

**Smoke Creek alluvial mining further expansion,
Argyle Diamond Mine**

Argyle Diamond Mines Pty Ltd

Proposed changes to environmental conditions

**Report and recommendation
of the Environmental Protection Authority**

**Environmental Protection Authority
Perth, Western Australia
Bulletin 750
July 1994**

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THE PURPOSE OF THIS REPORT

This report contains the Environmental Protection Authority's environmental assessment and recommendations to the Minister for the Environment on the environmental acceptability of the proposal.

Immediately following the release of the report there is a 14-day period when anyone may appeal to the Minister against the Environmental Protection Authority's report.

After the appeal period, and determination of any appeals, the Minister consults with the other relevant ministers and agencies and then issues his decision about whether the proposal may or may not proceed. The Minister also announces the legally binding environmental conditions which might apply to any approval.

APPEALS

If you disagree with any of the contents of the assessment report or recommendations you may appeal in writing to the Minister for the Environment outlining the environmental reasons for your concern and enclosing the appeal fee of \$10.

It is important that you clearly indicate the part of the report you disagree with and the reasons for your concern so that the grounds of your appeal can be properly considered by the Minister for the Environment.

ADDRESS

Hon Minister for the Environment
12th Floor, Dumas House
2 Havelock Street
WEST PERTH WA 6005

CLOSING DATE

Your appeal (with the \$10 fee) must reach the Minister's office no later than 5.00 pm on 12 August 1994.

ISBN. 0 7309 5689 X

ISSN. 1030 - 0120

Assessment No. 888

Contents

| | Page |
|--|-------------|
| 1. Introduction and background | 1 |
| 2. Summary description of proposal | 1 |
| 3. Environmental impact assessment method | 4 |
| 4. Evaluation | 5 |
| 4.1 The restoration of Smoke Creek drainage channels to prevent excessive soil erosion | 5 |
| 4.1.1 Objective | 5 |
| 4.1.2 Evaluation framework | 5 |
| 4.1.3 Evaluation | 6 |
| 4.2 The success of re-establishing the riverine vegetation | 6 |
| 4.2.1 Objective | 6 |
| 4.2.2 Evaluation framework | 6 |
| 4.2.3 Evaluation | 7 |
| 4.3 Proposed changes to commitments | 7 |
| 4.3.1 Objective | 7 |
| 4.3.2 Evaluation framework | 7 |
| 4.3.3 Evaluation | 7 |
| 4.4 Possible future mining downstream in Smoke Creek | 7 |
| 4.4.1 Objective | 7 |
| 4.4.2 Evaluation framework | 7 |
| 4.4.3 Evaluation | 8 |
| 5. Conclusions and recommendation | 8 |
| 6. Recommended environmental conditions | 9 |
| 7. References | 10 |

Table

| | |
|---------------------------|---|
| 1. Changes to commitments | 4 |
|---------------------------|---|

Figures

| | |
|---|---|
| 1. Smoke Creek alluvial mining project area | 2 |
| 2. Location of proposed mining operation | 3 |

Appendices

| | |
|---|--|
| 1. Statement of Conditions of Approval, 28 January 1992 | |
| 2. Environmental Management Commitments, May 1994 | |

1. Introduction and background

Following a trial alluvial mining operation in the mid 1980s, Argyle Diamond Mines Pty Ltd (ADM) received approval from the Minister for the Environment to develop an alluvial mining operation in Smoke Creek on 12 July, 1989. The approval was subject to a number of legally binding environmental conditions, including a condition requiring the proposal to be limited to the headwaters of Smoke Creek, as shown in the Notice of Intent submitted in 1989 (Argyle Diamond Mines Pty Ltd, 1989). The 1989 environmental conditions have now been cleared following the completion of that mining operation.

ADM subsequently submitted a proposal to commence an alluvial mining operation further down Smoke Creek (adjacent to the previous proposal), and received approval on 28 January, 1992 (Appendix 1; Statement of Conditions). The approval was subject to a number of legally binding environmental conditions, including a condition requiring the proposal to be limited to the area of Smoke Creek as shown in the 1991 Consultative Environmental Review (Argyle Diamond Mines Pty Ltd, 1991). The proposal was approved by the Minister for the Environment based on advice in the Environmental Protection Authority's Report and Recommendations on the proposal (EPA, 1991). Figure 1 shows the Smoke Creek alluvial mining project areas from 1989 to the present.

Following a site inspection on 8 December, 1993 and a compliance audit of the 1993 annual environmental report (Argyle Diamond Mines Pty Ltd, 1993), the Department of Environmental Protection has advised that the proponent is currently in compliance with the Statement of Conditions of 28 January, 1992.

In the 1991 Consultative Environmental Review, ADM mentioned possible extensions to the mining programme, depending on a geological evaluation of the resource. Following encouraging results, ADM is now seeking to extend the current alluvial mining operation further down Smoke Creek for a further six years of mining commencing in 1995, although some drainage control works would be required to be commenced in late 1994.

