) Arrangement in the form of low grade pile is as stated on attachment 2.

Paragraph 3

Top soil management

Article 38

- (1) Top soil management as meant in Article 32 point c is meant to regulate and to separate top soil from other soil layers.
- (2) Top soil as meant at paragraph (1) is a growth medium for plant and one of the deciding factors for plant growth success of reclamation activities.

Article 39

- (1) Top soil management must consider:
 - a. Soil profile observation and to identify the soil layers up to mining material deposit.
 - b. Soil stripping is based on soil layers and placed on suitable place accordingly to the layer level and top soil pile is not more than 2 meters.
 - c. Land formation is according to origin soil layer structure, top soil is placed on the very top with at least 0.15 meter thickness.
 - d. Thickness of top soil pile at soil that contains toxic is suggested thicker than the non-toxic one or applied with special treatment by doing isolation and separate it.
 - e. Soil stripping should not be done in wet condition to avoid condensation and damage on soil structure.
- (2) In case top soil layer is thin, limited, or a little, it is necessary to consider:
 - a. Decision on priority area that is highly sensitive area towards erosion needs to get soil

conservation handling treatment and planting.

- b. Top soil placement is on planting line or with potting system.
- c. The mixing of top soil with other soil that is if amount of top soil is very limited/very thin can be mixed with sub soil, things to avoid in top soil utilization are:
 - 1) contains much of sand (> 70% of sand or gravel);
 - 2) contains much of clay (> 60% of clay);
 - 3) has pH of < 5,00 or > 8,00;
 - 4) contains chloride 3%; and
 - 5) has electrical conductivity (ec) 400 milisiemens/meter;
- d. Direct planting is done using cover crop that grows fast and covers the soil surface.
- (3) Management of top soil at acreage for reclamation is as stated on Attachment 3.

Third Part

Erosion and Sedimentation Control

Article 40

Erosion can be caused by:

- a. wind;
- b. water.

Paragraph 1

Wind erosion

Article 41

- (1) Sensitive areas towards wind erosion are such as sandy beach, semi-dry/dry area (Nusa Tenegara) or on very wide opened mining land.

(2) Main impacts of wind erosion are:

- a. Land-productivity decrement;
- b. Dust disturbance; and
- c. Formation of dust deposit in the gutter, at left and right side of road, fence, and buildings.

(3) Annual plant or cover crop is used to control erosion in long term.

(4) There are actions done before plant can play its role, as follows:

- a. Using mulch as land cover;
- b. Making soil condition resistance towards erosion by letting soil in lump form, wetting soil surface, and making curves on soil; and
- c. Reducing wind velocity by making wind breaker.

(5) This wind breaker can be line of wild trees or bushes or planted ones planted perpendicular towards wind, planted trees or bushes are better originated from fast grow and strong ones or can be made as fence.

(6) In placing and selecting wind breaker, there are factors to consider:

- a. Erosive wind direction.
- b. Plant height and distance.
- c. Wind permeability (40% the highest).
- d. Wind breaker continuity and length as well as turbulence at area for reclamation:

(1) Factors that cause erosion are rain fall, slope inclination (topography), type of soil, land use (treatment on land), and soil cover plants.

(2) Some methods to control water erosion are:

a. Minimizing disturbed acreage.

- 1) By making details of activities of forest area utilization and reclamation;
- 2) By making obvious borders of development stages acreage;
- 3) By cutting trees only in acreage where forest area utilization takes place;
- 4) By monitoring closely the trees cutting execution.

b. Limiting/reducing run off speed with by:

- 1) Making terrace as stated on Attachment 4;
- 2) Making diversion/dodger channel (parallel to contour line);
- 3) Making Water Disposal Line (WDL) as stated on Attachment 5;

c. Increasing water infiltration

- 1) Making channel terrace in the form of holes or blocked channels made between staple crops to hold water and engrain it into soil (illustration attachment 18).
- 2) Soil harrowing in line with contour. Due to harrowing, soil becomes loose and its volume increases as medium for plant's root.

d. Storing sediment

- 1) To store sediment from erosion, a holding dam or control dam can be made as stated on Attachment 6.

