TRAINING PROGRAMME

DIEBACK CONTROL DURING MINING IN GOOD QUALITY FOREST

AIMS AND INTRODUCTION

This course has two aims:

To inform you about the new procedures for dieback control during mining.

To have you inform us about how the controls can be best implemented.

The first section deals with the background and development of the control procedures.

Later sections outline the Dieback Management Planning procedures and the Prescriptions for Dieback Control during Mining.

DIEBACK CONTROL OBJECTIVES FOR MINING

- EFFECTIVELY CONTROL DIEBACK WHILE MAINTAINING AN EFFICIENT MINING OPERATION.

- PREVENT DEVELOPMENT OF DISEASE ON DIEBACK-FREE AREAS WHICH ARE MINED.

- PROTECT VULNERABLE ADJACENT FOREST FROM DIEBACK INTRODUCTION AND INTENSIFICATION.

DIEBACK DISEASE

- A fungus which lives in soil and flourishes under warm wet conditions
- It can however survive in dry soil
- Can be spread quickly by runoff water or transfer in soil
- Kills plants by rotting roots and stem tissue leading to drought death
- Very difficult to see and detect quickly - best indicators are dead, susceptible plants
- Disease is mapped from aerial photos or in the field by CALM specialists.
- May be present before plants are killed - therefore care is needed in uncertain situations

Dieback Control Strategies

- Hygiene: cleanliness, access control, dry soil conditions
- Separation of hygiene categories
- Containment: drainage, vehicle movement

Different mixes of control measures relevant to different activities -

- bushwalking - low inoculum potential - no controls
- logging - extensive, intermediate inoculum potential - hygiene control
- mining - intensive, high inoculum potential - containment

The Seven-Way Test

Is required by RMP for all operations in Disease Risk Area = largely dieback-free forest.

Assesses -

. Risk/Hazard - presence of disease, vectors
. Impact - potential of disease to cause deaths
. Consequences - results of infection and deaths.

Rating of these factors allows assessment of -

. control steps required for an operation
. likelihood of control succeeding
. conditions under which operation can proceed.

A Seven-Way Test form is included as Appendix 1.

FOREST MANAGEMENT

State Forests managed by CALM under CALM Act.

Management under the Act according to -

. Regional Management Plan (RMP); and
. Policy Statements

Regional Management Plan - Multiple Use is a basic principle.

Multiple Uses - comprise primary uses -

. water
. timber
. conservation
. recreation

and imposed uses -

. services
. mining

Mining - occurs under the Mining Act or Special Agreement Acts.

Regional Strategies - guide a multitude of forest activities in the Regional Management Plan, eg. landscape, timber production, camping, hunting, mining, dieback control.

Dieback Control -

. is our primary concern here

. governed by -

- Policy Statement No. 3
- RMP Strategies p36
- Seven-Way Test

* A KEY FOREST MANAGEMENT OBJECTIVE -

. is to protect the forest from dieback disease.

Forest Operations -

. usually extensive, eg. logging and burning cover 1000s of hectares per year, using 100s of kilometres of roads.

. involve a low density of resources (m^3 per hectare or km travelled) and low return per hectare; moderate return per m^3.

. Dieback control is therefore limited to effective, low cost solutions relevant to large areas, eg. dry soil only, no soil movement, washdown, timber stockpiling, split phase operations.

BAUXITE MINING

. Operates under Special Agreement Acts

. is a landuse agreed by the State

. managed under RMP as an "imposed activity"

The Stages of Mining are shown in Table 1.
A Chronology of Mining and Forest Operations appears in Table 2.

* A KEY MINING OBJECTIVE -

. is to continue mining bauxite; to do this mining needs to be done responsibly.

Mining operations -

. generally intensive over a few 100 hectares per year using a few 10s of kilometres of road

. high density of resources and returns per hectare; low return per m^3.

. higher input solutions to dieback control are possible, eg. better road design and drainage.

Dry soil only operations in all dieback-free are not practical - some 87% of mining in 1991 will be dieback-free.

To stockpile 6 months ore -

. would be about 4.5 million tons covering 10s of hectares several metres deep.

. about double equipment fleet with few alternative uses

. double conveyor capacity etc.

TABLE 1 : CONTROL PROCEDURES APPLIED TO STAGES OF BAUXITE MINING OPERATIONS

Organisation	Stage	Profile Location	Control Principles	Operating Procedures (see Table 3)
CALM	FIRS	Surface	Standard hygiene	CALM procedures*
ALCOA	Survey + Exploration	"	"	Extensive low intensity
	Grade Control	"	Modified hygiene	Intermediate
CALM	Logging	"	Standard hygiene	CALM procedures*
ALCOA	Clearing	"	Containment, modified hygiene	Intensive
	Soil stripping	"	"	"
	Drill & Blast	Sub-surface	Containment	Not applicable
	Ore Extraction	"	"	" "
	Landscaping	"	"	" "
	Soil Return	New surface	Containment, modified hygiene	Intensive
	Ripping	"	"	" "
	Drainage Works	"	"	" "
	Seeding	"	"	Intermediate
	Planting	"	"	"
	Broadcast Fertilisation	"	"	"
CALM	Management	"	Standard hygiene	CALM procedures*

* Refer to "Manual of Hardwood Logging Specifications".

Table 2.

CHRONOLOGY OF MINING AND FOREST OPERATIONS

CALM			ALCOA	
Comments	Operation	Time (yrs)	Operation	Comments
Silvic. outside 25yr mining area	Last silvicultural operations	- 25	25 yr mine plan	Updated every 3-5 yrs or at strategic change
Last burn independent of mining cycle	Burn Z	- 17		
Allows dieback interp.	Cease burning I	- 14		
	Dieback photography I	- 11		
For exploration drilling Fits d/back interp cycle	Dieback interpretatn I Burn I Cease burning II 10yr logging plan	- 10	6 - 10yr mining plan	Annual update
Before explorn. drilling	Demarcate dieback I	- 9		
		- 8	60 X 60 layout, drill and geol. mapping	
		- 7	30 X 15 layout & drill	Consider moving back 1yr to improve last 2yrs of 5yr plan
For ore devt. drilling Inc FIRS burn, delay seed	Dieback Check II Burn II	- 6	30 X 15 preliminary orebody design	
Mark dieback after burn to avoid losing blazes	Demarcate dieback II	- 5	30 X 15 infill drill 5 Yr Mine Plan *	Peg after burn Annual update
Delay till ore bdy known to avoid overplanting	FIRS planting	- 4	Final outln for yr 0 Forward clearng submn.	Prewarning to CALM
	Dieback photography III Dieback interp III	- 3	Formal clearing bndy & D/back Mgt Pln submn	April submn to allow logging & salvage
Clearfall ore area, remainder to Bradshaw's prescn. Integrated ops.#	Demarcate dieback III Log and MFP	- 2	Clear, stack & burn	Oct onward
		- 1	Strip o/b & topsoil	To ensure adequate time to strip Priority 1's dry
		0	Blast & mine	
		+ 1	Mine/rehabilitate	
		+ 2	Complete rehab.	

Stays ahead of mining but avoids hydrological problems. Consider moving out to Year 5. Needs better ore data earlier OR Two stage logging - 5yr area - Bradshaw's
- 2yr area salvage & MFP

* 5 Yr Mine Plan has 3yrs of 15 X 15 data and 2yrs of 30 X 15 data. Can 5yrs data be obtained in years -7 to -5 ?

Compare this with logging where the same road network can be utilised and trucks can be used in the off-season to haul pine, finished products or other commodities.