This assessment report is required because the new area did not receive environmental approval as part of the 1992 Statement. Therefore, the new area has been considered as a change to the 1992 proposal and, under Section 46 of the Environmental Protection Act, the Minister for the Environment sought EPA advice regarding possible changes to the existing environmental conditions.

2. Summary description of proposal

The proposal is to mine approximately 24 million tonnes of diamond-bearing gravels from about 410 hectares of braided river channels within a total operations area of 550ha. The area is immediately downstream of the existing alluvial mine, which has been operating for five years, and will provide a further six years of mining. Figure 2 shows the location of the proposed expansion of the current mining area in Smoke Creek, which drains into Lake Argyle.

The existing alluvial mining and processing facilities would be used and similar rehabilitation procedures would be implemented. The mining and rehabilitation techniques have been slightly refined over the previous five years of mining, and are described in the proponent's report on the proposal (Argyle Diamond Mines Pty Ltd, 1994). The proponent has indicated that a new tailings disposal dam would be required and that a separate proposal would be developed when the tailings dam is required.

The environmental issues involved with the new proposal are identified and discussed in the proponent's 1994 report. The proponent has concluded that the potential impacts on vegetation, flora, fauna, drainage and aboriginal heritage are not significant. This is based on both site specific survey work and evidence from the actual environmental impacts resulting from the existing alluvial mining operation.