Paragraph 2

Water erosion

Article 42

- 2) If sediment has reached half of dam body, it is better to dredge and used as top soil layer.
- e. Reducing erosion
 - 1) Cover crop planting can be done to reduce erosion, especially when land management has just done.
 - 2) On relatively flat land, cover crop planting can be done manually, while on a little steep land can be done by using hydro-seeding.
- f. Management for water coming out from forest area utilization
 - 1) Water distribution from mining location to public must be according to regulation in effect:
 - 2) If rain fall is high, it is necessary to make strong and permanent dam completed with dodger channel.
 - 3) Dam location is placed in such way that run off water is easy to retain and redirected and also water channel inclination is made not too steep.
 - 4) In making permanent dam, it is better to complete it with spillways, disposal pipe/out let, and other things considered necessary.

Fourth Part

Revegetation

Article 43

Revegetation is done through activities stages:

- a. field preparation;
- b. seed nursery and/or provision;
- c. planting execution; and
- d. plant maintenance.

Paragraph 1

Field preparation

Article 44

The field preparation activities as meant in Article 43 point a covers:

- a. land clearing;
- b. soil treatment; and
- c. soil improvement.

Article 45

Clearing the land from weeds (coarse grass, climber, and so on) as meant in Article 44 point a is done so that staple plant can grow well without competition with weeds in getting nutrient, sunlight.

Article 46

Soil Treatment as meant in Article 44 point b is done so that soil becomes loose to make infiltration of plant's root easy into soil and to get necessary nutrient easily, so that plant can grow as expected.

Article 47

Soil improvement as meant in Article 44 point c is meant so that soil quality that less good for plant's growth can get special attention through soil improvement, such as:

- a. Gypsum usage.

Gypsum is used to improve soil condition that contains much clay and to reduce crusting formation on hard-setting soil.

b. Lime usage.

Lime is used especially to regulate pH, but also can be used to improve soil structure.

c. Mulch, straw, and other organic materials.

Mulch is material spread on soil surface as an effort to improve soil condition for seed adjustment at early stage of plant, to control erosion, and to maintain soil humidity, and to settle soil surface angle. Short-term cover crop can also be used as mulch.

d. Fertilizer.

Even though native plant can adapt low nutrition level, but enough fertilizer treatment can increase its growth.

Treatment with basic fertilizer using correct composition and dosage and accordingly to needs will be very influential to plants' growth level.

Organic fertilizer can be used due to its function as converter for nature of soil.

Treatment with grained or tablet fertilizer can be applied as long as there is no direct contact between root with fertilizer.

Paragraph 2

seed nursery and/or provision;

Article 48

- (1) Seeds needed for revegetation must be obtained through seed nursery and/or provision;
- (2) For that sake, every forest area utilizer must have nursery.
- (3) In case seeds available in nursery do not fulfill requirement to plant and/or the amount does not suffice needs of seed provision, direct provision can be done.

- (4) Law for seed nursery and/or provision implementation is regulated accordingly to the law and regulation.

Paragraph 3

Planting Implementation

Article 49

- (1) Stages of planting implementation involves:
 - a. arrangement of plant row direction;
 - b. stake planting.
 - c. seeds distribution;
 - d. plant hole creation; and
 - e. planting.
- (2) The arrangement for row direction must be parallel to contour or to the area that relatively flat following east-west direction.
- (3) Stake planting is following plant row direction and planting distance decided on technical design.
- (4) Seed distribution is done after planting hole creation activity or done after stakes have been planted.
- (5) Planting hole is made 30 x 30 x 30 cm or adjusted to seeds size to be planted with distance between plant hole as decided on technical design.
- (6) Before planting, soil that will be used to cover the plant hole will be mixed with basic fertilizer (N, P, and K) accordingly to needs or types of plant to be planted.

Article 50

- (1) Planting is done under condition as follows:

- a. The plastic (pot/polly bag) is removed from the seeds before planting.
- b. Plant the seed perpendicularly and compact enough and make sure by pressing surrounding area of the plant using feet.
- c. Amount of final plants is minimum 625 per hectare or with maximum 4 x 4 m planting distance adjusted to land form, area function and plant form/canopy.
- d. Planting stages are done as follows:
 - 1) For erosion and sedimentation control, first stage is cover crop.
 - 2) After cover crop grow, at certain locations must be preceded with pre-condition by planting pioneer plants or fast growing species so that land covering and nutrient enrichment can be obtained quickly.
 - 3) After pioneer plant aged between 2 up to 3 years, then enrichment is done by planting of long-cycle local species that have high economic value, which generally need shade at early planting stage.
 - 4) For other locations with possible condition, can be done direct planting with long cycle local plant types with plant typed adjusted to forest function.