FIGURE 1. : EXAMPLE OF GQF DESIGNATION

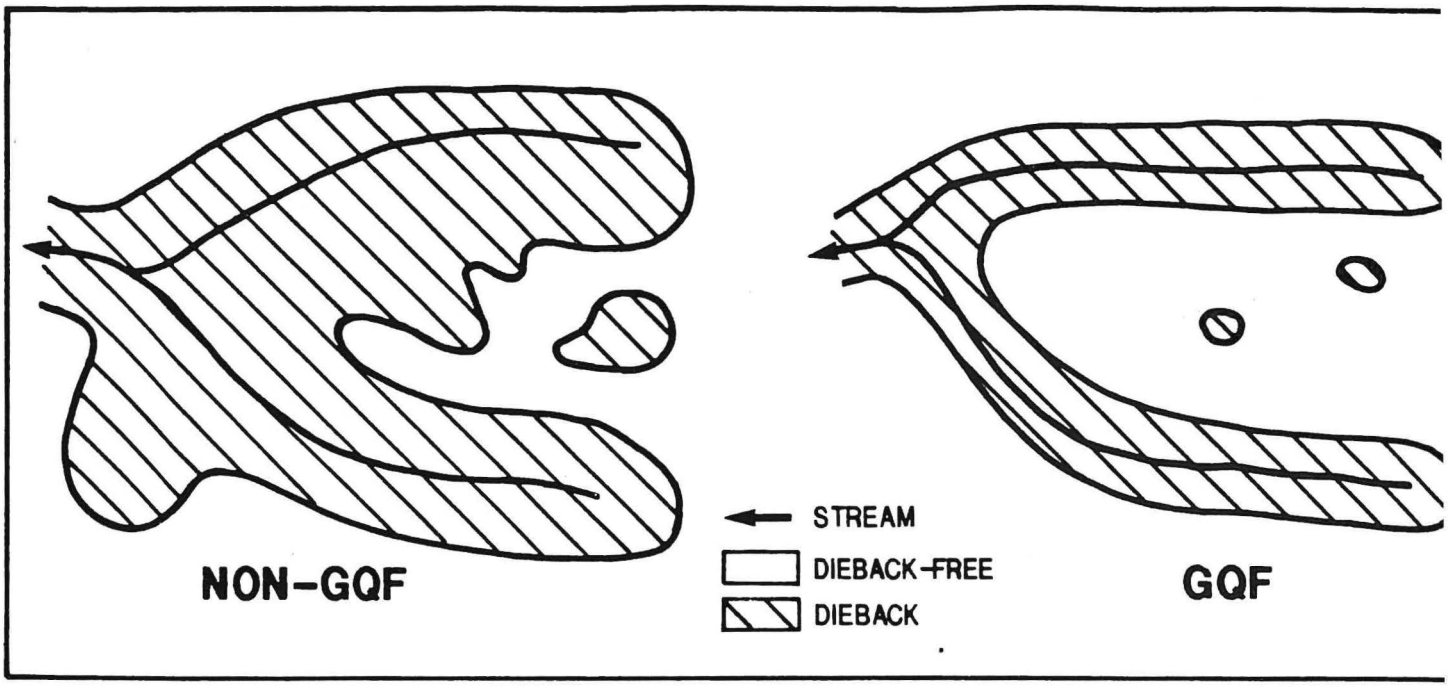
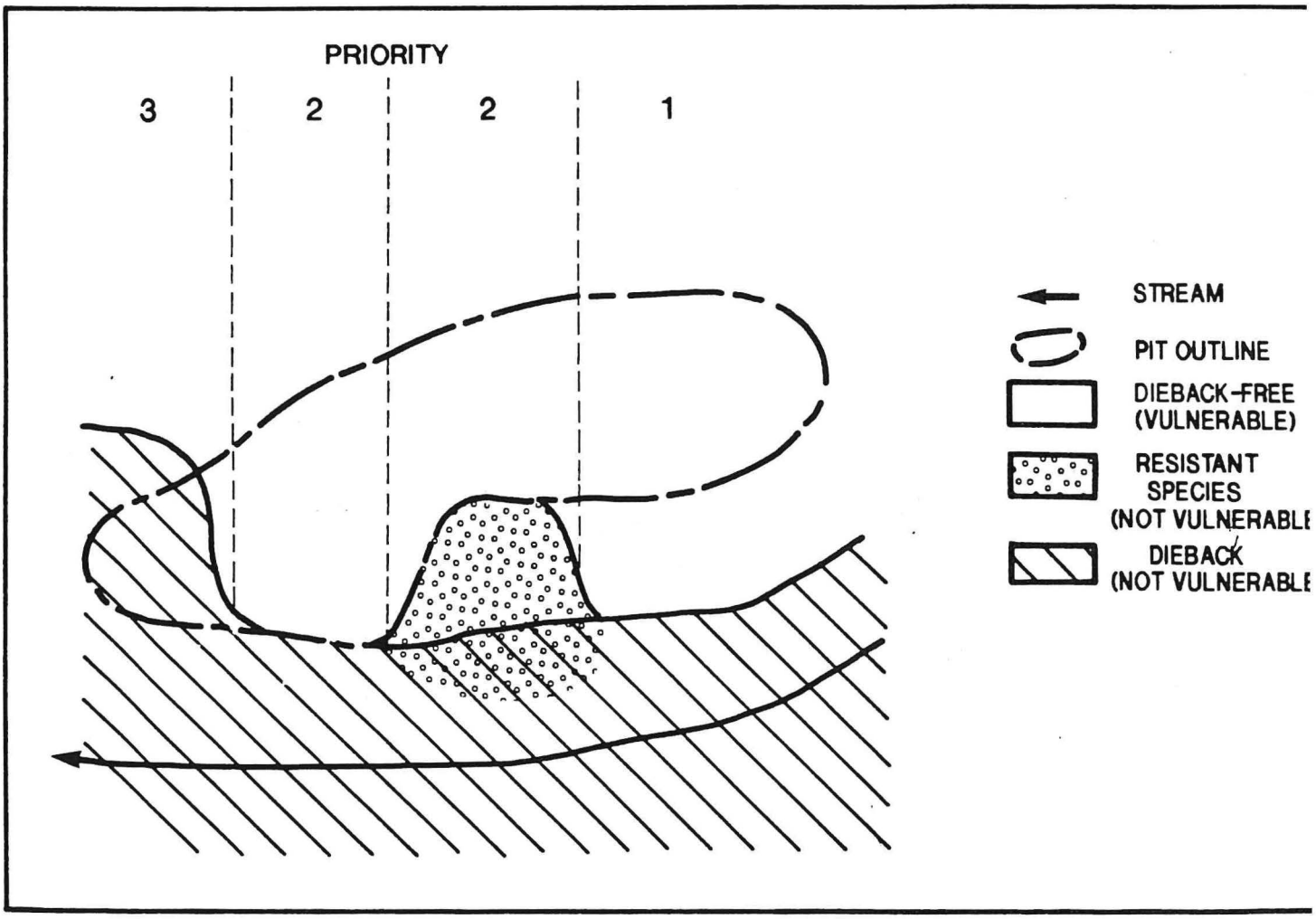


FIGURE 2. : EXAMPLE OF PRIORITIES



DIEBACK CONTROL IN MINING

Why do we need to control dieback now?

- State/Alcoa agreement to move away from Dwellingup and Lane Poole Reserve.
- Aim to consolidate operations at Huntly North by 1990.
- Move north and east into Good Quality Forest (GQF).

- GQF is largely free of dieback disease - see Figure 1

- Old mining areas were in area of high existing dieback impact.
- Current and future operations are moving into GQF.
- Therefore there is an increased need for dieback control if mining is to continue responsibly.

Joint Objectives -

- we have two joint and equally important objectives:

  - to control dieback disease
  - to mine bauxite, responsibly

How can this be done when soil movement can spread disease?

Just as different approaches have been developed for logging and buskwalking due to different intensities, so a different approach is appropriate for mining -

- The objective is to control dieback
- The existing Policy and Seven-Way Test provides a framework for disease evaluation and control
- We aren't tied to the usual means of control (eg. dry soil only) provided alternatives yield an acceptable level of control; note the 'Any Other' box on Seven-Way Test form.

Control Techniques in Mining include -

. Containment - better roading and drainage (eg. in trucking)
. Cleandown - eg. during exploration drilling
. Priority System - maximum effort in most important areas.

The correct control technique depends on:

. the stage of the operation
. the dieback status of the area
. the priority of the area

Stages of Mining and Forest Operations

. Mining and forest operation stages are shown in Table 3
. Depending on the stage, operations are -

- Extensive
- Intermediate; or
- Intensive

This is a measure of the level of risk posed by the operation.

The Priority System and Dieback Status

. Dieback status mapped by CALM experts
. Plant susceptibility to disease can also be mapped
. Plants are vulnerable to disease if they are -

- susceptible and
- not yet infected

Mapping Priorities allows maximum effort to be put into the most important areas.

TABLE 3
OPERATING CONDITIONS

Operations	Priority	Soil Moisture Description	Conditions	Hygiene
Extensive (eg. exploration drilling, survey)	*Dieback-free/ Uncertain	Dry/Moist#	No soil movement	As per existing prescription.
	* Dieback	Wet	No restrictions	As per existing prescription.
Intermediate (eg. grade control drilling)	1	Dry to moist	Doesn't stick, dusty to moist.	Strict hygiene and cleandown before entry and between holes, no soil transfer.
	2	Damp, but not saturated	Soil may stick, damp but no water pressed out.	Strict hygiene and cleandown before entry and between holes, no soil transfer.
	3	Wet, but not boggy	Sticky, wet, water pressed out.	No restrictions on entry. Strict cleandown on exit from dieback.
Intensive (eg. clearing, stripping, rehabilitation)	1	Dry to moist	Doesn't stick, dusty to moist.	As per developmental prescription.
	2	Damp, but not saturated	Soil may stick, damp but no water pressed out.	As per developmental prescription.
	3	Wet, but not boggy	Sticky, wet, water pressed out.	No restriction on entry, cleandown before exit from dieback.

* Priority system not used for exploration and survey.

\# Dry/moist - operations will only occur under dry soil or moist soil /no soil movement conditions. As a guide this is usually under 5mm of rainfall.

The Priority of a site depends on the dieback status of the site and the vulnerability of the area downslope, as shown in Table 4. An example is shown in Figure 2 .

Basically go from a Two Priorities System in Forest Operations (eg. logging) -

. Dieback
. Dieback-free

to a Three Priorities System in Mining -

. Priority 1
. Priority 2
. Priority 3

Status + Priority = Operating Area

Status + Priority + Stage = Operating Conditions

Assessment of Dieback Control Level in Mining -

. Based on -

- Risk/Hazard = intensity of stage + dieback presence
- Impact = vulnerability
- Consequence = vulnerability + location

Note similarity to Seven-Way Test.

Control of Dieback in Mining -

. Requires Planning
. Depends on Stage (= intensity) and Priority

TABLE 4

FOREST PRIORITY RATING

Downslope Status	Pit Status	
	Dieback-free/Uncertain	Dieback
Vulnerable to Dieback	Priority 1	Priority 2
Not Vulnerable	Priority 2	Priority 3

Operating Conditions

Priority 1 = Peak; driest conditions
Priority 2 = Shoulder; either side

Priority 3 = Low; wet conditions

A list of controls depending on the Stage of Operations and Priority of the area is shown in Table 3 .

Operating conditions during intensive operations are based on the soil moisture content NOT adherence to vehicles. Judgements based on soil sticking to the outside of vehicles would not be sensible when soil is being carried inside the truck or scraper.

The next two sections explain how the assessments are made and how dieback is to be controlled, using:

- Dieback Management Planning and
- Prescriptions for Dieback Control During Mining in GQF.

Resources -

- Alcoa will need to secure 2 to 5 extra scrapers over the dry season (approx. $1 million/annum) to meet the Priorities.

HYGIENE MEASURES continued

DIEBACK HYGIENE PLANS - specify type

DIEBACK CATEGORIES

ANY OTHER e.g. split-phase operations, mini-catchments etc.

3 RISK OF DIEBACK FUNGUS (high, moderate, low)

RISK OF INTRODUCTION

MULTIPLE INTRODUCTION RISK

RISK OF SURVIVAL

RISK OF SPREAD

Artificial_____ Natural_____

RISK OF MULTIPLE SPREAD

Artificial_____ Natural_____

COMMENTS

4 LANDFORM AND VEGETATION

Describe according to types used in impact category tables

5 LIKELY IMPACT ON VEGETATION Refer to tables of impact

WILL INTRODUCTION OF DISEASE AND IMPACT BE MONITORED?

HOW?

BY WHOM?

6 LAND USE

GWP No. 87

WITHIN DISEASE RISK AREA?
Classify A_1 A_2 etc or other (see Policy No. 10)

WITHIN ACTIVE CATCHMENT?

