# Response by the Government of the Northwest Territories to the Report of the Traditional Knowledge Working Group

### **Executive Summary**

The Traditional Knowledge Working Group was established in 1989 to seek ways in which the Government of the Northwest Territories (GNWT) and non-government organizations could work together to document traditional knowledge and ensure that it is applied both by government and other agencies. The Group's report was tabled in the Legislative Assembly in July 1991. The Report of the Traditional Knowledge Working Group contains 20 recommendations for government action in this area.

The Traditional Knowledge Working Group's recommendations address a wide range of government activities. The recommendations are also directed at non-governmental organizations. Many recommendations reflect the broad orientation of the working group's definition of traditional knowledge which includes the use of knowledge to develop culturally appropriate ways of governing. The Government has used these recommendations as a starting point for a plan of action designed to encourage and promote traditional knowledge. In some cases, the Government has already taken actions consistent with the recommendations of the report.

The GNWT response to the <u>Report of the Traditional Knowledge Working Group</u> recognizes the importance and value of the work done by the Traditional Knowledge Working Group. The GNWT began a process of Departmental consultation in September of 1992 in order to draft a response to the Report. The response presents a plan which outlines a role based on the commitment of the GNWT to traditional knowledge.

Traditional knowledge and its use differs among communities, regions, and cultural groups. The GNWT must encourage, support, and promote the study and use of traditional knowledge by communities, aboriginal cultural organizations, universities, and research institutions as well as within Government programs and services. The documentation and use of traditional knowledge must be pursued at the community level.

A Traditional Knowledge Policy establishes the Government's commitment to the use of traditional knowledge. This policy is intended to provide a framework for decision making for all departments and agencies of the government.

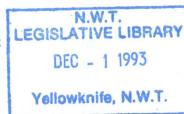
The coordination of GNWT traditional knowledge initiatives is assigned to the Minister of Renewable Resources.

The GNWT plans to give priority to traditional knowledge projects with the allocation of funds through several existing grants and contributions programs. At the end of a two year period, the program funding and criteria will be evaluated. Each program department of the GNWT will have a traditional knowledge coordinator.

The GNWT plans to cooperate with aboriginal cultural organizations on the development of northern cross-cultural orientation and training programs with an emphasis on traditional knowledge.

A meeting with elders was held in Fort Providence on 12-14 October 1993 to review the draft GNWT response and policy. The texts were revised based on comments and resolutions made by the elders.

**GNWT Response to Traditional Knowledge Report** 



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# GOVERNMENT RESPONSE TO THE REPORT OF THE TRADITIONAL KNOWLEDGE WORKING GROUP

#### INTRODUCTION

The Report of the Traditional Knowledge Working Group, tabled in the Legislative Assembly in July 1991, contained twenty recommendations for government action. The recommendations flowed from the deliberations of a working group established by the Minister of Culture and Communications to "seek ways in which the Government of the Northwest Territories and non-government organizations could work together to document traditional knowledge and ensure that it is applied both by government and other agencies."

Building on the Working Group's recommendations, this response outlines the government's commitment to traditional knowledge, and initiatives to demonstrate that commitment (Appendix A). This response is based on the conviction that traditional knowledge is a dynamic, evolving phenomenon, which is integrally linked to aboriginal cultures, and to the land which supports those cultures.

Before finalizing this response, a draft was provided to elders who had participated in the preparing the Report of the Traditional Knowledge Working Group. Elders met for three days in mid October 1993 and their comments and resolutions are reflected in this response. The Government is grateful to the elders for their continued guidance.

## The Role of Government in Preserving and Using Traditional Knowledge

The documentation and application of traditional knowledge must be pursued at the community level - not between four walls in office buildings in Yellowknife. Establishing new programs in government departments, or hiring more government staff to document traditional knowledge, are not the most effective ways to ensure that traditional knowledge is studied and utilised.

Another reason that centrally organized government programs cannot be effective is because traditional knowledge and its use differs among communities, regions and cultural groups in the NWT.

The appropriate role for government in enhancing the study and use of traditional knowledge is to:

encourage individual researchers, communities and aboriginal organizations to study and document traditional knowledge;

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- **support** research projects designed to study traditional knowledge, publish research findings and suggest ways in which traditional knowledge can be applied both in government programs, and elsewhere;
- promote the study and application of traditional knowledge, not only within government, but also by communities, aboriginal cultural organizations, universities and research institutions; and
- **use** traditional knowledge, where appropriate, in government programs and services.