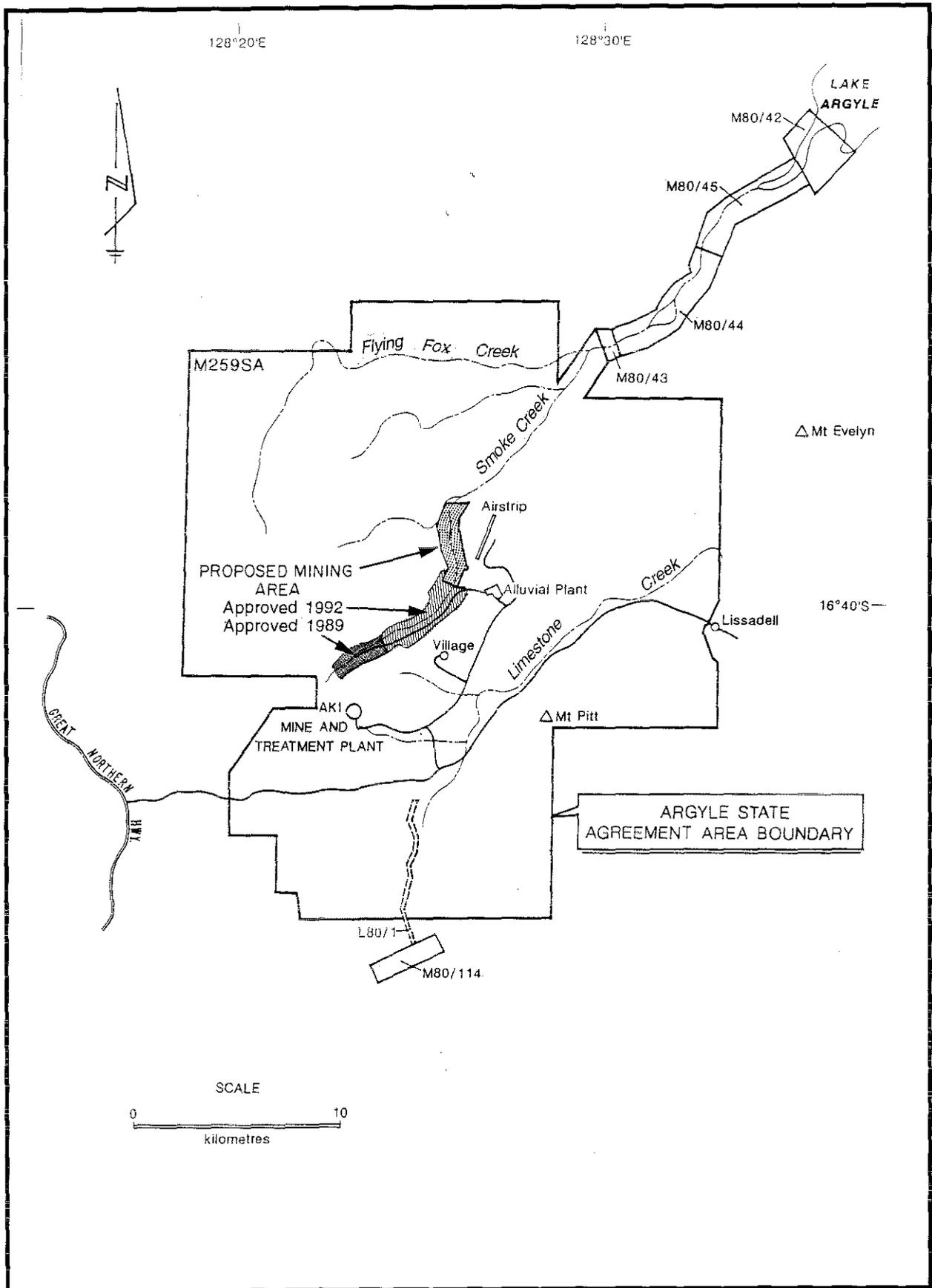


Figure 1. Smoke Creek alluvial mining project area. (Source: Argyle Diamond Mines Pty Ltd Alluvial Mining Expansion Programme May, 1994.)

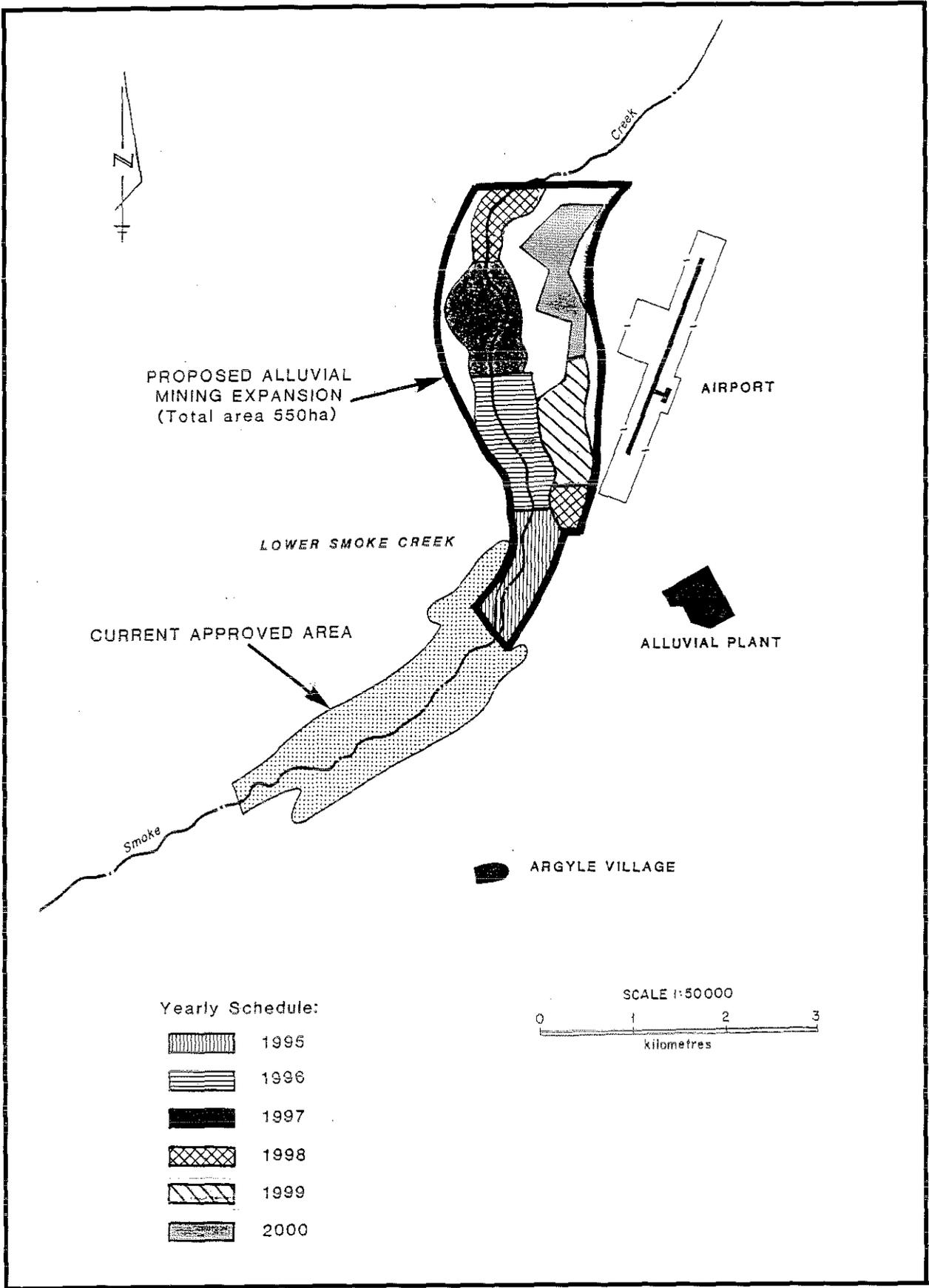


Figure 2. Location of proposed mining area. (Source: Argyle Diamond Mines Pty Ltd Alluvial Mining Expansion Programme May, 1994.)