SALINITY ZONE specify using map in GWP 87

7 CONSEQUENCES ON LAND USE Refer to tables of consequences

IF HYGIENE SUCCESSFUL

IF HYGIENE FAILS

see over

CONSEQUENCES continued

CONSEQUENCES ON BROADER SCALE on catchment, forest ecosystem, landscape

CONSEQUENCES OF NOT PROCEEDING WITH THE WORK on economy, employment etc

8 EVALUATION OF 7-WAY TEST Your comments, signature and date

OIC AREA

REGIONAL SUPERINTENDENT

OIC PROTECTION

POLICY REVIEW GROUP

ACTING CONSERVATOR

SEVEN-WAY TEST

DIVISION

DATE

1 THE WORK PROPOSED

PURPOSE

INITIATED BY

LOCATION (block etc)

TYPE AND EXTENT OF THE WORK

ARE OTHER OPTIONS AVAILABLE? Specify, including "do nothing"

2 HYGIENE MEASURES REQUIRED Summary of hygiene prescription

CLEAN MACHINERY

DRY SOIL

SUPERVISION

ACCESS ROUTES

continued overleaf

DIEBACK MANAGEMENT PLANNING

An outline of the dieback management process is enclosed in this file and follows the following sequence:-

1) Establish where Good Quality Forest (GQF) exists. This is done by identifying the areas that mining wishes to access i.e. the 25 year Mine Plan and establish with CALM, large areas of disease free forest. An example of Good Quality Forest is given.

2) Make sure the area has been dieback interpreted. Alcoa funds 2 dieback interpreters who work for Inventory and Planning within CALM. The interpretation looks for the presence of dieback indicator plants and probable risk of spread of the disease.

3) The detailed interpretation acts as a record, before operations access the area. The detailed interpretation is rationalised for operations, usually to dieback-free and dieback areas. Sometimes areas are defined as "suspect", these areas will be determined as uncertain dieback for mining purposes. Operations personnel must be aware of the consequences on operations of accessing this particular category.

4) For mining operations priorities or categories are set. Areas which will become dieback management units (DMU's). Priorities will be set for GQF, categories in non GQF. The priorities will be set dependent on where the orebody is situated in the landscape, in particular, in relationship to whether the orebody itself is dieback free or not and whether the forest downslope is vulnerable or not to the introduction of the disease.

5) Dieback status and priority therefore = operating conditions required for access to that area.

6) Though there are 3 dieback categories, dieback-free, uncertain or dieback, and 3 priority rankings 1, 2 and 3 in reality only 4 combinations are likely to occur regularly.

7) Guidelines are examined in the setting of the priorities, each area has to be examined on a case by case basis, all the best mine development information has to be available and the best information on environmental considerations. These are married together to obtain a list of priorities for a given year. These will be presented to CALM at the same time as the annual clearing notice is submitted and developed as part of the 24 month planning process. Ideally, this should be on a 36 month basis.

8) Two examples are shown of real life situations, how would you rank these areas, what have you taken into account in making the decision, are there several possibilities.

9) Alcoa informs the government through CALM of its intentions for dieback management in accessing Good Quality Forest. The means of doing this is through a Dieback Management Plan, it covers most of the critical facets of the mining operation and enables CALM to evaluate how the mining operation intends to operate in the area, similar to a 7 way Test.

10) The Dieback Management Plan will also be supported by documentation elaborating on the reasons for accessing an area in a given way. They might refer to why drainage or access has been organised in a particular way. Changes in dieback status of an area need to be explained.

11) An example of a dieback management plan is included. The one was for an area in Urbrae.

12) The dieback management plan is designed as a mine planning tool and is helpful in presentation to CALM; but a simpler system of informing operational personnel is required. This means illustrating to foremen what is specifically required in different areas of the mine. This is best achieved through a monthly objective map, updated regularly. This alerts foremen to the necessary procedures required in the field.

13) The map is supported by access and cleandown requirements for priority areas with different dieback classifications. This is an abbreviated form of the more elaborative prescription agreed by Alcoa and CALM.

14) To aid operations personnel in understanding what to do when confronted with differing priorities in the field, procedures are being developed to specify how operations should occur examples are shown for track upgrading and vehicle inspection and cleandown.

15) A list of procedures which needs developing is included. Any other procedures?

16) Your help is needed in making sure that everyone understands what is required of a mining operation in access to areas of good quality forest. If you have an idea of any aspect of this process please let Peter Elliott or Warren Tacey know as this process is continually improving. It will be reviewed on an annual basis. As better information becomes available, especially from research, then new procedures will be developed.

PE2/88/860

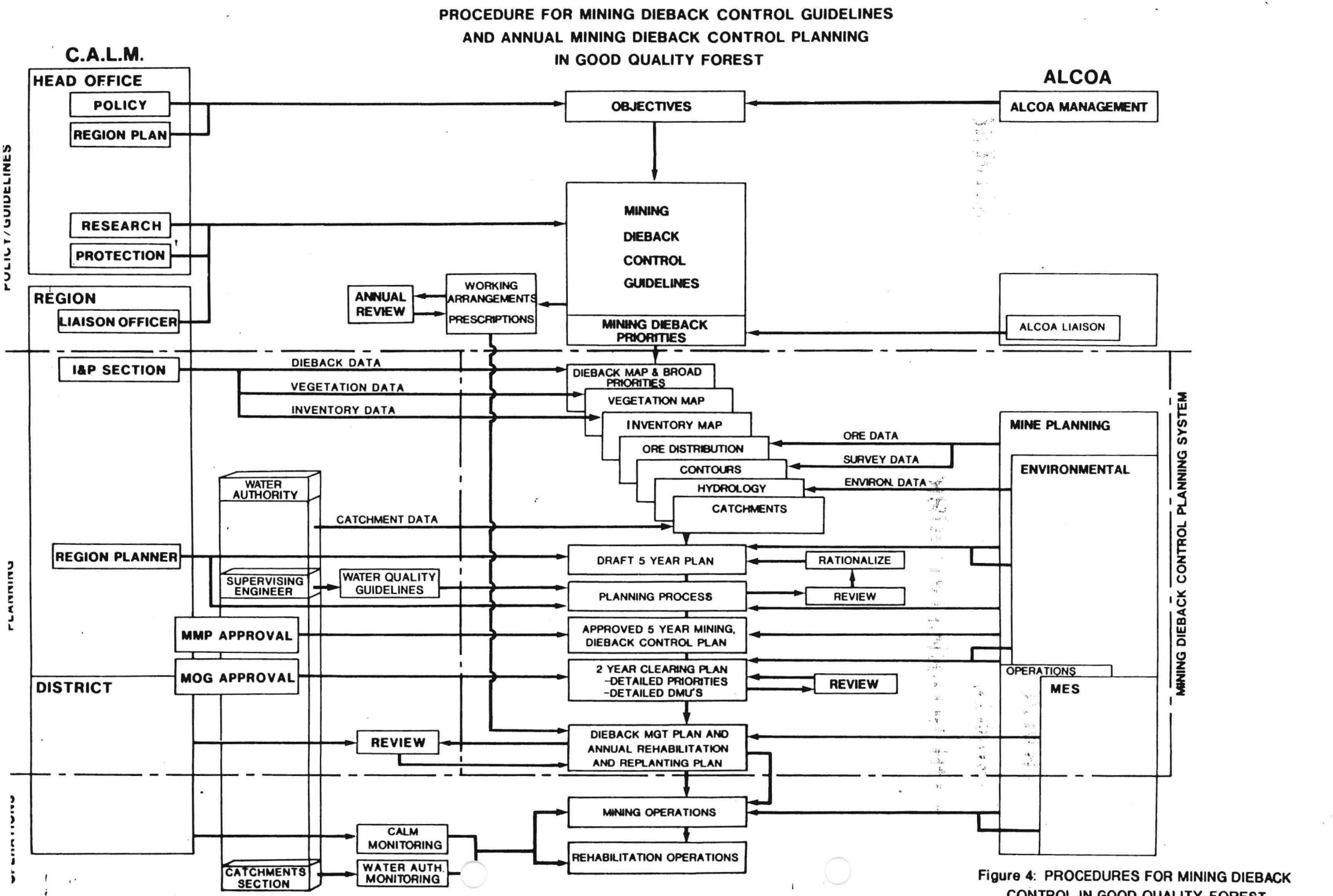


Figure 4: PROCEDURES FOR MINING DIEBACK CONTROL IN GOOD QUALITY FOREST.

STEPS FOR DEFINITION AND MANAGEMENT OF GOOD QUALITY FOREST.