#### **RESPONSE**

#### General comments:

The Working Group's recommendations were sweeping, and addressed a range of government activities, as well as recommendations directed at non-governmental organizations. The government has chosen to use the recommendations as a starting point for a plan of action designed to encourage and promote traditional knowledge. This approach has been followed for a number of reasons:

- Some of the recommendations would be difficult, if not impossible, for the GNWT to implement as written, because they address areas that are not wholly within the government's jurisdiction.
- Some recommendations would involve adding more staff positions to the central operations of existing departments. This is not consistent with the government's belief that resources to promote traditional knowledge must be allocated "where the action is" i.e. at the community level.
- In its definition of traditional knowledge, the Working Group Report went far beyond the concept of knowledge as "information gained through experience", and adopted a broad definition that includes values, beliefs and spiritual relationships.
   Many of the Report's recommendations reflect this broad orientation, going beyond the study and application of knowledge to address culturally appropriate ways of governing.

For example, Recommendation #14, which deals with flexible work arrangements to enable GNWT employees to pursue traditional activities, does not address the documentation and application of traditional knowledge as much as it addresses the need to develop institutions of government that are appropriate to the aboriginal cultures of the north.

This, and similar recommendations, are consistent with the government's stated intent to "develop new Territorial and community government structures that are easier to understand and that better represent our northern styles and cultural traditions" (Government Leader's address: Reshaping Northern Government, February 1992). The transfer of authority to communities, participation in joint management structures through land claims initiatives, and emphasis on developing a "home-grown public service" through affirmative action are all designed to promote a culturally appropriate and sensitive form of government in the north, and are consistent with the recommendations of the Traditional Knowledge Working Group. Thus, the intent of many of the recommendations will not be explicitly addressed by this response, but in the broader context of the Reshaping Northern Government initiative.

• The government has already taken actions consistent with some of the recommendations, prior to the release of the report or subsequent to it.

The Plan outlined below reflects the spirit and intent of the Working Group's recommendations, although it does not necessarily follow the letter of all of them.

#### The Government's plan:

### a) <u>Traditional Knowledge Policy</u>

Cabinet has approved a policy that establishes the government's commitment to the study and application of traditional knowledge. The policy is intended to provide a framework for decision-making for all departments and agencies of the government. The policy outlines the government's commitment to traditional knowledge, specifies each department's responsibilities and ensures that consideration will be given to traditional knowledge in the development of new initiatives when it is appropriate (Appendix B).

## b) Priority and mandate

The mandate for coordination of government-wide traditional knowledge initiatives has been formally assigned to the Department of Renewable Resources. This department has taken the lead in establishing an in-house working committee to pursue and promote traditional knowledge.

The Department of Renewable Resources is also the department that is primarily responsible for supporting the traditional land-based lifestyle that fosters and promotes traditional knowledge.

Traditional knowledge spans many subject areas. However, the single area in which there has been the most demand from communities and aboriginal groups for traditional knowledge to be acknowledged and incorporated into government decision-making is in environmental management.

During the many public hearings that have been held to deal with major development proposals and land use plans in the NWT, local people have consistently maintained that they are best equipped to provide baseline information about the land and its resources, and to assess the impacts of development upon the environment, by virtue of their traditional knowledge.

Traditional knowledge must play a major role in all aspects of environmental management, including:

- land use planning,
- screening and issuing land and water use permits,
- establishing and managing protected areas,
- wildlife management,
- environmental impact assessment,
- environmental monitoring.

The public management bodies established through land claims agreements to manage land, water and wildlife will certainly rely upon traditional knowledge as a key management tool.

The Department of Renewable Resources will be provided with additional staff resources to undertake this new responsibility.

Assigning this mandate to one department does not take away from the ability of other departments to continue to pursue traditional knowledge initiatives. It also does not lessen their responsibility to consider traditional knowledge in all decision-making processes, as required by the Traditional Knowledge Policy.

