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**Ministry of Communications, Government of India
Department of Telecommunications**

Project Number: IND / 961002

Report of the Mid - Term Evaluation Mission

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Mission Members

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Table of Contents

1.	Introduction	-----	Page No. 01
2.	Project objectives	-----	Page No. 01
3.	Target beneficiaries	-----	Page No. 02
4.	Project Strategy and Institutional Arrangement	-----	Page No. 02
5.	Issues to be covered & Methodology	-----	Page No. 03

6.	Executive Summary	-----	Page No. 04
7.	Findings	-----	Page No. 06
8.	Chief Technical Advisor (CTA)	-----	Page No. 10
9.	Project Advisory Committee (PAC)	-----	Page No. 11
10.	Lack of Equipment for Laboratories	-----	Page No. 11
11.	Course Development	-----	Page No. 12
12.	Fellowship	-----	Page No. 13
13.	Usefulness of the project	-----	Page No. 13
14.	Extension of the project	-----	Page No. 14
15.	Redeployment of Experts in New Areas	-----	Page No. 14
16.	Recommendations	-----	Page No. 16
17.	Lessons Learnt	-----	Page No. 27

PROJECT : IND/96/002 - Human Resource Development, Management of Telecommunications

1.0 Introduction:

The UNDP and Government of India had approved a country project **IND196/002 - Human Resource Development, Management of Telecommunications** in January 1996. The Department of Telecommunications (DOT) had restructured its staff to meet the requirements of the changing scenario in the Telecom Sector. The focus of the project was to retrain the existing manpower in the DOT / BSNL to bring them in tune with the changes in environment. The thrust was on Human Resource Development.

The project duration was 48 months. The project actually started in October 1996 and was to end in September 2000. Following a tripartite meeting in July 2000, it was extended upto end April 2001. The project is on cost sharing basis with UNDP contributing to \$2, 627,800 and the Government of India \$ 2,222,000.

The Terms of Reference called for a mid term evaluation, having a duration of **three weeks** and which was to be carried out **starting**

January 15, 2000. This evaluation has actually been carried out from **08.01.2001 to 22.01.2001 in a total period of 15 days.** The two member team comprised B.N.Iyengar as team leader and A. Bhattacharya as member. Keeping in view the timing of the review, the team has taken a forward looking approach in order to extract the maximum from the project in the further period.

2.0 Project Objectives and Purpose of the Mid Term

Review The Project Objectives were:

1. To develop the capabilities of the telecom training centers to train and retrain the grassroots level staff of nearly 300,000 to upgrade their skills and knowledge in the new technologies being introduced in the network.
 2. To upgrade the telecom training centers at Bhopal, Bhubaneswar, Mumbai (Bombay), Lucknow and Chennai (Madras) and for improving the facilities in 22 other lower level (circle / district) training centers for training of skilled technical and operative staff through short term reorientation courses.
 3. To establish course development facilities at BRBRAITT, Jabalpur.
 4. To develop computer based training programmes for video . distance education
- 1
5. To strengthen Manpower Planning and Career Development cells at the field (circle / metro district) level organizations with MIS facilities to identify training needs of the staff in various positions.

The purpose of the review was to assess the status and achievement of the project and evaluate the technical aspects, usefulness and appropriateness so far on being produced by the project.

3.0 Target Beneficiaries

The direct beneficiaries would be:

1. 300,000 employees of the DOT whose skills and knowledge would be upgraded through this project.
2. Officials / trainers attached to this project who would be trained abroad.

The indirect beneficiaries would be:

1. The customers or subscribers using the telephone services in the country.
2. The private sector, which would have the advantage of improved telecom infrastructure.
3. The nation as a whole as there is a direct relationship between telecom penetration and the GDP of the nation.

4.0 Project Strategy and Institutional Arrangements

The project is being nationally executed by the Department of Telecommunications, now restructured as the Bharat Sanchar Nigam Limited (BSNL), a public sector organization of the DOT, set up for providing telecom services in India. This project is being coordinated by the DDG (Training) BSNL, who is the National Project Director.

The International Telecommunication Union is the implementing agency for the components as listed in Annex IX of the Project Document.

The project outputs were expected to be achieved through the following:

- (i) The Chief Technical Advisor (CTA) and the international experts, who would train the instructors of the various training centers and assist the project authorities to establish laboratories and review and revise the existing courses and training material.
- (ii) Study tours of selected DOT officers to acquire first hand information on the organization and management of advanced telecommunication systems that can be adopted to the Indian Scenario.