Paragraph 4

Plant Maintenance

Article 51

- (1) Plant maintenance is meant to trigger plant growth in such a way to have optimum condition for plant growth.

(2) Plant maintenance activities are:

a. Inter planting.

Inter planting is done to dead or damaged, unhealthy or wilted plant, and done on running year maintenance, year I and year II until plants can grow well and naturally.

b. Weed control.

Weed control is done to reduce/lessen competition between staple plants with weeds. Weed control can be done manually such as weeding and removing weeds to loosen the soil or chemically like chemical agent/herbicide spraying, depends on field condition, soil condition, plant types, and weed types.

c. Fertilizing.

- 1) Fertilizing is meant to pace up plant growth and to increase increment.
- 2) In deciding type, dosage, and time for fertilizing, it is necessary to consider plant species and soil fertility as well as to perform soil analyze before hand.

d. Pest and disease control.

- 1) Plant pest and disease control chemically can only be done on a very critical condition that tends to fail whole forest reclamation.
- 2) Control is done by following guidelines for usage/treatment precisely and correctly.

e. Prevention of forest fire and illegal grazing.

- 1) Forest fire can be a serious threat for crop growth, plant productivity and quality.
- 2) Some of prevention efforts towards fire are: land clearing from flammable

materials; selecting plant types that resistance towards fire and providing education on fire prevention to local society.

- 3) Prevention towards illegal grazing is done through education, provision of livestock feed seed, and if necessary building safety fence.

f. Trimming.

- 1) Trimming can be done to provide enough growing space for plants.
- 2) Trimming is also meant to provide growing space for enrichment plant or relay crop planted after pioneer or fast grow crop planting.

g. Thinning.

- 1) At early planting that usually done with fast grow species, land covering occurs quickly that cause plant growing competition.
- 2) Thinning is done to reduce plant growing competition, to remove plant with pressed growth, and to provide enough growing space for relay or enrichment plants.
- 3) Thinning activity is done at half cycle of pioneer crop age with amount/percentage of available crop amount depends on crop density condition and plant species or plan for long cycle local species planting.
- 4) Felling management for thinning refers to the law and regulation.

h. Enrichment.

- 1) Enrichment planting can be done by doing relay planting after pioneer crops aged 2

(two) up to 3 (three) years or after thinning.

- 2) Plant enrichment is done by planting long-cycle local plant species that have high economic value accordingly to analysis result in AEI study.

Fifth Part

Financing

Article 52

- (1) Cost for forest reclamation implementation is born by the license holder of forest area utilization.
- (2) To guarantee the success of forest reclamation implementation, license holder is obliged to pay Reclamation Guarantee Fund (RGF).
- (3) Law on quantity, form, placement procedure, liquidation of Reclamation Guarantee Fund is done accordingly to the law and regulation.

Sixth Part

Forest Reclamation Period of Time

Article 53

- (1) Due date for forest reclamation completion is 1 (one) year at maximum before the due date of license for forest area utilization.
- (2) In case the company will return borrowed forest area before the due date of forest borrow-use license, then the due date for forest reclamation completion is 1 (one) year at the latest before the due date to return the forest.
- (3) Assessment is done on forest reclamation success before it is returned as meant at paragraph (1) and (2).

CHAPTER VI

INSTITUTION

Article 54

Institution includes:

- a. Executive Organization of Forest Reclamation; and
- b. Human Resources (HR).

Article 55

- (1) For the license holder of forest area utilization it is obliged to have special organization that handles forest reclamation.
- (2) Organization as meant at paragraph (1) carries out duties as follows:
 - a. To identify region space allocation plan and utilization to be mined;
 - b. To identify the baseline;
 - c. To plan forest reclamation efforts;
 - c. To execute plans and efforts for forest reclamation;
 - e. To establish maintenance, research, monitoring, and reporting all execution of plans and efforts for forest reclamation.

Article 56

Human resources, as meant in Article 54 point b, are obliged to possess expertise in the field of forestry, agriculture, mining, soil, and other fields related to forest reclamation.

Article 57

The license holder of forest area utilization is obliged to improve quality and capability of human

resources expertise in implementing forest reclamation activities, through activities such as training, on the job training (apprenticeship), comparative study, and workshop.