### c) Reallocation of Grants and Contributions

For the 1994/95 and 1995/96 fiscal years, traditional knowledge projects will be made a priority for the allocation of funds through several existing government programs. These grants and contributions programs will be reprofiled to give first priority for funding to projects to study, promote and publicize traditional knowledge.

At the end of the two-year period, the program criteria and funding will be evaluated.

### d) Departmental coordinators

Within each program department of the GNWT, responsibility will be assigned for the coordination of traditional knowledge initiatives. Coordinating staff will respond to requests for support from researchers and communities investigating traditional knowledge, monitor traditional knowledge initiatives and make recommendations within their departments about opportunities to incorporate traditional knowledge into government programs.

### e) <u>Traditional Knowledge Awards</u>

As part of his new responsibility for traditional knowledge, the Minister of Renewable Resources will develop an annual awards program which will recognize the contribution to northern society of holders of traditional knowledge, as well as significant contributions to the study of traditional knowledge.

### f) Public awareness campaign

The Minister of Renewable Resources will also be responsible for the design and implementation of a comprehensive public education and awareness campaign about traditional knowledge in the NWT. This campaign will be undertaken in consultation with aboriginal cultural organizations. Information on grants and contributions available will be highlighted as part of the campaign.

# g) <u>Develop northern cross-cultural training programs</u>

The government will cooperate with aboriginal cultural organizations on the development of northern cross-cultural orientation and training programs with an emphasis on traditional knowledge, that can be accessed by GNWT staff.

#### **APPENDIX A**

# GNWT Response to the 20 Recommendations From Report by the Traditional Knowledge Working Group

 Instead of a Declaration of Recognition and Support, the government has approved a Traditional Knowledge Policy to accomplish the same goals.

This Policy will provide a framework for decision-making for all government departments and agencies in the development of programs, policies and legislation.

- The Government will designate a traditional knowledge coordinator in all program departments. Responsibilities of these staff are addressed in the *Traditional Knowledge Policy*.
- 3. The Government does not support the establishment of a Territorial Elders Council. Setting up a new territorial advisory body would not be consistent with the government's stated intent to reduce the complexity and cost of government in the NWT by eliminating and downsizing existing boards and agencies.

However, the GNWT will consult with territorial elders and youths on specific traditional knowledge subjects that are designed to meet practical needs of northern communities and Government.

The Government does, however, recognize the increasing importance of consulting with elders and will explore new ways to do so. Already many local bodies such as Hunters' and Trappers' Associations regularly seek the input of elders in their decision-making. The government recognizes and supports the role of Elders Councils that are affiliated with the Dene and Inuit Cultural Institutes, the Inuvialuit Social Development Program, and the Metis Heritage Association and will continue to take into consideration any advice or recommendations flowing from these bodies.

No funds are available for operational support to elders councils at this time. However, the Government will review existing councils and their current mandates and funding sources available to them.

The commitment to conferences and consultation strategies with elders will be addressed in the Government's workplan on traditional knowledge initiatives.

With respect to cultural organizations, the Government will provide opportunities for these organizations to review the Government's workplan and will consult with these organizations as needed.

MLAs are also encouraged to consult directly with individual elders and Elders Councils in their constituencies.

4. The Government does not support the appointment of traditional knowledge representatives to all government boards, agencies and committees. As noted above, this would not be consistent with the government's move to downsize existing advisory bodies. Many agencies deal with issues that would not be directly affected by traditional knowledge - for example, the Public Utilities Board.

The *Traditional Knowledge Policy* ensures that boards and agencies will consider traditional knowledge in their decision-making processes when it is appropriate to do so.

- 5. The Government will initiate a comprehensive education and promotion campaign aimed at the general public, as recommended.
- Traditional knowledge awareness for government employees would appropriately be delivered within the context of cross-cultural orientation and awareness courses. The government now makes such courses available to all employees.

The Government supports the concept of cross-cultural awareness training which has been developed and is delivered by northern aboriginal cultural organizations, and is committed to working cooperatively with those organizations towards the development and delivery of such courses.

7. No amendment is required to the legislated mandate of the Science Institute of the NWT to enable it to pursue these recommendations. The importance of traditional knowledge is explicitly recognized in the Science Institute's mission statement. The Institute already collects and distributes research results, acts as a repository for research findings, and seeks funding as an independent agency for research projects.