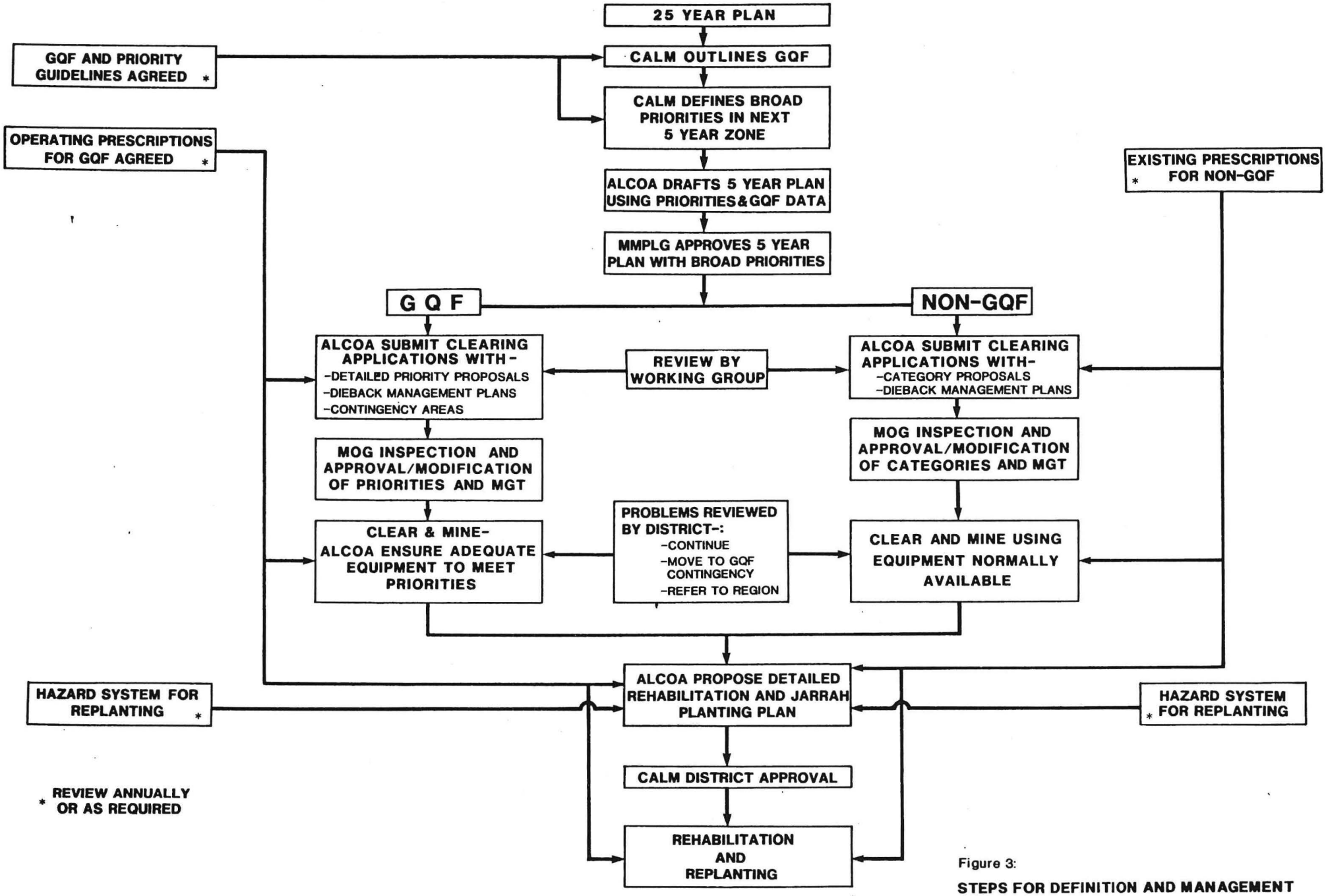


Figure 3:

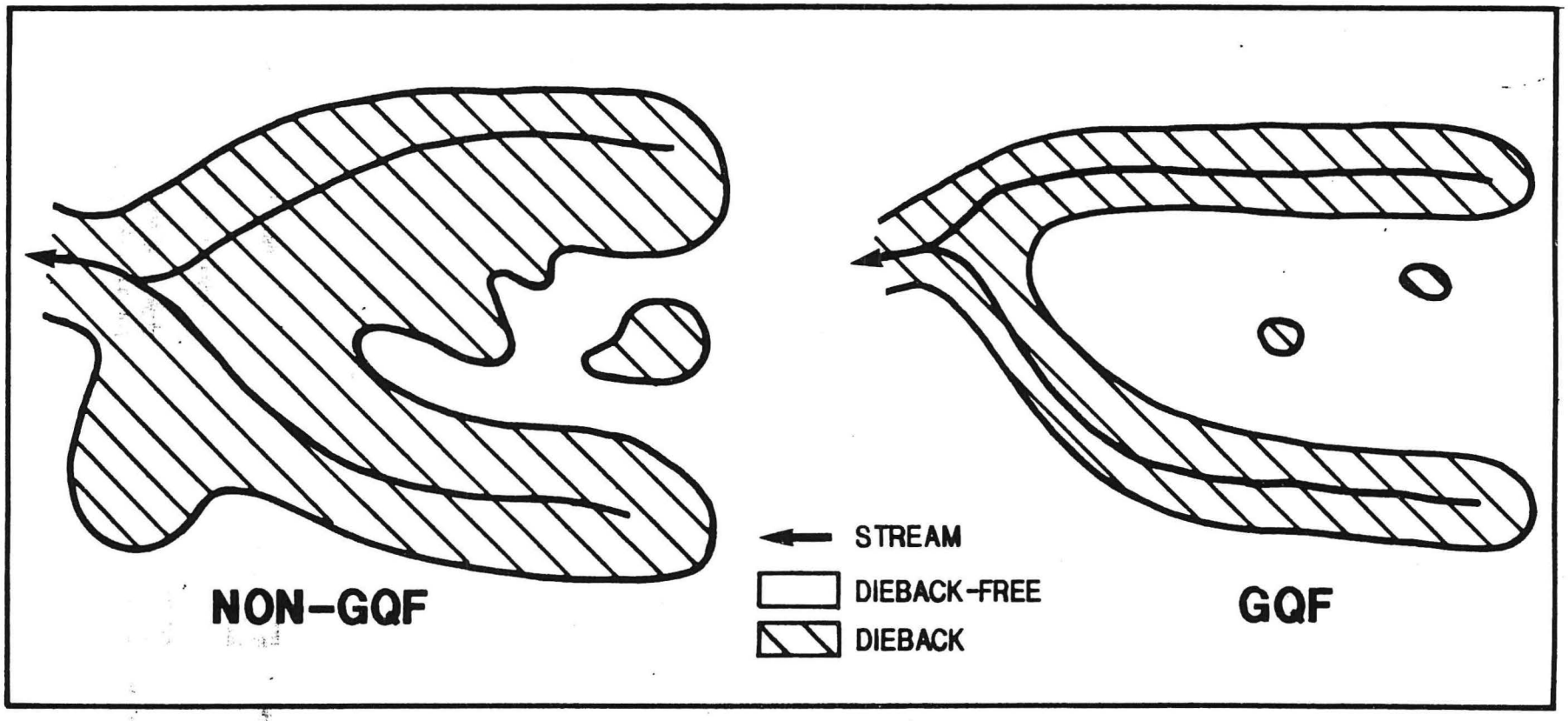
STEPS FOR DEFINITION AND MANAGEMENT OF GOOD QUALITY FOREST.