Article 58

In order to increase quality and capability of human resources in forestry field, there are trainings as follows:

- a. GIS mapping and mastering tenurial information on forest area, the license holder can work together with Forest Area Establishment Office (FAEO/BPKH) as Technical Executor Unit (TEU/ UPT) of Directorate General of Forestry Planology.
- b. Monitoring and evaluation of River Flow Area that go along with environmental surveillance, management, and control, the utilization license holder can work together with Management Office for River Flow Area (MORFA/BPDAS) as the Technical Executor Unit (TEU) of Directorate General of Management Guidance for River Flow Area and Social Forestry.
- c. Forest plant nursery technique, the utilization license holder can work together with The Office for Forest Plant Seed (OFPS/BPTH) as TEU of Directorate General of Management Guidance for River Flow Area and Social Forestry.
- d. Forest development policy in the region and sustainable forest management, the utilization license holder can work together with Provincial Forestry Office.

CHAPTER VII

TECHNICAL MONITORING AND ASSISTANCE

First Part

General

Article 59

- (1) Activities of technical monitoring and assistance on forest reclamation implementation is done at least once a year.
- (2) Activities of technical monitoring and assistance is carried out by:
 - a. central level; and
 - b. regional level.

Article 60

- (1) Monitoring activities of forest reclamation implementation as meant in Article 59 paragraph (1) is done to observe the implementation development of forest reclamation activities, to identify, as well as to anticipate occurring and/or to occur problems to be able to take action as early as possible.
- (2) Monitoring activities are done to obtain data and information, policy and implementation of forest reclamation.

Article 61

Activities of technical assistance as meant in Article 59 paragraph (1) is meant to provide suggestion and input for improvement of forest reclamation implementation that is less/not suitable with current law.

Second Part

Technical Monitoring and Assistance

at Central Level

Article 62

- (1) Technical monitoring and assistance at central level as meant in Article 59 paragraph (2) point a is carried out by the Directorate General of Management Guidance for River Flow Area and Social Forestry cq. Directorate for Forest and Land Rehabilitation Guidance.
- (2) In the implementation of technical monitoring and assistance as meant at paragraph (1) can involve related instances such as Directorate General of Mineral, Coal, and Geothermal, the Ministry of Energy and Mineral Resources, Directorate General for Forestry Planology of Ministry of Forestry.

Third Part

Technical Monitoring and Assistance at

Regional Level

Article 63

- (1) Technical monitoring and assistance at regional level as meant in Article 59 paragraph (2) point b is carried out by Governor, Regent/Major accordingly to their authority.
- (2) In the implementation of technical monitoring and assistance, Governor, Regent/Major assign technical instance to handle forestry matters and can involve related instance.

Article 64

Technical monitoring and assistance is done by technical office as meant in Article 63 appointed

by Regent/Major to monitor the development of reclamation implementation, such as:

- a. Fulfilling payment obligation to Provision of Forest Resources-Reforestation Safety Fund (PFR-RSF/PSDH-DR);
- b. Crop inventory from reclamation result;
- c. Progress/improvement of forest area utilization; and
- d. Reclamation/revegetation.

Article 65

Technical monitoring and assistance as meant in Article 63 is done by technical office appointed by Governor to monitor:

- a. development of border management implementation;
- b. forest area safety implementation;
- c. development of forest area utilization implementation; and
- d. reclamation/revegetation.

Article 66

- (1) Directorate for Forest and Land Rehabilitation Guidance on the behalf of Directorate General of Management Guidance for River Flow Area and Social History assigns Management office of RFA to implement technical monitoring and assistance on reclamation especially related to water management condition at concerned RFA aside from monitoring on the progress of forest reclamation implementation;
- (2) In carrying out water management condition monitoring as meant at paragraph (1) can be done with SPAS installation.

Article 67

Decision for the time to carry out technical monitoring and assistance is done by respective technical instance and coordinated with related parties.

Article 68

(1) Result of monitoring is used to:

- a. Know development/progress of reclamation implementation;
- b. Provide data and information as control function toward the implementation of forest reclamation accordingly to the law and regulation.

(2) Result of monitoring is reported by technical instance that handles forestry affairs at District/City level to Governor cq. Head of Provincial Forestry Office with copy to Directorate General of Management Guidance for River Flow Area and Social Forestry.