The Science Institute has indicated its willingness to act as a resource to the NWT public library system for acquiring and distributing traditional knowledge information. NWT Library Services and the Science Institute will jointly pursue recommendation 7(d).

8. The GNWT acknowledges the valuable role of the Science Institute in acting as a repository for research results, and will ensure that the results of all research and information projects in which the government is a participant are provided to the Science Institute.

The Government cannot bind the actions of aboriginal cultural organizations.

9. This recommendation proposes a policy that addresses a wide range of research procedures and the disposition of research results and ethics, and that binds the actions not only of the GNWT and its employees, but other research agencies as well. Such a policy is beyond the scope of the GNWT's jurisdiction.

The Government will encourage the Science Institute of the NWT to address these issues through its licensing procedures and research guidelines.

The GNWT would be willing to cooperate in the development of a cooperative research protocol to include issues of training of researchers and payment of elders with aboriginal cultural organizations, the Science Institute, the Polar Commission and other research institutes as appropriate.

The Government will examine legislation regarding the ownership and copyright of traditional knowledge research findings and protection of intellectual property rights of aboriginal communities.

10. The mandate of the Centres for Teaching and Learning includes research and documentation of traditional knowledge for the purposes of developing culturally-based curriculum materials. For example, the Dene KeDe curriculum has just been produced by the Department of Culture, Education and Employment and the Inuqatigiit curriculum is being developed. The Centres are funded and have access to sources to develop this work.

The Government will seek to increase support to traditional knowledge programs both within and outside of the formal school system.

11. The Government has announced the reprofiling of existing grants and contributions programs to make traditional knowledge initiatives a priority.

The Government's Interdepartmental Working Group on traditional knowledge that will be established will be responsible for developing a workplan and budget for traditional knowledge initiatives. This will include reviewing the allocation of existing resources.

- 12. The GNWT recognizes the important role of aboriginal languages in the preservation and transmittal of traditional knowledge, and is committed to the maintenance, enhancement and revitalization of aboriginal languages. This commitment is implemented through a range of programs designed to support community-based initiatives, specific projects such as support to the Dene Standardization Committee, and programs to promote development of aboriginal language curriculum materials for use in schools.
- 13. The GNWT will support and participate in all opportunities for the exchange of information among traditional knowledge holders, scientists and other professionals.
- 14. Some elements of this recommendation are already provided for either in government policy or in the Collective Agreement:

- The new Collective Agreement includes job-sharing provisions for employees of hospitals and health-care facilities.
- Numerous positions are being decentralized this year pursuant to the Government Leader's June 1992 announcement in the Legislative Assembly.
- Government employees can apply for Education Leave in order to pursue academic studies at post-secondary institutions, or to take short-term professional or technical training.

The Community Transfer Initiative will result in community governments having more authority and responsibility for program delivery. Employment decisions concerning issues such as job-sharing and leave for traditional activities can then be made at the local level.

- 15. The Department of Renewable Resources has been assigned responsibility for implementing a series of annual awards recognizing the contribution to northern society of holders of traditional knowledge. These awards will be publicized as part of the public awareness campaign.
- 16. The GNWT regularly lobbies the federal government on issues of concern to northern residents, and will continue to do so.
- 17. The Minister of Renewable Resources is responsible for the coordination of GNWT traditional knowledge initiatives. The *Traditional Knowledge Policy* assigns responsibility for monitoring and implementation to individual departments as appropriate.

The Government will establish an Interdepartmental Working Group to promote the full use of traditional knowledge in its programs and services. As stated in the response to Recommendation No. 2, traditional knowledge coordinators will be appointed within program departments.

The Government agrees that a link between elders, cultural organizations and government is necessary. The Interdepartmental Working Group will provide its workplan to elders and aboriginal cultural organizations for review.

- 18. The Department of Renewable Resources will receive additional staff resources to enable effective implementation of new traditional knowledge responsibilities.
- 19. Identification of the potential benefits of traditional knowledge use will be an essential element of all departmental initiatives.
- 20. No independent study will be undertaken at this time.

# APPENDIX B Traditional Knowledge Policy

The Government of the Northwest Territories recognizes that the aboriginal peoples of the NWT have acquired a vast store of traditional knowledge through their experience of centuries of living in close harmony with the land. The Government recognizes that aboriginal traditional knowledge is a valid and essential source of information about the natural environment and its resources, the use of natural resources, and the relationship of people to the land and to each other, and will incorporate traditional knowledge into Government decisions and actions where appropriate.