Commitments

The proponent has proposed three changes to the commitments made for the existing 1992 operation. The changes are refinements to the rehabilitation techniques based on five years experience from the existing alluvial mining and rehabilitation operations; they are shown in Table 1.

Table 1. Changes to commitments

| Previous commitment | New commitment |
|---|---|
| 2. Clearing of vegetation, stockpiling of topsoil and stockpiling of barren overburden will be carried out progressively and in accordance with the rate of mining. | Clearing of vegetation, direct return of the surface soil and direct return of overburden will be carried out progressively and in accordance with the rate of mining. In the event of direct return not being possible, temporary stockpiles will be utilised. |
| 6. The Smoke Creek drainage line will be reinstated by either re-shaping and construction, or by modifying the mining operation so that the mining face lies parallel to the direction of stream flow. In this latter situation, complete backfilling will not occur and a channel will be created by the void. Application of this technique will be subject to the need for practical and efficient movement of ore trucks in the mining operation. | The Smoke Creek drainage channel will be reinstated by re-shaping returned gravels or by not completing the backfill process and utilising voids left after mining. Selection of the method used will be subject to the need for practical and efficient movement of the ore trucks in the mining operation and take into account the hydrology of the area where possible. |
| 11. Monitoring of revegetation work carried out as part of the current mining programme suggests that seeding and fertiliser application may not be a worthwhile strategy within the overall rehabilitation programme. However, a seeding and fertilising trial will be carried out in areas suitable and this operation will be generally timed to coincide with the onset of the wet season. | Monitoring of revegetation work will continue as part of the current mining project, including continued seeding trials in suitable areas. Seeding will generally be timed to coincide with the onset of the wet season. |

Future mining areas

In the 1991 Consultative Environmental Review, the proponent briefly mentioned the scope for further mining downstream of the mining areas proposed at that time, depending on the results of geological evaluation; those results led to this proposal. In the report for this proposal, the proponent again states that further areas downstream of the area currently applied for would be evaluated for future mining but are not formally proposed at this time. This includes the rest of the Smoke Creek drainage system to the boundary of the mining leases, some 20km distant near Lake Argyle (Figure 1).

Based on the results of the existing mining and rehabilitation programmes, the proponent intends to put into place a similar environmental management programme for the alluvial mining and rehabilitation operations proposed for the next six years. The proponent intends that such a programme would also be satisfactory for any further alluvial mining proposals.

3. Environmental impact assessment method

The proponent's 1994 report was submitted to the Department of Resources Development as a requirement of a condition of the Diamond (Argyle Diamond Mine Joint Venture) Agreement

Act 1981. The Minister for Resources Development referred the report to the Minister for the Environment for consideration of the statutory obligations under the Minister's 1992 Statement of Conditions. The Minister for the Environment requested the Environmental Protection Authority to report to him under Section 46 of the Environmental Protection Act on the effect of the new proposal on the 1992 Conditions of Approval.

The proponent's 1994 report was distributed to the Departments of Minerals and Energy and Resources Development and to the Water Authority of Western Australia for their comments on the environmental issues. The Director of Engineering Services of the Shire of Wyndham-East Kimberley was consulted by telephone and indicated that the Shire had no comments on the proposal (C. Britt, *pers. comm.*).

The proponent's representative indicated that the owner of the adjacent land (Lissadell Station) and the local Aboriginal communities had been appraised of the proposal through the on-going local liaison procedure (J. Wither, Manager - Alluvial Operation, ADM, *pers. comm.*).

ADM's proposal to expand the mining operation downstream of the existing mine in Smoke Creek was developed in consultation with officers of the Departments of Environmental Protection (DEP), Minerals and Energy (DOME) and Resources Development (DRD) and the Water Authority of Western Australia (WAWA). Annual inspections by these agencies have been carried out for both the alluvial and open pit mining operations for the previous life of the mine. The new proposal was discussed and inspected at a site meeting on 8 December, 1993.

The key environmental issues identified from the assessment are:

- the restoration of Smoke Creek drainage channels to prevent excessive soil erosion;
- the success of re-establishing the riverine vegetation;
- proposed changes to the environmental management commitments; and
- possible future mining downstream in Smoke Creek.

4. Evaluation

4.1 The restoration of Smoke Creek drainage channels to prevent excessive soil erosion

4.1.1 Objective

To determine the effectiveness of the previous restoration of the drainage channels in the headwaters of Smoke Creek with regard to preventing excessive erosion.

4.1.2 Evaluation framework

Technical information

Sediment transport from catchments affected by ADM's Smoke Creek alluvial diamond mine has been monitored since 1989/90 (Argyle Diamond Mines Pty Ltd, 1993). The results show that the sediment yield (tonnes/square kilometre/year) from the area affected by the alluvial mine is about half that from the regional catchment, which includes areas affected by cattle grazing, and is two and a half times the yield from a small control catchment (Matsu Valley) on Smoke Creek above the alluvial mine.