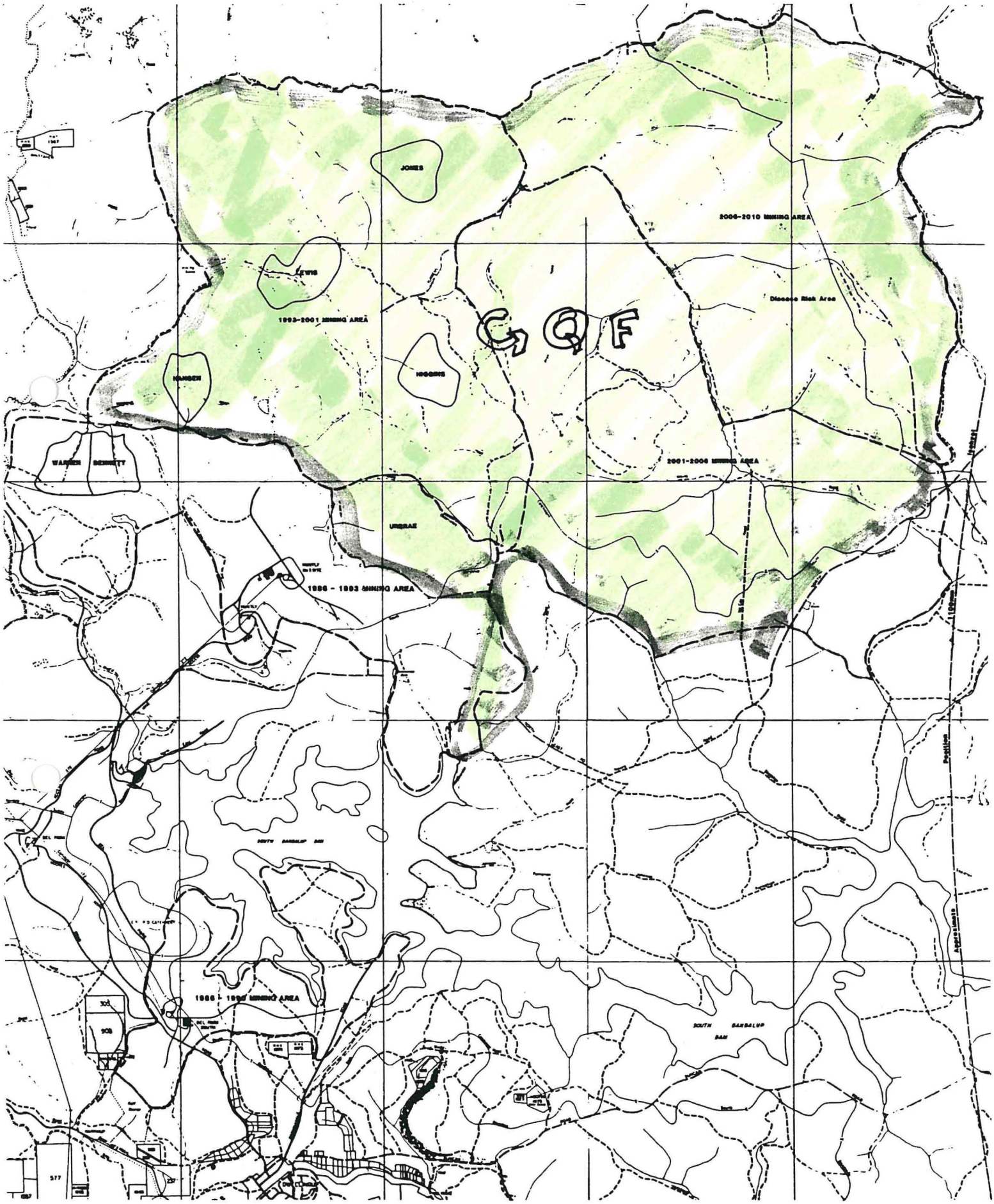
TASK

IDENTIFY
GOOD QUALITY FOREST
ON
25 YEAR MINE PLANS

WHO: ALCOA IDENTIFIES
CALM ENDORSES

EXAMPLE OF GQF DESIGNATION





DWELLINGUP 25 YEAR MINE PLAN

Scale approx. 1 : 62500

MAP

TASK = DIEBACK MAPPING

RATIONALISE

SECURE DIEBACK FREE
LOW POTENTIAL RISK

DIEBACK FREE

UNINTERPRETABLE
NOT EFFECTIVELY
QUARANTINED

UNCERTAIN

HIGH POTENTIAL RISK
SUSPECT
DIEBACK

DIEBACK

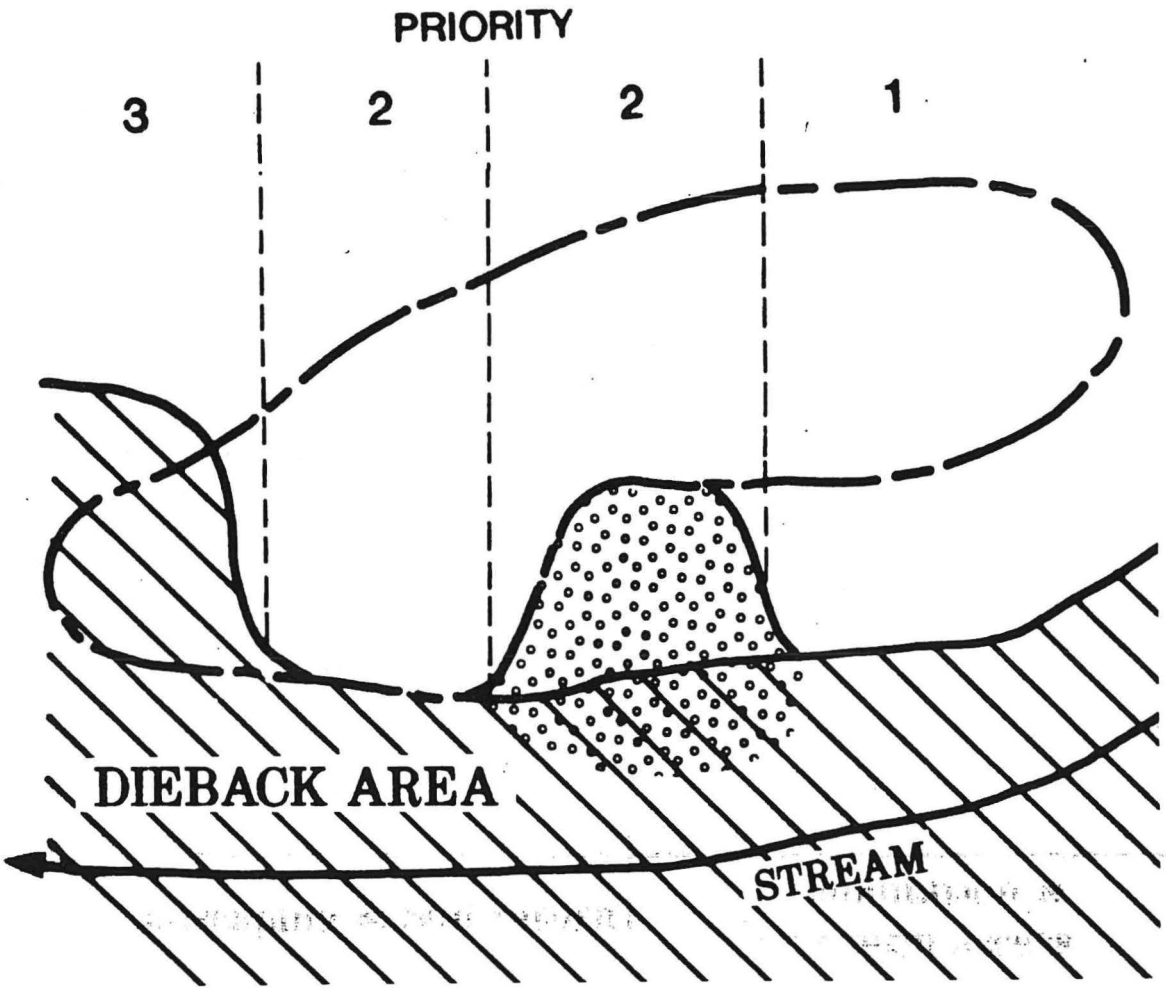
PRIORITIES

= WHEN

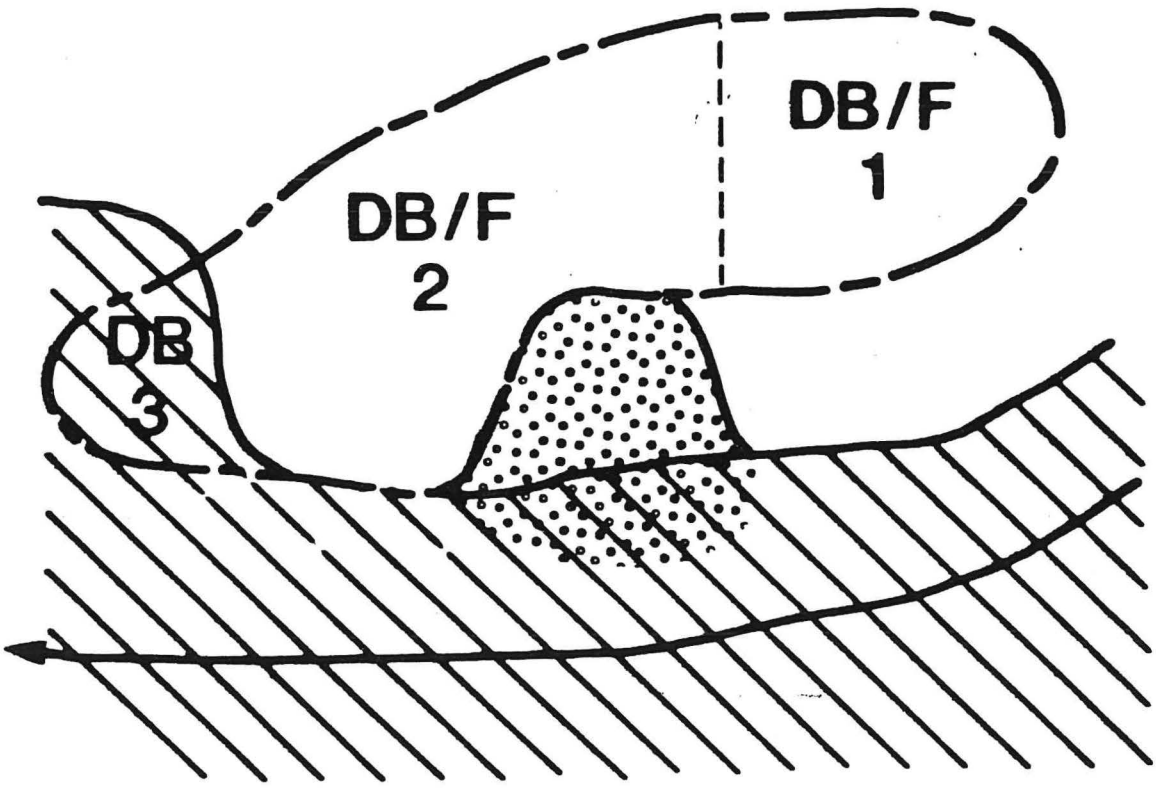
DOWNSLOPE	DIEBACK FREE/ UNCERTAIN	DIEBACK
VULNERABLE	1	2
NOT VULNERABLE	2	3

PLANS

= WHERE


PRIORITY
3
2
2
1
DIEBACK AREA
STREAM
STREAM
PIT OUTLINE
DIEBACK-FREE (VULNERABLE)
RESISTANT SPECIES (NOT VULNERABLE)
DIEBACK (NOT VULNERABLE)

DIEBACK STATUS + PRIORITY = OPERATING CONDITIONS



STREAM

PIT OUTLINE

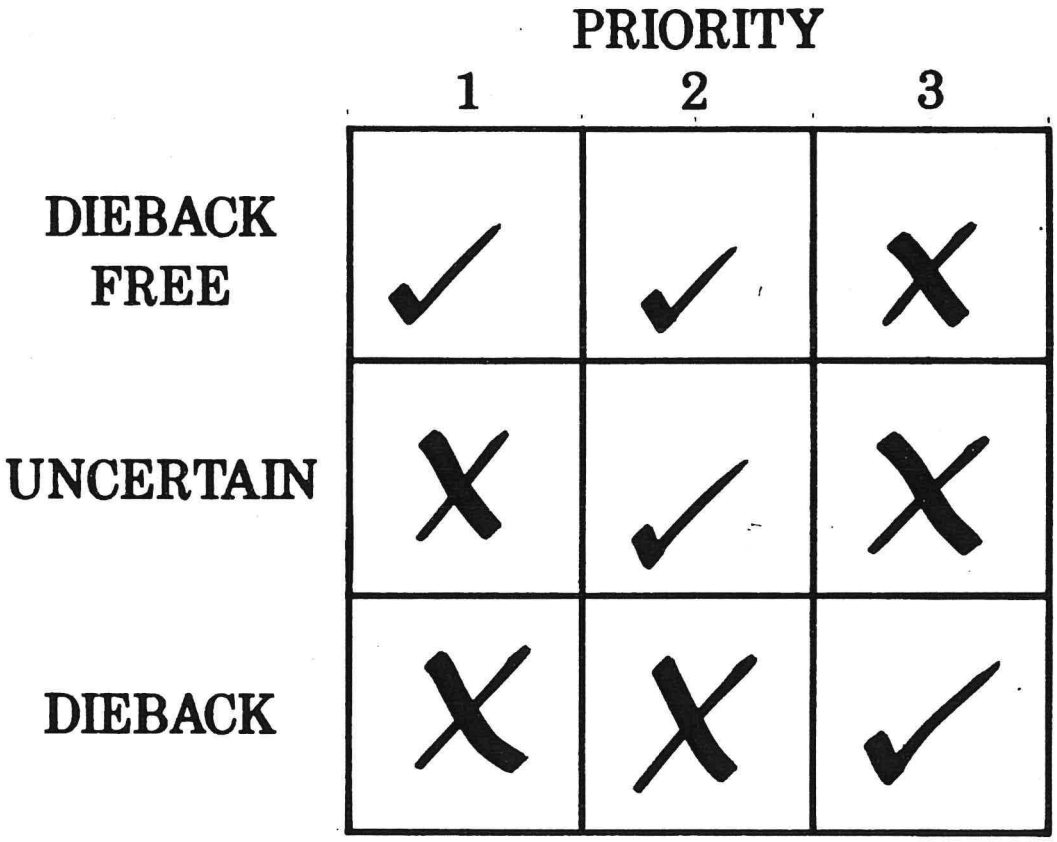
DIEBACK-FREE (VULNERABLE)