This policy is based on the following principles:

- 1. The primary responsibility for the preservation and promotion of traditional knowledge lies with aboriginal people.
- 2. Government programs and services should be administered in a manner consistent with the beliefs, customs, knowledge, values and languages of the people being served.
- 3. Traditional knowledge should be considered in the design and delivery of Government programs and services.
- 4. The primary focus of traditional knowledge research should be the aboriginal community.
- 5. Traditional knowledge is best preserved through continued use and practical application.
- 6. Oral tradition is a reliable source of information about traditional knowledge.

# **SCOPE**

This policy applies to all departments, agencies and employees of the Government of the NWT.

#### **DEFINITIONS**

1. Aboriginal cultural organization

Any local, regional or Territorial organization which promotes aboriginal culture in the NWT.

#### 2. Program department

A department of the government which delivers programs to the public.

#### 3. Research institution

Includes universities, research associations affiliated with universities, and government-sponsored research organizations.

#### 4. Traditional knowledge

Knowledge and values which have been acquired through experience, observation, from the land or from spiritual teachings, and handed down from one generation to another.

#### **PROVISIONS**

#### 1. Authority and Accountability

#### (a) Executive Council

(i) approves government-wide traditional knowledge initiatives.

### (b) Ministers: Program Departments

- i) consider recommendations from communities and aboriginal cultural organizations regarding the incorporation of traditional knowledge into the design and delivery of government programs, and take action as appropriate;
- ii) respond to requests for in-kind support from non-government organizations.

#### (c) Minister of Renewable Resources

- i) responsible for coordination of GNWT traditional knowledge initiatives approved by Executive Council;
- ii) ensures that traditional knowledge about the natural environment is taken into consideration in all environmental management actions and decisions of the government.

### (d) Deputy Ministers: Program Departments

- assign responsibility for traditional knowledge coordination within their departments;
- ii) identify program areas where the study or application of traditional knowledge is appropriate;
- iii) make recommendations to Ministers with regard to the incorporation of traditional knowledge into the design and delivery of programs;
- iv) make recommendations to Ministers with regard to requests for in-kind support from non-government organizations.

### (e) Deputy Minister of Renewable Resources

i) in consultation with other Deputy Ministers, coordinates the implementation of government-wide traditional knowledge initiatives.

# (f) <u>Traditional Knowledge Coordinators</u>

At the direction of the Deputy Minister of each Program Department:

- i) monitor traditional knowledge projects, studies and other initiatives relevant to the program areas of their department;
- ii) participate in the on-going exchange of information about the traditional knowledge research and developments;
- iii) provide support upon request to communities, aboriginal cultural organizations and research institutions conducting traditional knowledge studies or projects, as time and resources permit;
- iv) identify areas where traditional knowledge could successfully be incorporated into the design or delivery of a government program, and make recommendations.

# (g) Science Institute of the NWT

- i) licenses all scientific research in the NWT in accordance with the Scientists Act,
- ii) maintains a data base of traditional knowledge research conducted in the NWT;

- iii) promotes and supports the study, documentation and application of traditional knowledge;
- iv) pursues and supports the development of traditional technology for economic development purposes.

### 2. Support to Non-Government Traditional Knowledge Initiatives

The government may provide, upon request, in-kind support to communities, aboriginal cultural organizations and research institutions which wish to conduct studies or projects related to traditional knowledge in the NWT. Such support might include: providing information, assisting with literature reviews, assisting with program design, or assisting with access to government or non-government funding.

Requests for such support should be directed to Ministers of the appropriate program departments. Provision of in-kind support will be at the discretion of the Minister. Should the requests involve a substantial amount of staff time or departmental resources, Ministers may request written substantiation of requests.

#### 3. Prerogative of the Executive Council

Nothing in this directive shall in any way be construed to limit the prerogative of the Executive Council to make decisions or take actions, with respect to traditional knowledge, outside the provisions of this directive.