The results indicate that the "natural" sediment yield from the previous land use (grazing activity) exceeds the sediment yield following mining and rehabilitation at this stage. The trend in nearby catchments affected by ADM's alluvial mining is for the yield to decrease over time as the vegetation is progressively established. It is expected that this trend will occur in the Smoke Creek catchment.

Comments from key government agencies

WAWA provided advice which noted two matters about which it would like further information, but recommended that the expanded mining proposal be approved. The two matters are, firstly, the use of rock fill to armour the critical parts of the recontoured river banks to prevent erosion and, secondly, measures to prevent hydrocarbon pollution of the river from refuelling operations in the field. WAWA indicated that the long term sediment monitoring programme should be continued as agreed at the meeting on 8 December, 1993, and noted that commitments had been made by the proponent to continue to address the potential for excessive soil erosion (P. Ryan, WAWA, June 1994, *pers. comm.*).

The Environmental Protection Authority understands that the proponent will liaise directly with WAWA to provide detailed information on the two matters raised above, and notes that WAWA did not consider the matters significant enough to delay the EPA's assessment report.

4.1.3 Evaluation

The monitoring data indicates that the sediment yield (erosion) from the rehabilitated alluvial mining areas is markedly less than that from areas of the natural catchment under the previous land use (grazing). Furthermore, the yield is known to decrease with time as the revegetation progresses.

The Water Authority of Western Australia, which is responsible for managing Lake Argyle, has approved of the expanded mining operation on the basis that the proponent is successfully preventing excessive erosion from the previous mining operation. Hence, because of the similarity between the previous and proposed mining areas, the EPA accepts that the current restoration procedures should be equally successful.

4.2 The success of re-establishing the riverine vegetation

4.2.1 Objective

To determine the success of re-establishing the riverine vegetation following previous mining.

4.2.2 Evaluation framework

Technical information

The success of revegetation on the areas affected by the previous alluvial mine has been monitored by ADM for all the areas mined since the start of operations in the Smoke Creek catchment. During this time the rehabilitation strategy has been progressively refined and the latest rehabilitation results in the 1993 Annual Environmental Report are reported to be encouraging (Argyle Diamond Mines Pty Ltd, 1993).

The rehabilitation technique is designed to retain clumps of trees as natural seedstock, to reform and stabilise the drainage channel(s), to seed areas and supplement with nursery seedlings as appropriate, to monitor the revegetation and to take remedial action if required. Annual inspections by government agencies have endorsed the proponent's monitoring results and rehabilitation techniques.

Comments from key government agencies

DOMÉ provided advice that "the potential environmental impacts of the existing mining operation are being managed satisfactorily and that there is nothing particular in the proposed mining area that will cause any additional problems". DOMÉ has recommended that the mining proposal be approved partially on the basis of the successful revegetation of the previously mined areas (H. Jones, DOMÉ, May 1994, *pers. comm.*).

4.2.3 Evaluation

The monitoring data indicate that the re-establishment of riverine vegetation is proceeding successfully. Hence, because of the similarity between the previous and proposed mining areas, the EPA accepts that the current rehabilitation procedures should be equally successful.

4.3 Proposed changes to commitments

4.3.1 Objective

To determine the environmental acceptability of the proposed changes to the proponent's environmental management commitments.

4.3.2 Evaluation framework

Technical information

The proponent has trialled the proposed changes to the rehabilitation techniques and has reported encouraging results (Argyle Diamond Mines Pty Ltd, 1993). The proponent now seeks to implement them as part of the standard rehabilitation procedure for the proposed expansion of the alluvial mine.

The effectiveness of the changes were evaluated during the site inspection on 8 December, 1993 and government agencies concluded that the changes were a functional improvement to the previous rehabilitation techniques.

Comments from key government agencies

DOMÉ provided advice that specifically indicated its support for the proposed changes to the commitments (C. Mills, DOMÉ, *pers. comm.*).

4.3.3 Evaluation

The proposed changes to the three commitments (commitments 2, 6 and 11) are a result of the refinement of the rehabilitation operations over the previous five years of alluvial mining. The EPA considers that the changes improve the flexibility of the commitments without altering the spirit or intent of the original commitments. The EPA considers that the expansion of the alluvial mining operation can be managed under the existing environmental conditions, including the modified commitments (Appendix 2).

4.4 Possible future mining downstream in Smoke Creek

4.4.1 Objective

To evaluate the likely environmental acceptability and the government approvals process for possible future mining proposals downstream in Smoke Creek.

4.4.2 Evaluation framework

Technical information

The alluvial mining operation has been expanded downstream in Smoke Creek since the mid 1980s as the resource has been progressively evaluated. Future expansions beyond the area of this proposal to the boundary of the mining lease are possible and would inherently raise the

same environmental issues. The environmental management procedures have been documented in the 1991 Consultative Environmental Review, the annual environmental reports and in the 1994 "Additional Proposal" report.