RESISTANT SPECIES (NOT VULNERABLE)

DIEBACK (NOT VULNERABLE)

PRESCRIPTIONS

= HOW



PRIORITIES

= WHEN

DEFINE GUIDELINES

Quality of forest downslope

Area of downslope forest

Hazard rating

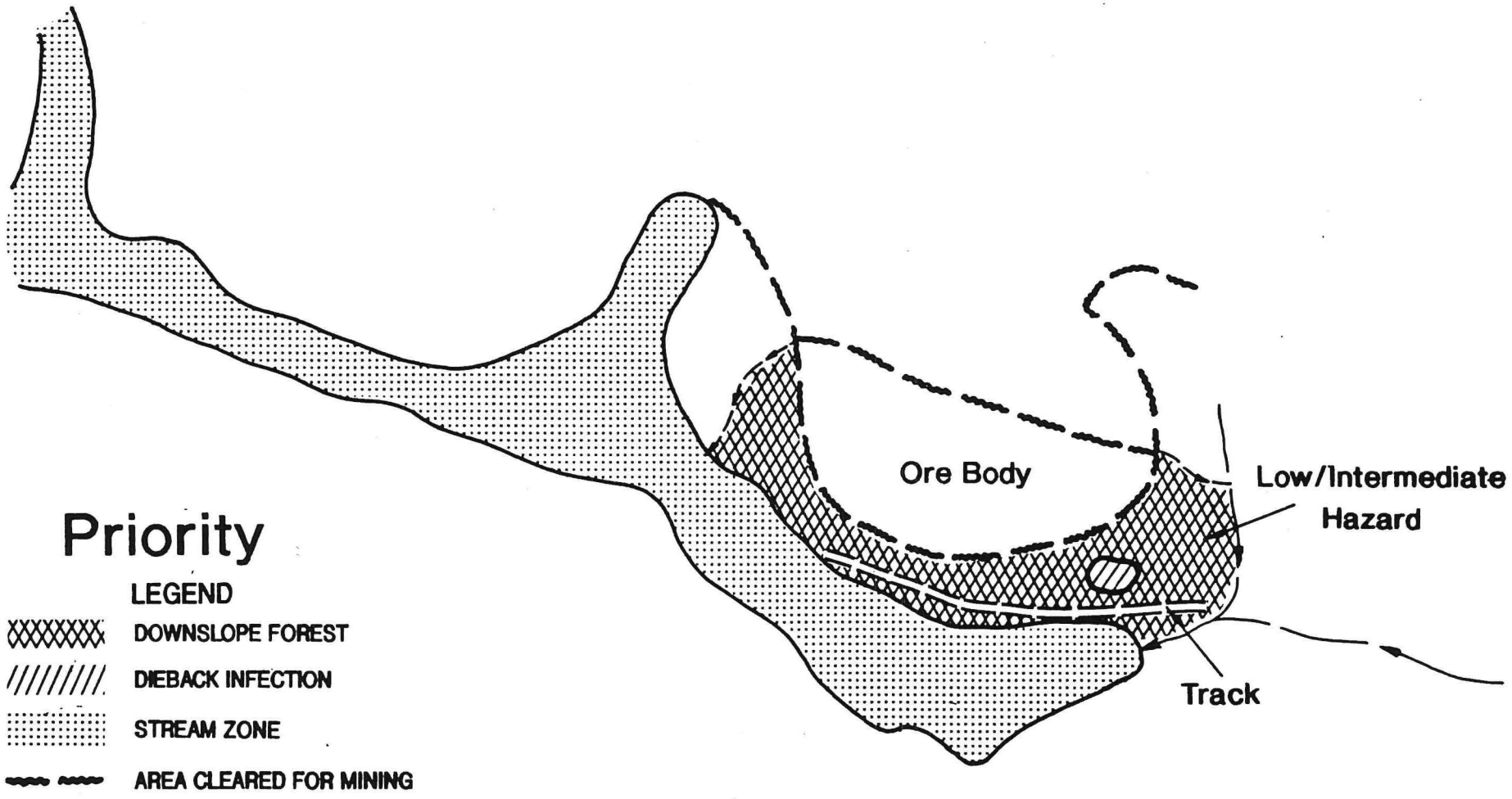
Type of vegetation

Drainage characteristics of area

Catchment boundaries

Haul road location

etc.


Ore Body
Low/Intermediate
Hazard
Track
Priority
LEGEND
DOWNSLOPE FOREST
DIEBACK INFECTION
STREAM ZONE
AREA CLEARED FOR MINING

PLANS

INSIDE GOOD QUALITY FOREST REQUIRE DIEBACK MANAGEMENT PLAN

Ore dist. & clearing	Dieback line/Stockpiles
Access	Drainage
Landscaping & Soil return	Rehabilitation & long term access