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ሁኖL የዓሩ ለሩሒዬበጜናቃላ፣ጋና ቃዹጜ፟፟ጜጓተርፈሩ Δሩህተሩሒቃናጋና ይጋኑትቼበሶላቦችታ ላፌዎላ፣ጋበኑ የራΓ የዓር የጋር ው ማርመር መስተም የተመቀመው የተመሰው የተመ

#### <u>Δε~ι CΔγΔ۲۹ "Δ"</u>

### عمل ۱۲۵۰ مر ۱۲۵۰ کمر ۵۰ میر ۵۰ میر ۵۰ میر ۱۲۵۰ میر

- 3. נפניטי בייחיברי שיייביב ליייביביל בייחיביים נפניטי ביינים ביי

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Δ፫% ሀትራሊ ማነጋጎር በሮቼበቦን Dላዬና, ሁኖር በነሀና ለኖልዬን ትሬጭ በረ የሁን የና ዬ D ትላን ትሬና ወናር ሁኖር በነሀና ለራፈላ መርጉልና ረናፈ ወረ በቦታር ነንቦት ምነ ወነር ነው ነው ነርና መመን ነው ነርነው መንግ ነው ነው ነርነው መንግ ነርነ

LalaD%n's Calalas nabycotine cilc D%nhabybostan  $\Delta$ D%n  $\Delta$ D%n

 $UCL^4G$   $WA'^2$   $C^4D$   $WA'^2$   $WA'^2$  W

 $\Delta c^{4} d l^{2} & c \wedge c^{4} l^{4}$   $\Delta c^{4} l^{4} \wedge c^{4} l^{4} l^{4}$ 

ሀ ማይ ነብና ይህ ተመሰው ይህ ተመሰው የሚያ መደን መደን የተመሰው የሚያ መደን የመደን የመደን የተመሰው የሚያ መደን የሚያ መደን የሚያ መደን የተመሰው የሚያ መደን የተመሰው የሚያ መደን የሚያ መደን የሚያ መደን የሚያ መደን የሚያ መደን የሚያ መደን የመደን የሚያ መደን የ

 $\lambda_{\alpha} \Delta_{\alpha}$   $\lambda_{\alpha}$   $\lambda_{\alpha}$ 

 $V_{C}$   $V_{C$ 

LGLUPS CAPA LANDAL VERTICAL TO ALL AND ALL AN

- 12. aርላሩ ሁኖር ነጻጐቦና  $\Delta$ ርርጭተ/ተርፈና ለትር  $\Delta$ ውጭቦጐራ aር ነጻትጋዜና aር  $\Delta$ ርቦን  $\Delta$ ር ነጻት  $\Delta$ ር ነፃተር የተረፈመው ለተር ነጻት  $\Delta$ ር ነፃተር የተረፈመው ለተር ነጻት  $\Delta$ ር ነፃተር የተረፈመው ለተር ነጻት  $\Delta$ ር ነፃተር ነጻት  $\Delta$ ር ነፃተር ነጻት  $\Delta$ ር ነጻ

- $\Delta \Gamma^{(1)} \dot{b} \Gamma^{(2)} = \Delta \Gamma^{(1)} \Delta \Gamma^{(2)} \Delta \Gamma^{(2)} = \Delta \Gamma^{(1)} \Delta \Gamma^{(2)} = \Delta \Gamma^{(2)}$
- 15. Levis a tdc- $\lambda$ n' bladdodatevo disjch  $\Delta$ -catdningcieth of the objection of the objective of the object

ሀሮLበነብና ለቦላጭበናበራላጭንና ላልጐራጭረጭበኦራላጭጋራኑ ሀሮLበነብጐራ ለነብ፫ኒጭበኦጋራ ርL $\Delta$ በብና ላጋጭርኦራንጐልጎራላጎLC  $\Delta$ ራጭብረንጭበብና ጭኦኦኦኦላና ለራኢልጐዮራ ቴLረበፖራጋ. ኦጭኦኦኦኦና ላጋራህኦኦላራ ልL 2-୮,  $\Delta$ ራጭብረንጭራኢትነብና ላኦሬናበትጐቦና ር $\Delta$ ኦኦኦላና ርነልራራ ሀርLበነብጐህረና ለራኢልጐዮራል.