Future alluvial mining proposals would require the approval of the Minister for Resources Development under the Diamond (Argyle Diamond Mine Joint Venture) Agreement Act 1981 and would be subject to the Minister for the Environment's 1992 Statement of Conditions.

Comments from key government agencies

The Department of Resources Development has indicated that, under the Agreement Act, it would require a proposal document for any expansion of the alluvial mining project and that the documentation would be required to contain an environmental management programme (R. Harris, DRD, *pers. comm.*). Also, the approval of the proposal and the environmental management programme would involve consultation with DOME and EPA according to the normal working arrangement between DRD and these agencies.

4.4.3 Evaluation

The 1992 Statement of Conditions includes a requirement for the proponent to adequately revegetate the mining area such that the drainage channels are stable and erosion is minimised to natural levels (condition 3; Appendix 1). To date, condition 3 has not been used and based on annual site inspections and the proponent's annual compliance reports, the EPA has concluded that the previous and existing alluvial mining operations have been implemented satisfactorily under the 1992 Statement of Conditions such that there have been no unmanageable environmental impacts. The EPA has concluded above that this proposal would be environmentally acceptable if it were implemented under the same conditions, with the slight modifications to the commitments.

Hence, the EPA foreshadows that future alluvial mining proposals within the Smoke Creek drainage system would be likely to be environmentally acceptable if implemented under the Minister's 1992 statement and under the same environmental management programme as that which has operated to date without the need for another formal assessment.

With regard to the government approvals process, the EPA notes that any future mining proposals would be referred for environmental assessment directly to the Minister for the Environment or via the Agreement Act.

5. Conclusions and recommendation

Following consideration of the ADM's 1994 report, plus the written and verbal advice of the relevant government regulatory agencies and the advice of officers of the Department of Environmental Protection, the Environmental Protection Authority considers that the new proposal is essentially a continuation of the existing mining operations, which have been managed satisfactorily. Accordingly, the potential environmental impacts of the new proposal are regarded as manageable. In reaching this conclusion, the EPA identified the key issues as:

- the restoration of Smoke Creek drainage channels to prevent excessive soil erosion;
- the success of re-establishing the riverine vegetation;
- proposed changes to the environmental management commitments; and
- possible future mining downstream in Smoke Creek.

The EPA concludes that the previous and existing alluvial mines in Smoke Creek have been satisfactorily managed such that the environmental impacts have been minimised to acceptable levels. The EPA considers that the proposed expansion should be managed under essentially the same environmental management programme as has been operating previously, with the three modifications to the commitments.

Recommendation 1

The Environmental Protection Authority has concluded that the proposal by Argyle Diamond Mines Pty Ltd for the Smoke Creek Alluvial Mining Expansion Project is environmentally acceptable subject to the following key points:

- implementation of the approved environmental management programme; and
- continuation of the environmental monitoring.

Accordingly, the Environmental Protection Authority recommends that the proposal could proceed subject to:

- the Environmental Protection Authority's recommendations in this assessment report (Recommended Environmental Conditions are listed in Section 6); and
- the proponent's commitments of May 1994 (see Appendix 2).

The EPA foreshadows that future alluvial mining proposals within the Smoke Creek drainage system would be likely to be environmentally acceptable if implemented under the Minister's 1992 Statement and under the same environmental management programme to that which has operated to date without the requirement for another formal assessment.

In the next section, the Environmental Protection Authority has detailed the changes to the Minister for the Environment's Statement which amend the environmental conditions to incorporate the new area for mining and the changes to the three commitments.

6. Recommended environmental conditions

The following Recommended Environmental Conditions would amend the Minister's Statement of 28 January 1992 (Appendix 1).

PROPOSAL: ALLUVIAL DIAMOND MINE EXPANSION, SMOKE CREEK, ARGYLE (607/888)
CURRENT PROPONENT: ARGYLE DIAMOND MINES PTY LIMITED
CONDITIONS SET ON: 28 JANUARY 1992

Condition 1 is amended to read as follows:

1 Proponent Commitments

1-1 In implementing the amended proposal, the proponent shall fulfil the commitments made in the 1991 Consultative Environmental Review and in the "Additional Proposal and Environmental Report, May 1994", reported on in EPA Bulletin 750; provided that the commitments are not inconsistent with the conditions or procedures contained in this Statement. (A copy of the commitments as modified in May 1994 is provided as Appendix 2).

Note: Other conditions in the Minister's statement of the 28 January 1992 are unchanged (Appendix 1).