2

- (iii) Fellowship training abroad, to be used to train the course instructors of training centers and to help them develop new courses and material.
- (iv) Laboratories equipped with the equipment and systems procured through the ITU, with the project inputs as well as counterpart contribution.

5.0 Issues to be covered and Methodology:

As per the Terms of Reference (Annex A), attention was to be paid to the following issues:

- 5.1 Project concept, design and relevance of the project objectives and outputs.

- 5.2 Project effectiveness (results achieved so far).
- 5.3 Appropriateness and usefulness of solutions worked out by the project.
- 5.4 Involvement of Telecom Training Centres and the five selected CTTCs and DTTCs in the development of project outputs.
- 5.5 Coordination with other projects and institutions outside the project.
- 5.6 Sustainability.

Comments and observations on these are given in this report.

The methodology adopted by the team was as follows:

- 1. Briefing by the UNDP.
- 2. Meetings with senior officials of the BSNL.
- 3. Meetings with Advisor (HRD) of DOT.
- 4. Visit to Advanced Level Telecom Training Centre (ALTTC), Ghaziabad.
- 5. Visit to BRBRAITT, Jabalpur.
- 6. Visit to Circle Telecom Training Centre (CTTC), Chennai.
- 7. Visit to District Telecom Training Center (DTTC), Mumbai.
- 8. Preparation of draft report for discussions.
- 9. Preparation of the finalized report of the mid-term evaluation for submission to the UNDP taking into account discussions on the draft, inputs from the ITU etc.

The Terms of Reference is at Annex A. The itinerary of visits is at Annex B. The list of officers met is at Annex C. The team had full cooperation from all the departments and officers throughout the mission. Impromptu exercises, desired by the team at all the sites were organized at extremely short notice and participation everywhere was laudable. The team wishes to profusely thank all the officers met during this review exercise.

6.0 Executive

Summary: 6.1 The

Project

IND/96/002 is a Human Resource Development project between the UNDP and the Government of India in the Telecom Sector.

6.2 Context

The DOT has embarked on a massive plan to modernize the telecommunications network, which has grown from 9 million lines end March 1995 to 26.5 million lines end March 2000. The target for year 2000 was 20 million lines, which has been substantially exceeded (Annex D). Large and small sized state-

of-the-art digital exchanges, optic fibre cables, digital microwave systems, satellite systems and rapid introduction of voice and non-voice services are transforming this sector (Annex E).

De-regulation, liberalization and the entry of private sector operators has altered the monopoly character of telecom services to multi-poly character. As a consequence, the BSNL / DOT is facing increasing competition from the other private sector service providers.

Thus, there was an urgent need for upgrading the knowledge of the staff and their skills to enable them to meet the challenges posed by these rapid and significant changes. Since telecom is a very basic infrastructure requirement for nation building, the need for this program assumed great importance.

The project has been conceived and designed towards fulfilling this objective. The outputs are relevant to the national priorities and policies. The direct beneficiaries of the project are the BSNL and its staff and the indirect beneficiaries are the users of the telecom services and the nation.

6.3 A summary of observations of the review team is given below:

- i) There were major structural changes (Annex G) and environmental changes (Annex H) in the Telecom sector in the period 1996 - 2000 which had to be faced and solved.
- ii) The staff strength remained frozen during this period.
- iii) Being a HRD project, the thrust was to retrain and retool the staff to meet the challenges arising out of these major changes in structure, improve productivity and develop capability to meet the technology changes, growth, competition and improved performance. This has been met and their skills and

4

knowledge has been upgraded. The process is an ongoing one as changes are continuing to occur. The productivity increased from 32 staff per 1000 lines to 14 per 1000 in this period. The revenue generated per staff increased by 71.5%, while the system grew by 20% annually (Annex I).

- iv) The telecom training centers at Bhopal, Bhubaneswar, Mumbai,

Lucknow and Chennai have been upgraded. Provision of Video Distance Learning System has brought a new dimension to the training process. A large number of faculty have been conducting lectures, including computer based training programmes, using this system, though there is a lot more to be learnt in using the system. This system also requires to be upgraded with respect to both software and hardware to continually exploit its full potential as well as maintain it. Other lower level CTTCs and DTTCs are benefiting from the training of skilled technical and operative staff.