(3) Result of monitoring by technical instance that handles forestry affairs at Provincial level is reported to Governor with copy to Directorate General of Management Guidance for River Flow Area and Social Forestry.

(4) Result of technical monitoring and assistance by Management Office of RFA is reported directly to Directorate General of Management Guidance for River Flow Area and Social Forestry.

Fourth Part

Forest Reclamation Success Assessment

Article 69

- (1) Assessment on forest reclamation success is done through evaluation activities towards forest

reclamation implementation.

- (2) Assessment on success for central level is done by Team coordinated by Directorate General of Management Guidance for River Flow Area and Social Forestry and assessment on success at regional level is done by Team coordinated by Provincial Technical Office that handles forestry.
- (3) Assessment on forest reclamation success is done once every 5 (five) years or a year before due of license borrow-use of forest area;
- (4) Law on the implementation of forest reclamation success is regulated accordingly to the law and regulation.

Article 70

- (1) Building/installation of SPAS as meant in Article 66 paragraph (2) is meant to find out about water management condition and erosion/sedimentation occurred.
- (2) SPAS as meant at paragraph (1) is to measure or to know:
 - a. Water management condition, indicated from River Regime Coefficient (RRC), comparison between maximum discharge (Q_{max}) and minimum discharge (Q_{min}) in an RFA. (how to calculate RRC can be seen on attachment table)
 - b. Occurred erosion is indicated from the amount of mud/sediment content in water carried away by river flow or the amount of sediment on wa-

ter bodies. The bigger sediment content carried by water flows means RRA condition is unhealthier.

Article 71

- (1) SPAS set is installed at outlet small watershed (catchment area).
- (2) In case in mining acreage available more than one catchment area, then the biggest one or the most influenced one is chosen to build and install SPAS.
- (3) In order to complete SPAS building, it is necessary to install rain gauge, the manual one Ombrometer or the automatic one Automatic Rainfall Recorder/ARR).
- (4) In installing the SPAS set, the license holder can coordinate/consult with local Management Office of River Flow Area.
- (5) Processed/analyzed data of observation result in form of water discharge and mud content is reported periodically and is part of reclamation report.

Fifth Part.....
to be continued

(A)

FOREST RECLAMATION GUIDELINES

(The Regulation of The Minister of Forestry of Republic of Indonesia Number P. 4/Menhut-II/2011, 14 January 2011)

[Continued from Business News No. 8110 page 36-48]

Fifth Part

Observation Based on Spatial Data

(Measurable, Reportable, and Verifiable/MRV)

Article 72

- (1) System of control, observation on forest reclamation activities must be measurable, reportable, and verifiable (MRV), and must fulfill the principles of:
 - a. Combination of remote sensing and ground based inventory;
 - b. Calculation result: transparent and open for review;
- (2) The implementation system of control, monitoring as meant at paragraph (1) has to be supported by:
 - a. sufficient mapping/spatial data (aiming accuracy of activities location);

b. availability of database system of process documentation and activities output;

c. availability of monitoring result system (outcome), impact, and benefit from reclamation program.

Article 73

- (1) All data and information as result from forest reclamation observation/monitoring is provided in numeric/textual, spatial, and visual.
- (2) For visual data, company is obliged to prepare photo image/documentation that can describe the development of image appearance from the baseline until completion of mining, before activities and after revegetation is done.

- (3) Forest reclamation as part of Forest and Land Rehabilitation (FLR) as development program with multiyear process, the input, output, outcome, and impact of the program can be identified and measured.
- (4) Forest reclamation observation/monitoring is very important to make sure the input, output, outcome, and impact of the forest reclamation runs accordingly to plan/aim of the program.

Article 74

The implementation of observation with MRV system as meant in Article 72 and Article 73 must meet stages as follows:

- a. Output observation/monitoring that involves direct output observation/monitoring of Forest Reclamation activities such as trees plant/crop as direct result of input, in MRV context, this output observation/monitoring will be used more.
- b. Outcome observation/monitoring that involves result observation/monitoring that indicates the output of Forest Reclamation has come to function. Indicators that can be observed at on-site/location such as decreasing erosion and sedimentation and so on are part of this outcome indicator.
- c. Impact observation/monitoring of Forest Reclamation activities that involves indicators at offsite/outside or surrounding location that shows the impact/influence of activities, indication of water management improvement, society economy and social are impact indicators of Forest Reclamation that needs to be measured.
- d. Benefit observation/monitoring is observation to examine how much benefit from the program.