7. References

1. Argyle Diamond Mines Pty Ltd, 1989. *Smoke Creek Alluvial Mining Project Notice of Intent*.
2. Argyle Diamond Mines Pty Ltd, 1991. *Alluvial Mining Programme Consultative Environmental Review*. Prepared by D. C. Blandford & Associates Pty Ltd.
3. Argyle Diamond Mines Pty Ltd, 1993. *Annual Environmental Report, July 1993*.
4. Argyle Diamond Mines Pty Ltd, 1994. *Additional Proposal and Environmental Report on the Alluvial Mining Expansion Programme at Argyle Diamond Mines, May 1994*. Prepared by D. C. Blandford & Associates Pty Ltd.
5. Environmental Protection Authority, 1991. *Argyle Diamond Mine Expansion, Smoke Creek*. Bulletin 583, September 1991. Environmental Protection Authority, Perth.

Appendix 1

Statement of Conditions of Approval, 28 January 1992



WESTERN AUSTRALIA
MINISTER FOR THE ENVIRONMENT

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT
TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT
1986)

ALLUVIAL DIAMOND MINE EXPANSION,
SMOKE CREEK, ARGYLE (607)

ARGYLE DIAMOND MINES PTY LIMITED

This proposal may be implemented subject to the following conditions:

1. In implementing the proposal, the proponent shall fulfil the commitments (which are not inconsistent with the conditions or procedures contained in this statement) made in the Consultative Environmental Review. (A copy of the commitments is attached).
2. Subject to these conditions, the manner of detailed implementation of the proposal shall conform in substance with that set out in any designs, specifications, plans or other technical material submitted by the proponent to the Environmental Protection Authority with the proposal. Where, in the course of that detailed implementation, the proponent seeks to change those designs, specifications, plans or other technical material in any way that the Minister for the Environment determines on the advice of the Environmental Protection Authority, is not substantial, those changes may be effected.
3. Where, in the opinion of the Environmental Protection Authority, natural regeneration of native vegetation is inadequate in areas under rehabilitation, the proponent shall supplement the vegetative cover with seeds or plants, to the satisfaction of the Environmental Protection Authority in consultation with the Department of Mines.
4. The proponent shall be responsible for decommissioning and removal of the plant and installations and rehabilitating the site and its environs, to the satisfaction of the Environmental Protection Authority. At least six months prior to decommissioning, the proponent shall prepare and subsequently implement a decommissioning and rehabilitation plan, to the satisfaction of the Environmental Protection Authority.
5. No transfer of ownership, control or management of the project which would give rise to a need for the replacement of the proponent shall take place until the Minister for the Environment has advised the proponent that approval has been given for the nomination of a replacement proponent. Any request for the exercise of that power of the Minister shall be accompanied by a copy of this statement endorsed with an undertaking by the proposed replacement proponent to carry out the project in accordance with the conditions and procedures set out in the statement.

Published on

28 JAN 1992

6. If the proponent has not substantially commenced the project within five years of the date of this statement, then the approval to implement the proposal as granted in this statement shall lapse and be void. The Minister for the Environment shall determine any question as to whether the project has been substantially commenced. Any application to extend the period of five years referred to in this condition shall be made before the expiration of that period, to the Minister for the Environment by way of a request for a change in the condition under Section 46 of the Environmental Protection Act. (On expiration of the five year period, further consideration of the proposal can only occur following a new referral to the Environmental Protection Authority).
7. The proponent shall prepare an "Audit Programme", which includes requirements for the preparation of periodic "Compliance Reports", in consultation with and to the satisfaction of the Environmental Protection Authority. The proponent shall subsequently implement the approved Audit Programme, to the satisfaction of the Environmental Protection Authority. The proponent may include the compliance reporting as part of its environmental reporting obligations pursuant to the Diamonds (Argyle Diamond Mines Joint Venture) Agreement Act.



Bob Pearce, MLA
MINISTER FOR THE ENVIRONMENT

28 JAN 1992

MANAGEMENT COMMITMENTS

Major commitments to environmental management by Argyle Diamond Mines Pty Limited are summarised as follows:

1. A continuous monitoring programme will be carried out to determine the effectiveness of measures taken for protection and rehabilitation of the environment. Reports will be submitted to the Minister for State Development when reasonably required by the Minister.