- v) Course development facilities at BRBRAITT have been established. Skills are being sharpened and a number of courses have been developed under this project (Annex J). Course development expertise using the VDL is being generated.
- vi) The supply of equipment by ITU, wherever it has happened, has created well equipped laboratories for training and course development.
- vii) There are laboratories at ALTTC, where the infrastructure is ready but where the supply of equipment from the ITU is yet to come. This has come in the way of achieving some of the project objectives. In turn, this has led to underutilization of the Expert Working Months (Annex K).
- viii) Fellowship training programmes, though useful, have shown an anomaly between areas and WM, as well as a gap in the understanding by the institutions where these are organized with regard to the content of the fellowship, which again come in the way of full utilization (Annex K).
- ix) The BSNL has to improve the system of interaction with the ITU as well as reexamine its requirement of equipment and experts, specially in new areas. It also has to firm its mind regarding the need for the CTA in the remaining period of the project.
- x) Both direct and indirect beneficiaries have benefited from this project.
- xi) The Project Advisory Committee (PAC) has to start functioning (Annex L).
- xii) Manpower Planning and Career development issues are being given their due importance by the BSNL. Cells dealing with

these are functioning in the circles. They will implement the policies that will be laid down by the BSNL very early. The ITU expert is also contributing in this area.

- xiii) A final extension of the project from May 2001 to end March 2002 has been recommended with two tripartite meetings in this period to monitor progress.
- xiv) A high level two member team from BSNL has been

recommended to settle the various issues with the ITU urgently.

These aspects are dealt with in some detail now. On the whole, this an excellent and useful project, in-spite of some shortcomings in equipment supplies and experts usage till now.

_7.0 Findings

7.1 Project Concept, Design, relevance of project objectives and output

Referring to Issue 5.1, the project has been conceived and designed very well. Its objectives are very clear and well defined. As it is fully oriented towards Human Resource Development (H RD) of the restructured staff of the BSNL, it is very relevant and the outputs are well defined. There is a well-defined work plan for achievement of the project outputs.

The environment under which the project had to function from October 1996 to December 2000 underwent substantial changes with respect to structure and environment.

In this period, there were as many three major structural changes in the DOT and having their impact on country-wide basis. Starting with a monopoly status and handling both policies as well providing telecom services, DOT reformed itself through a series of quick changes by separating out the provision of telecom services and policy issues. The telecom services are provided through an autonomous public sector organization, the BSNL. Policy issues are handled by the DOT (Annex G). The project has been able to handle the HRD issues arising out of these changes and hence is relevant and continues to be relevant.

Regarding the other significant changes, technology changes in Telecommunications ranged from analogue to fully digital environment (Annex E). Also, opening out of the sector to private service providers, de-regulation and liberalization and policy changes by the Government introduced a very competitive environment. The project had the flexibility to meet the challenges required on various counts.

The status on output and activities is at Annex F.

7.2 Project Effectiveness and Impact of the Project

Wherever it has fructified, the project has proved a very useful and effective tool for HRD. The major test for this is in great improvement in the productivity of the staff, which was a direct result of the project (Annex I).

The first indicator is the reduction of staff per 1000 telephones from 34 in 1966 to about 14 by 2000, improving over a target of 20 per 1000 for the year 2000.

The second parameter is the revenue generated per employee which went up from Rs.29098 in 1995-96 to Rs.49903 in 1999-2000, representing an increase of 71.5% for this period.

The third parameter was the bonus earned by the staff, which increased from 64 days in 1995-96 to 71 days in 1999-2000.

The staff is able to handle technology from analogue/ lower version of digital to state-of-the-art digital. It is able to handle Internet, Intelligent Networks along with system growth rates of 20% and more. With the introduction of new telecom services, better quality and competitive telecom environment has been ensured in a cost effective manner. Introduction of new services such as Cellular Services, Internet, Wireless in the Local Loop are examples.

The only area the project could not fulfill till now, is in the area of equipment procurement, expert services and fellowships through the ITU for the laboratories and training. This has resulted in unequipped laboratories, provided with fully built-up infrastructure by the ALTTC center and which are lying idle, resulting in underutilized expert programmes. An impact analysis due to the nondelivery of equipment for the laboratories at ALTTC has been carried out by the ALTTC (Annex M).

In the case of experts, these were utilized to the extent equipment could be organized by the ITU as well as in those

areas where no equipment was involved. Hence, those equipment that the ITU could not arrange to supply, had the impact in non-utilization of expert months associated with the un-equipped laboratories. As against a total of 84 WM provided, only 47.5 were utilized leaving a balance of 36.5 WM unutilized (Annex K). This is a very unsatisfactory state of affairs.