Article 75

- (1) In order to support forest reclamation observation to get clear image since the early process of forest area utilization until the reclamation implementation, the license holder or forest area utilization is obliged to prepare satellite image with sufficient resolution since before forest area utilization takes place until the transfer of forest area.
- (2) Satellite image provision is part of observation with MRV method that necessary to carry out for certain period of time accordingly to validity of license for forest area utilization.
- (3) For the license holder of forest area utilization with 5 (five) years validity or less, satellite image provision is done at the beginning and completion of forest area utilization activities.
- (4) For the license holder of forest area utilization with validity above 5 (five) years, satellite image provision is done every 5 (five) years period.

CHAPTER VIII REPORTING MECHANISM OF FOREST RECLAMATION IMPLEMENTATION

Article 76

The license holder of forest area utilization as the executor of forest reclamation is obliged to submit report of reclamation implementation periodically to Director General of Management Guidance for River Flow Area and Social Forestry of Ministry of Forestry with copies to:

- a. Directorate General for Forestry Planology of Ministry of Forestry;
- b. Directorate General of Mineral, Coal, and Geothermal, the Ministry of Energy and Mineral Resources;
- c. Provincial Technical Office that handles forestry; and

- c. District/City Technical Office that handles forestry.

Article 77

- (1) Forest reclamation report consists of:
- Quarterly Report;
 - Annual Report.
- (2) Forest reclamation report format for quarterly and annual report is according to report format as stated on attachment 7.
- (3) Aside from data on report format, it should be completed with:
- SPAS data (water discharge, sedimentation);
 - Documentation photos of reclamation activities implementation; and
 - Map and coordinate of reclamation acreage (scale 1:10,000).

Article 78

The license holder of forest area utilization is also obliged to make condition pictures/images of forest area borrow-use acreage since 0 year up to the transfer/returning of it.

CHAPTER IX SANCTION

Article 79

For the license holders who do not implement forest reclamation activities accordingly to the law or do not carry out forest reclamation activities, are applied with sanctions, as follows:

- Administration sanction, accordingly to the law and regulation preceded with 3 (three) times written warning with 3 months interval for each warning.
- Sanction in the form of license cancellation for forest area utilization after assessment of forest

reclamation done accordingly to the law and regulation.

Article 80

- (1) Administration sanction is given by Directorate General of Management Guidance for River Flow Area (Directorate General of MGRFA) and Social Forestry after observation has been done by Provincial Office that handles forestry field or by local MGRFA.
- (2) In case after the third warning period has over and the license holder of forest area borrow-use does not do forest reclamation, then Directorate General of Management Guidance for River Flow Area and Social Forestry forms verification/assessment team to perform assessment on reclamation implementation as base for cancellation of license for forest area borrow-use by Minister.
- (3) Member of verification/assessment team consists of related instance as regulated in the Regulation of Minister of Forestry Number: P.60/Menhut-II/2009 concerning Guidelines for Assessment on Forest Reclamation Success.

CHAPTER X FINAL PROVISIONS

Article 81

By the enactment of the Regulation of the Minister of Forestry, Decree of the Minister of Forestry and Plantation Number: 146/Kpts-II/1999 concerning Guidance for Reclamation of Ex-Mine in Forest Area, is annulled and stated not in effect anymore.

Article 82

This Regulation of Minister of Forestry starts to take effect since the promulgation date.

GOVERNMENT REGULATIONS

For everybody to acknowledge this regulation,
this Regulation of Minister of Forestry is promulgated
by placing it in the State Gazette of the Republic of
Indonesia.

Stipulated in Jakarta
on 14 January 2011
THE MINISTER OF FORESTRY
THE REPUBLIC OF INDONESIA

Sgnd.
ZULKIFLI HASAN

Promulgated in Jakarta

On 18 January 2011
THE MINISTER OF LAW AND HUMAN RIGHTS
THE REPUBLIC OF INDONESIA
Sgnd.
PATRIALIS AKBAR

THE STATE GAZETTE OF THE REBULIC OF INDONE-
SIA YEAR 2011 NUMBER 23

Editorial note:

- For technical reason, Attachment is not included.

(A)