#### Δc~ CΔγΔ<\* "D"

#### **₽10 CD 2 L3 σ C V S C V S O**

#### C'a acdin diane on one all all of the actions of the action of the actio

- 1.  $\Lambda \subset \Lambda^{0} \cup \Lambda^{0} \subset \Lambda^{0} \cap \Lambda^{0} \subset \Lambda^{0} \subset \Lambda^{0} \cap \Lambda^{0} \subset \Lambda^{0} \subset \Lambda^{0} \cap \Lambda^{0} \subset \Lambda^{0} \subset \Lambda^{0} \cap \Lambda^{0} \subset \Lambda^{0}$
- 3.  $\Delta \in \mathbb{R}^3$   $\Delta' \in \mathbb{R}^4$   $\Delta' \in \mathbb{R}^4$
- 5. Δεθερίας Λείρους υπονητών συνορτών το συνορτών συνορτ

#### 

 $\dot{C}^{\bullet}$ ሬ ላጋላሁች ላጋችር D ው ላችጋች ር L  $\Delta^{\bullet}$ ኔና ሁኖኒ ነሪ  $\Delta^{\bullet}$ ኔና  $\Delta^{\bullet}$ 

#### <u>ጋ የ</u> የቦ ና

١٠ مو١٩٠٤ ١٠ م م ١٩٠٤ م ١٠ م

 $\Lambda$  %  $\Lambda$  %

3. /a) \(\Delta \sigma \Delta \delta \sigma \Delta \delta \sigma \Delta \delta \delta \sigma \delta \delta

 $\Delta$ ሬ ቦታ D / ትሬ ነጋ ነላናል ነላር ነው ነ ነር ነው ነላና ነው ነላር ነው ነላር

\$D>Lσ~5D<6 D\$A~5D<6 / / Δ۵/3ΓJ6 Δ3/3ΓJ6 Δ3/3ΓJ6 Δ3/4ΓJ6 Δ3/4ΓJ6 Δ3/4ΓJ6 Δ3/4ΓJ6 Δ3/4ΓΔ6 Δ3/4ΓΔ6 Δ3/4ΓΔ6 Δ3/4ΓΔ6 Δ3/4ΓΔ6 Δ3/4ΓΔ6 Δ4/4ΓΔ6 Δ4/4

#### کام< مرارد

- (ii) PDPD%C $^{4}$ ጋኑ/ $^{4}$ PDPD $^{4}$ C $^{4}$ PDPD $^{4}$ PDP $^{4}$ PD
- (d)  $\Gamma \sigma^{1} C \Delta^{1} = \Gamma D C_{1} C_{2} C_{2} C_{3}$

- (ii)  $\alpha = \Delta^{4} + L^{4}C^{4} = \Lambda^{4}C\Lambda^{4$

- (>)  $\Gamma \sigma^{1}CD^{1} O^{1}C^{1} O^$

 $\Pi_{c}$   $\Pi_{c$ 

- (ii)  $\Delta \subset D^{4} \subset I^{3}$   $\Delta \subset D^{4} \subset I^{3}$   $\Delta \subset D^{4} \subset I^{4}$   $\Delta \subset D^{4} \subset D^{4}$   $\Delta \subset D^{4} \subset D^{4}$
- (vi) % Dት የዕጭር ነጋበት ፈ Dት ያና (ፈ  $\sigma$ )  $\Delta$ ር የሀንበ ነው ነገር ነገር ነው ነገር ነው

#### (U) \$\sigma \sigma \D\sigma \Sigma \Sigma \D\sigma \Sigma \D\sigma \Sigma \D\sigma \Sigma \D\sigma \Sigma \Sigma \D\sigma \D\sigma \Sigma \D\sigma \Sigma \D\sigma \Sigma \D\sigma \Sigma \D\sigma \D\s

- (ii) Of the production of the
- ( iii)  $\Lambda$  የ"- $\alpha$ 0°10%  $\alpha$ 0°4°20%  $\alpha$ 0°5°5%  $\alpha$ 0°6°5%  $\alpha$ 0°6%  $\alpha$ 0°6

#### 

#### 3. $\nabla \lambda \Gamma_{4} \gamma U L 4 - \sigma_{4} C_{2} L_{4} \Delta D = (U > \rho_{4}) + P U \Gamma > \rho_{4} C_{4}$

 $\Pi_{c} D_{r} + H_{c} C_{r} C_$