7

In the case of Fellowship training, these could also not be utilized fully due to various reasons (Annex K). This is discussed in detail separately.

7.3 Appropriateness & Usefulness of Solutions

The major challenge before the BSNL/DOT was training the lower level staff to enable them to meet the changes in technology, environment and competition, specially as a public sector unit. During the period that the project has been operational since October 1996, more than **248,000** staff out of 300,000 have been trained, including almost all of the 54,000 **female staff**. **Training programmes for the lower level staff are thus a success story, both with respect to personnel trained and from the gender angle. Thus the 300,000 staff and officials I trainers attached to this project, who are the direct beneficiaries, have benefited.**

The capability to provide new services such as internet, cellular and other value added services has benefited the indirect beneficiaries such as customers and other service providers.

The private sector has benefited due to the availability of an advanced telecom infrastructure, which they are also using.

These developments are also improving the telecom infrastructure and aiding nation building and economic growth.

However since the scenario in telecom is changing rapidly, this process of training and retraining is an ongoing process. The appropriateness and usefulness of the project is demonstrated by the all round improvement in staff performance as shown in the earlier paragraph.

7.4 Involvement of TTC's & five selected CTTC's / DTTC's

The major Training Centres viz. *BRBRAITT* at Jabalpur, as well as the five CTTC's / DTTC's are fully involved in this programme. All the Training Centres involved in this project have immensely benefited on the account. This is an example of the valuable contribution this project has made to the development of telecom in India. Except for ALTTC, which does not have this facility, all of them are using the VDL facility as much as possible. It is important to ensure that the VDL system is both improved and

8

maintained, so that it's capability can be further utilized. This is discussed in more detail now.

In case of the ALTTC, modern laboratories where ever equipped, expert services, fellowships, seminars, workshops and course development has contributed toward upgrading it. With the introduction of more laboratories, this could be built up further.

7.5 Video Distance Learning Equipment

This part of the project has fructified. The system was commissioned on 15.07.2000, with the Studio at BRBRAITT, Jabalpur and class rooms at Jabalpur, Bhubaneswar, Chennai, Lucknow, Bhopal and Mumbai. Twenty two batches, involving 622 trainees, have been trained till now using this system. It has made a perceptible impact on the training process and has been welcomed everywhere. **The experience gained till now is very good.**

In order to assess the impact, the mission undertook a polling exercise at Jabalpur, The results of the polling exercise (Annex H) brings out the responses of the teacher as well as the trainees at all the distant class rooms, when ascertained from the studio at BRBRAITT, Jabalpur. In addition to this, two other exercises were carried out from CTTC, Chennai and DTTC, Mumbai, where the effect of use of audio visual aids at the studio at Jabalpur, using the Distance Learning System was tried. The purpose was to assess its impact on the trainees at Chennai and Mumbai and to assess the potential for increased usage. These aids were transparencies, video clips, computer outputs and practical demonstration like fibre optic splicing. This exercise revealed that, except for Computer Based Training, all the other **Audio Visual Aids could be integrated into the system.** Regarding CBT Courses, a further exercise will have to be done concerning font size, colour contrast and amount of data on screen to get the full benefit. This would value add substantially to the training process

9

7.6 Coordination with other projects & institutions outside the project

Recognizing the importance of the VDL System, even in the limited period of use of this system from July 2000 onwards, active discussions between the BSNL and other Ministries and organizations are in progress in its usage in teaching schemes, where Distance Learning System has great potential. This is likely to fructify in the near future.

7.7 Sustainability

The project is very flexible and has shown the capability to absorb and respond to top level structural changes.

This period also saw an annual addition of 3.25 million lines during 1997-1998, increasing to an annual addition of 3.91 million lines in the period 1999-2000. In physical terms the growth rate is 20% CAGR (Annex D).

The technology environment, which was a combination of analogue and low capability digital at the start of the project became fully digital by March 2000. This huge change has enabled in revolutionizing the telecom sector, including spurring value added services and software activities.

The project has been able to handle all these changes, while increasing the productivity of the trained personnel. It is thus both flexible and sustainable.

7.8 Risk to the Project

There is absolutely no risk to this project 8.0

Chief Technical Advisor (CTA)

The CTA was scheduled to come on four missions of 6 months each. Till now he has come on two missions of 6 months each. Thus only half of the project provision has been utilised till now. During 2000, there was no budget provision for the CTA. **The need for the CTA or other wise has to be decided by the BSNL.** Since the CTA is also an ITU expert, the balance expert months can be examined for redeployment in new areas. The field Vacancy Notice for the CTA is at Annex N, where his area of expertise is also given.