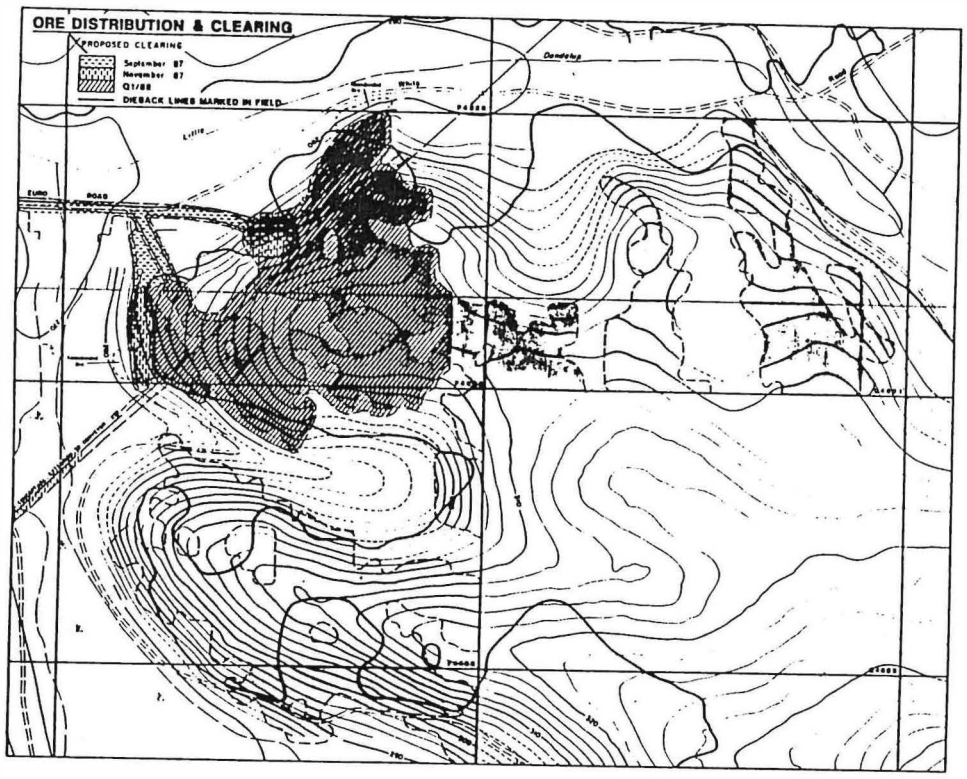
PRESCRIPTIONS

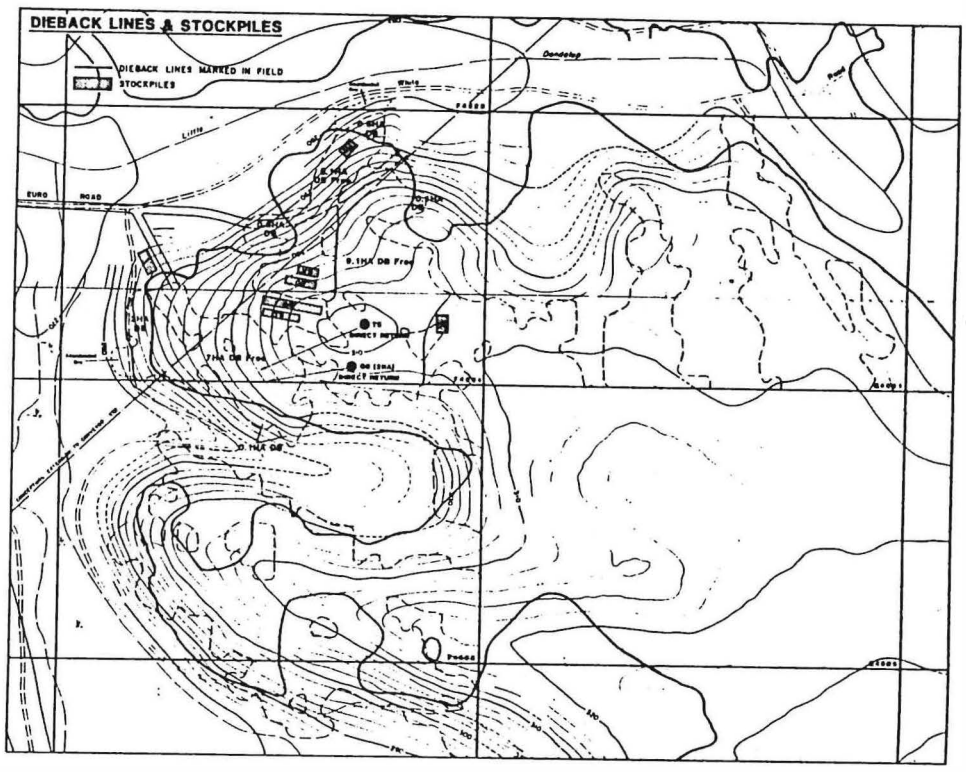
= HOW

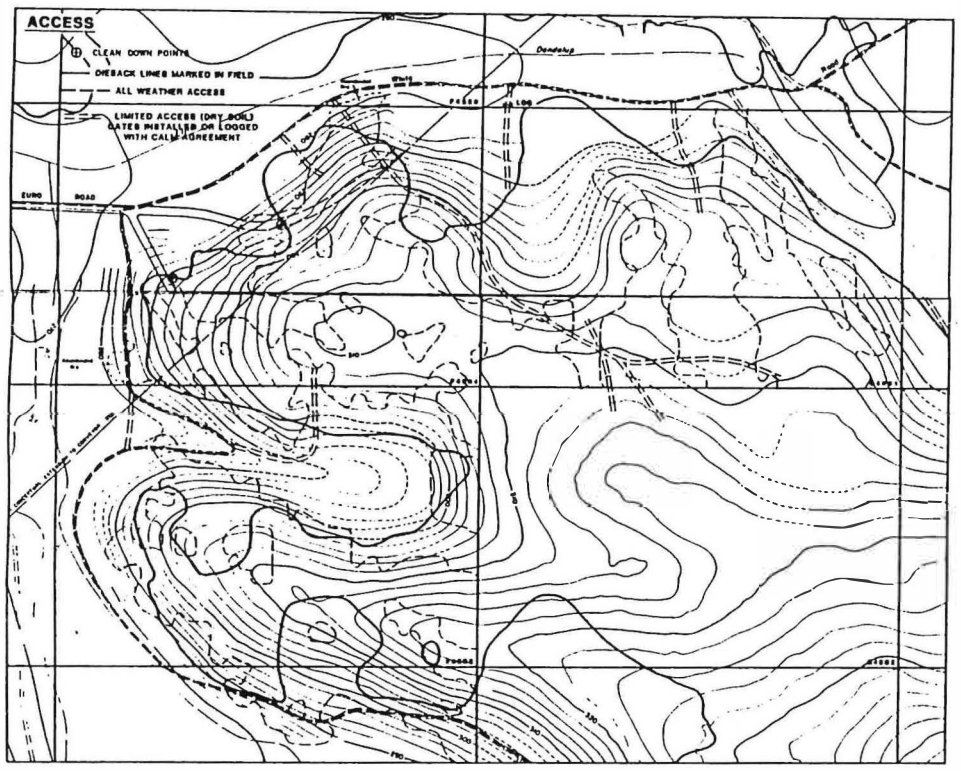
Define how operation will achieve DIEBACK MANAGEMENT PLAN

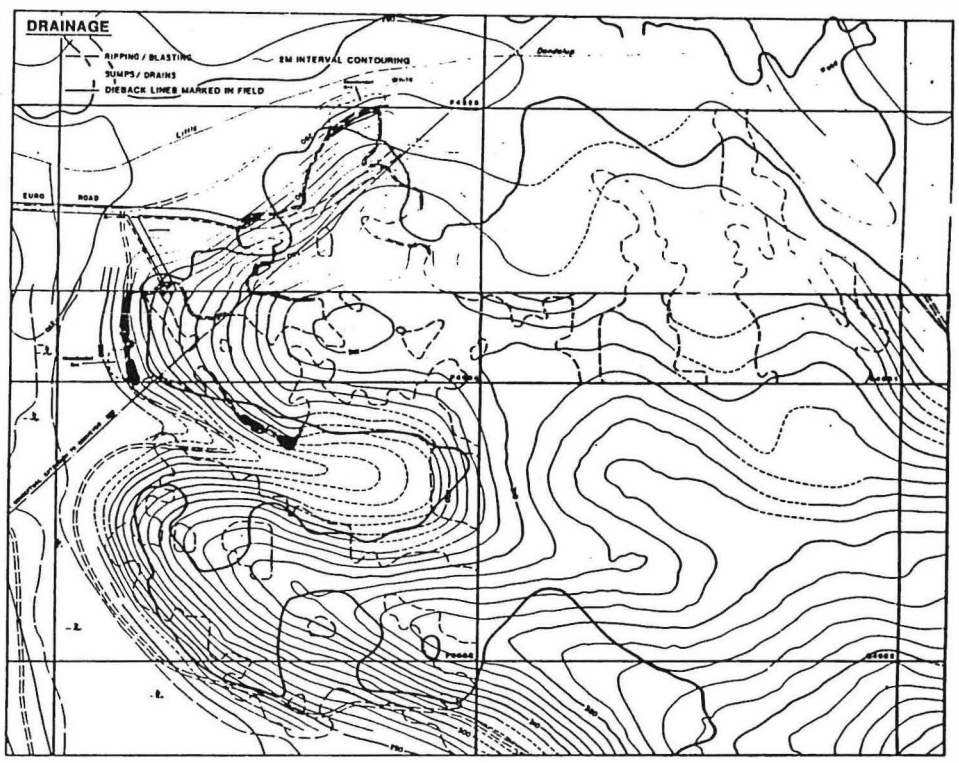
i.e. Document rationale

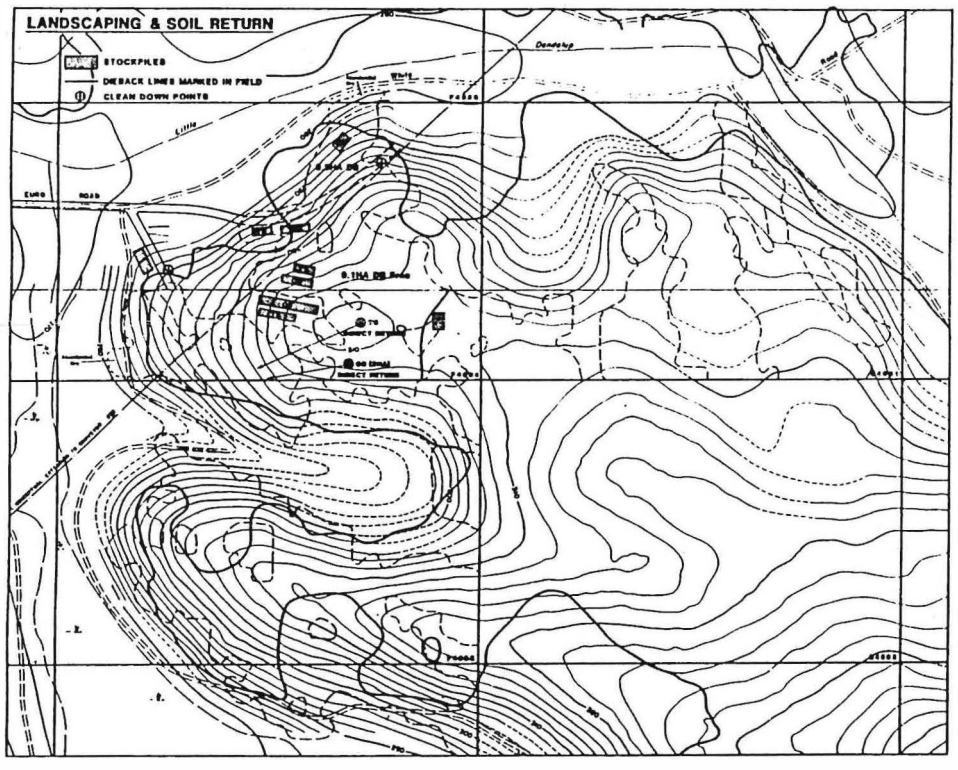
i.e. Why drains located where they are ?
Why topsoil to be stockpiled/returned ?
Changes in dieback status.