Argyle Diamond Mines currently submits environmental reports on an annual and triennial basis, and this procedure will be continued for this proposed programme.
2. Clearing of vegetation, stockpiling of topsoil, and stockpiling of barren overburden, will be carried out progressively and in accordance with the rate of mining.
3. The amount of land cleared in advance of the mining face will be restricted to that necessary for a practical but efficient operation.
4. Individual trees and clumps of trees, where appropriate, will be identified and retained as part of the rehabilitation programme.
5. As the mining face advances, reject material from the alluvial process plant will be returned to the mined area and re-spread to form an undulating surface.
6. The Smoke Creek drainage line will be reinstated by either re-shaping and construction, or by modifying the mining operation so that the mining face lies parallel to the direction of stream flow. In this latter situation, complete backfilling will not occur and a channel will be created by the void. Application of this technique will be subject to the need for practical and efficient movement of ore trucks in the mining operation.
7. On completion of backfilling, alluvial overburden will be re-spread if it has been stockpiled, and topsoil will then be re-spread across the surface.
8. Deep ripping will be carried out where practicable to break down areas compacted during the backfilling operation and to incorporate the surface material into the upper surface of the gravels.
9. Vegetation material cleared in the site preparation operation will be returned to the area and re-spread to provide the basis for habitat restoration.
10. If erosion control works or absorption banks are required as part of the rehabilitation process, these will be designed and installed prior to the onset of the wet season.
11. Monitoring of revegetation work carried out as part of the current mining programme suggests that seeding and fertiliser application may not be a worthwhile strategy within the overall rehabilitation programme. However, a seeding and fertilising trial will be carried out in areas suitable and this operation will be generally timed to coincide with the onset of the wet season.
12. During the wet season, specific monitoring programmes will be carried out to confirm hydrologic design parameters and to assess the overall performance of techniques being utilised.
13. The rehabilitation programme commences immediately after mining with re-shaping of backfilled gravels. Re-spreading of topsoil and vegetation material generally occurs within several weeks, and earthworks will be constructed before the onset of the wet season.
14. The environmental management programme and associated works will be carried out to the satisfaction of the EPA on advice from the Department of Mines, and in accordance with practices relevant at the time.

Appendix 2

Environmental Management Commitments, May 1994

MANAGEMENT COMMITMENTS

Major commitments to environmental management by Argyle Diamond Mines Pty Limited are summarised as follows:

1. A continuous monitoring programme will be carried out to determine the effectiveness of measures taken for protection and rehabilitation of the environment. Reports will be submitted to the Minister for State Development when reasonably required by the Minister.

Argyle Diamond Mines currently submits environmental reports on an annual and triennial basis, and this procedure will be continued for this proposed programme.

2. Clearing of vegetation, direct return of the surface soil and direct return of overburden will be carried out progressively and in accordance with the rate of mining. In the event of direct return not being possible, temporary stockpiles will be utilised.
3. The amount of land cleared in advance of the mining face will be restricted to that necessary for a practical but efficient operation.
4. Individual trees and clumps of trees, where appropriate, will be identified and retained as part of the rehabilitation programme.
5. As the mining face advances, reject material from the alluvial process plant will be returned to the mined area and re-spread to form an undulating surface.
6. The Smoke Creek drainage line will be reinstated by either re-shaping returned gravels or by not completing the backfill process and utilising voids left after mining. Selection of the method used will be subject to the need for practical and efficient movement of the ore trucks in the mining operation and take into account the hydrology of the area where possible.
7. On completion of backfilling, alluvial overburden will be re-spread if it has been stockpiled, and topsoil will then be re-spread across the surface.
8. Deep ripping will be carried out where practicable to break down areas compacted during the backfilling operation and to incorporate the surface material into the upper surface of the gravels.
9. Vegetation material cleared in the site preparation operation will be returned to the area and re-spread to provide the basis for habitat restoration.
10. If erosion control works or absorption banks are required as part of the rehabilitation process, these will be designed and installed prior to the onset of the wet season.
11. Monitoring of revegetation work will continue as part of the current mining project, including continued seeding trials in suitable areas. Seeding will generally be timed to coincide with the onset of the wet season.
12. During the wet season, specific monitoring programmes will be carried out to confirm hydrologic design parameters and to assess the overall performance of techniques being utilised.
13. The rehabilitation programme commences immediately after mining with re-shaping of backfilled gravels. Re-spreading of topsoil and vegetation material generally occurs within several weeks, and earthworks will be constructed before the onset of the wet season.
14. The environmental management programme and associated works will be carried out to the satisfaction of the EPA on advice from the Department of Mines, and in accordance with practices relevant at the time.

RESPONSIBILITY

Argyle Diamond Mines Pty Limited will carry out the proposed alluvial mining operation using a reputable mining and earth-moving contractor. Conditions relating to environmental protection will be developed by ADM and will form part of all contracts for the programme.

Environmental staff at Argyle diamond mine will supervise all aspects of the operation that relate to environmental management including review of contractor performance.

Detail design work will be carried out by staff of the Environmental section who will also supervise construction and be accountable for the implementation and completion of rehabilitation programmes.

Consultation is carried out on a regular basis with officers of the Department of Agriculture in Kununurra, and these consultations and inspections will continue through the proposed programme. Similarly, appropriate officers within the EPA will be expected to visit the operation and contribute to environmental management strategies being implemented or proposed.

The proposed alluvial mining operation will be continually monitored and evaluated by site personnel. This action is necessary to ensure the adequacy of site-specific design and, in terms of overall environmental management, to ensure that strategy goals will be achieved.