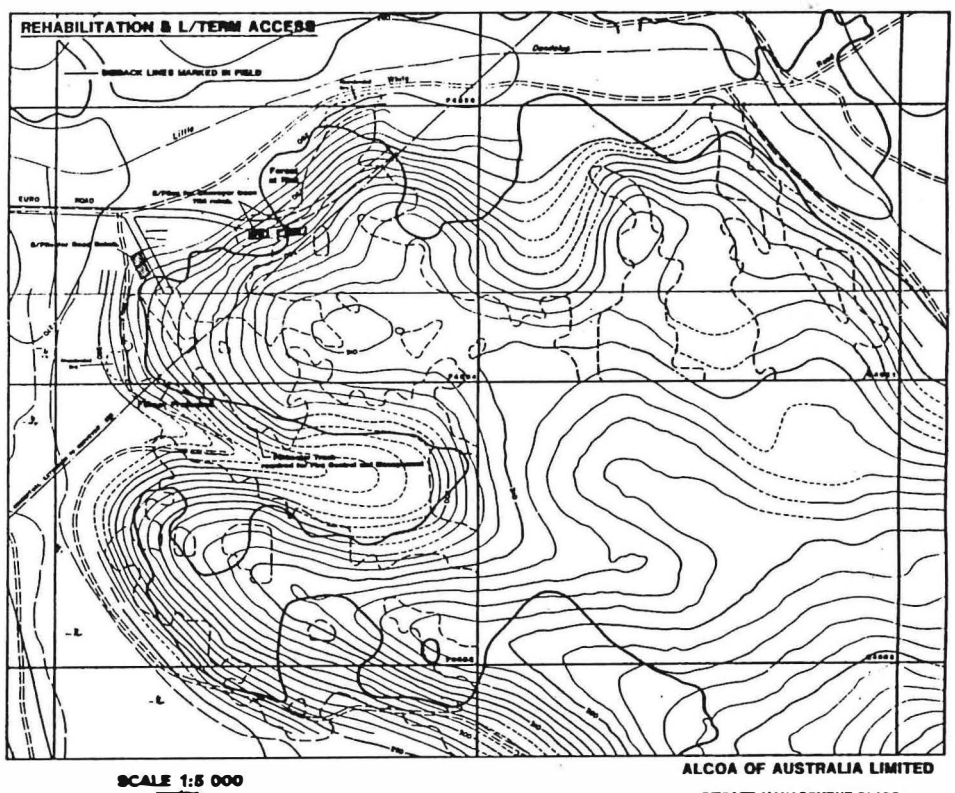












SCALE 1:5 000

ALCOA OF AUSTRALIA LIMITED

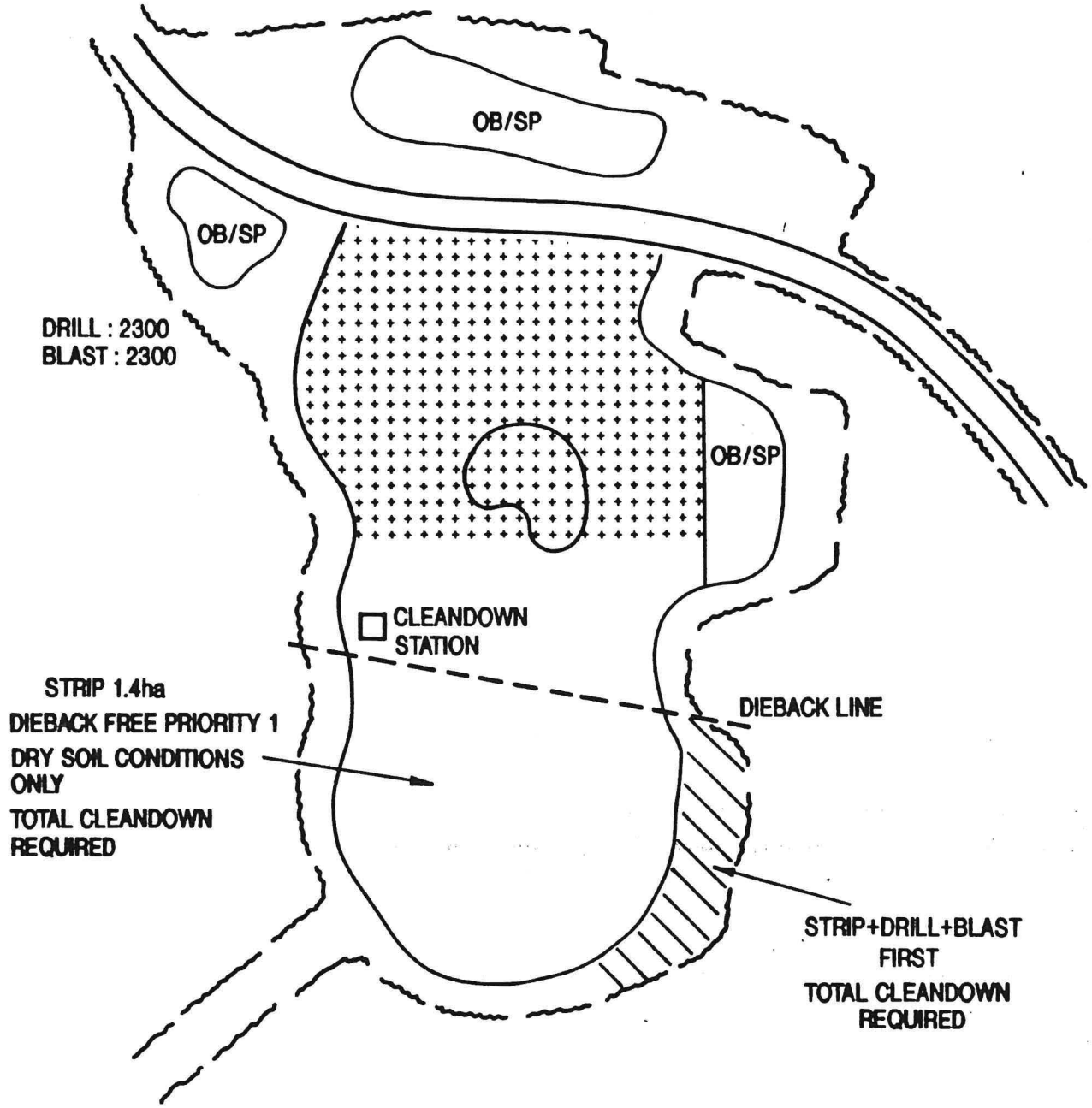
DIEBACK MANAGEMENT PLANS

DIEBACK MANAGEMENT PLAN

PLANS

= WHERE

- DAY TO DAY OPERATIONS NEED
- PRODUCE MONTHLY OBJECTIVE MAP



PRESCRIPTIONS

= HOW

ACCESS + CLEANDOWN REQUIREMENTS

FOR PRIORITY AREAS WITH

DIFFERENT DIEBACK CLASSIFICATIONS

PROCEDURES

= HOW DO I DO IT ?

OPERATIONAL PROCEDURES REQUIRED FOR :

1) Signposting/access to and from forest tracks
2) Track upgrading
3) Topsoil/overburden movement within and between pits
4) Cleandown of vehicles
5) Setting up cleandown locations
6) Perimeter track establishment
8) Landscaping regulations
9) Soil moisture conditions
10) Dieback management during haul road construction

etc.

GENERAL PROCEDURES

1. Procedure for signposting
2. Procedure for access to/from forest tracks
3. Procedure for track upgrade
4. Rules for soil movement
5. Rules for landscaping
6. Drainage establishment procedures
7. Procedure for siting a cleandown location
8. Procedure for vehicle inspection and cleandown
9. Procedure for establishing cleandown ramp
10. Procedure for establishing soil moisture conditions
11. Procedure for maintenance of signs/validity
12. How to produce a contained area
13. How to establish a perimeter track
14. Rehabilitation procedure for tracks
15. How to create a "green" haul road
16. Sunbaking regulations
17. Procedures for haul road construction
18. Perimeter track management procedure

19. Use of fungicides

20. Rules for establishing an operational dieback line

21. Procedures for servicing vehicles

22. Permit requirements

23. Drain and sump maintenance procedures

SPECIFIC PROCEDURES

1. Use of megajets

2. Access to forest by blast crew

3. Digging/backfilling for culvert installation when a dieback free haul road exists

4. Dieback check list

Procedure 2 : Vehicle Inspection and Cleandown

1. Vehicle Inspection

a) All equipment must be clean on entry to dieback free or uncertain area.

b) All vehicles/machines must stop at any dieback boundary.

c) Each vehicle should be thoroughly inspected. The undercarriage and tyres or tracks of vehicles need particular attention.

d) Look for cloddy, caked mud and dirt on roo bars, bumpers, mud flaps, suspension, transmission, tracks, bowls, etc.

e) Determine whether the soil is dry and can be removed easily by blowdown or brush.

f) Check you have the appropriate equipment to do the cleandown required.

g) Do not proceed beyond a dieback line, where you are required to cleandown, if cleandown facilities are not available.

2. Vehicle Cleandown

Equipment must be clean on entry to dieback-free or uncertain areas. Equipment must be clean on leaving dieback or uncertain areas except when travelling through dieback to another dieback area. Cleandown can be by:-

- Washdown with dieback-free water from a high pressure/low volume pump;
- Blowdown with compressed air and
- Brushing down

Blowdown/brush down is only allowed during dry soil conditions.

If washdown is required the following do's and don'ts must be observed.

At the workshop

Do use designated ramps, pads.

Do ensure run-off flows to where it can be treated ie. Anpress unit.

Do use high pressure spray to remove caked on mud and soil. Use spade or bar to assist removal (wire brushes are useful).

Don't forget to remove mud and soil from cleats, and underside of protection plates on tracked vehicles.

Don't drive vehicle through washdown effluent.

NOTE: Use brush or compressed air rather than washing if soil is dry and can be removed by this method.

Field Washdown

Do washdown at designated washdown point, ramp or pad.

Do ensure water runs into a sump where it can be treated with a fungicide, if necessary.

Do use dieback-free water in washdown. This may require the use of a fungicide (1 tablespoon of sodium benzonate or copper sulphate per 3000 litres). Always add fungicide if unsure of dieback status. Do not drink fungicide treated water.

Do use a brush, bar or spade to remove compacted soil.

Do make sure cleandown points have brushes, spades or bars to enable effective cleandowns.

Don't washdown in dieback-free ("green") forest areas ie. Do you know the dieback status of the forest you are operating in? If in doubt, keep out.

Don't fail to clean any machine capable of carrying infection from infected to healthy forest.

Don't drive vehicles through the washdown water.

Procedure 5 : Upgrading of Forest Tracks

1. Forest Track Upgrading

a) Forest tracks to be upgraded should be agreed between Alcoa and the District CALM office.

b) Gravel should be from dieback-free areas wherever possible.

Dieback gravel can only be used for access tracks in infected areas. Agreement should be reached between the District CALM office and Alcoa on who is responsible for upgrading each track.

c) Earthmoving work will only occur when the soil is dry except in dieback. CALM District office will determine suitable soil conditions. Work should be programmed for December, January, February and March when soil is dry.

d) All-weather tracks will be constructed to dry quickly and to shed water to approved points.

e) Side drains will be constructed on all-weather tracks that pass through dieback free forest. These are to carry run-off swiftly and directly to the nearest dieback affected area or swamp vegetation. Sumps may be necessary to remove silt if discharge is close to a stream.

f) Road upgrading equipment must be clean before entering dieback-free or uncertain forest.

g) Grading of tracks should not be done in a way that pushes dirt long distances into clean forest, or deeper or wider than prescribed.

h) Soil should not be graded from dieback into dieback-free or uncertain forest. CALM to mark dieback free section of tracks using green/yellow pegs.

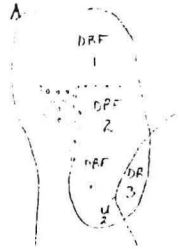
2. Supervision

Track used by Alcoa and cleanliness of Alcoa vehicles will be supervised by appropriate Alcoa personnel with periodic checks by CALM personnel. CALM and Water Authority must also comply with hygiene as outlined in the access plan.

FIGURE : SUMMARY OF GOOD QUALITY FOREST MANAGEMENT

STEP	(1)	(2)	(3)	(4)	(5)
TITLE	MAP	RATIONALISE	PRIORITIES = WHEN	PLAN = WHERE	PRESCRIPTIONS = HOW
TASK = WHAT	DIEBACK MAPPING	OPERATING CATEGORIES	SET PRIORITIES Pit	ANNUAL DIEBACK MANAGEMENT PLAN	1. Select Job 2. Check Op. Conds 3. Check Priority 4. Check Soil Moisture 5. Check Dieback Status 6. Select Prescription 7. Undertake Job
	Secure Dieback Free Low Potential Risk	Dieback Free			
	Uninterpretable Not Effectively Quarantined	Uncertain			
	High Potential Risk Suspect Dieback	Dieback			
RESPONSIBLE = WHO	CALM INVENTORY	ALCOA MES/ CALM DISTRICT	CALM DISTRICT/ALCOA MOG APPROVAL	ALCOA/CALM DISTRICT	ALCOA/CALM DISTRICT SUPERVISION

Downslope	Dieback-Free/ Uncertain	Dieback
Vulnerable	1	2
Not Vulnerable	2	3



Priority System