9.0 Project Advisory Committee (PAC)

This has been formed and its composition is at Annex L. No meetings have been held till now.

10.0 Lack of Equipment for Laboratories

10.1 The affected Laboratories are LAN / WAN, SDN / ATM, Opto-Electronics, IDN / ISDN, CCS 7, BISDN. This has led to the fully prepared sites at ALTTC lying unutilized for several months as well as denying training facilities for carrying hands-on training to supplement the theoretical training using these laboratories. **This has also led to non-utilization of 36.5 WM out of a total provision of 84 WM provided in the project.**

10.2 Domestic & International Satellite Laboratory is functional.

10.3 Digital MARR and IDN / ISDN are understood to be considered by the BSNL for dropping.

10.3 ITU has recently intimated in their communication of 19.01. 2001 to UNDP, that they have placed orders for the supply of LAN I WAN equipment. The provisional acceptance test was expected mid June 2001 and that the final acceptance test should take place end July, 2001. The availability of this equipped laboratory would strengthen ALTTC in various ways. This is a necessary item for ALTTC. The expert would be required just before the final acceptance and after the commissioning of the laboratory i.e June / July 2001 as it stands at present. This is an important component of the project. **This activity cannot be completed by April 2001.**

10.4 Regarding ATM Equipment, ITU has stated that this is a case of single bid. Negotiations are being carried out with the bidder and are expected to be completed by end January 2001. It is understood that the ITU has managed to obtain a price reduction of 10% for the Video Server. The DOT has given clearance to the ITU to go ahead and place the order. The delivery, installation, & commissioning and final acceptance tests is expected by the end of 2001. However this is a very vague target. **ITU has to inform when they will place the Purchase Order as well as the delivery date at site.** This laboratory is also essential as ATM Systems are being inducted into the public network of BSNL. Training as well as course development in this area is a must. If this laboratory is

made functional at least by the second half of 2001, it would be worth it. **This activity also cannot be completed by April 2001.**

11

10.5 Regarding **Telematics / B-ISDN** Equipment, there is no chance of this system being received during 2001. DOT / **BSNL has to decide whether they would still like to go ahead with this system or drop it. It is expected** that they will **communicate their decision to the ITU shortly.**

10.6 Regarding the **protocol analyzer**, which has been repaired and shipped by the supplier it is understood that it has been collected.

10.7 Regarding the ISDN Local Loop Test Instrument, ITU is yet to issue the purchase order. BSNL has to chase the placement of order by ITU. The delivery period for this equipment is 4 to 6 weeks after placement of purchase. This equipment may be received by the middle of 2001. The expert will **be required as** and when the equipment is available at site, say June 2001. This activity cannot be completed by April 2001.

10.8 Regarding **External Plant Equipment**, ITU expects that some of the procurement action can be partly completed before April 2001. They should clarify when the firm purchase order will be placed on the bidder as well as the delivery schedule for receipt of the equipment at site. **This requires close monitoring by the DOT.**

10.9 Regarding **Optical Fibre instruments**, the ITU should confirm the status of the purchase order and the delivery at site. **The services of expert will have to be timed with the receipt of the equipment.**

10.10 The Proxima Desk Top Projector is under dispute. There is no progress in this case. This was received in February 1997 and is 3 years old. It is suggested that the DOT **examine the possibility of getting this repaired locally.**

10.11 It is necessary for the DOT / BSNL to have higher level discussions with the ITU for equipment supplies immediately and finalize all actions. **The interaction between ITU and DOT**

needs to be improved. The present process of obtaining equipment through the ITU does not appear to be satisfactory.

11.0 Course Development

- 11.1 The Course Development Cell, under a General Manager has been established at BRBRAITT, Jabalpur. This cell has developed material for 51 weeks. This cell has to be equipped by full-fledged documentation facilities. The CTTC's and DTTC's, which train staff at the grassroots level, have to impart training in the local language.

12

This is being done, using the courses developed by the Course Development Cell. This is a specialized activity, which comprises combination of course development expertise and the faculty expertise. Course Developers are assets and are required to be retained at the training centers, ensuring their career and promotional aspects. A note on Course weeks for material developed at BRBRAITT, Jabalpur / ALTTC Ghaziabad is at Annex J

- 11.2 The aspect of **course development** was also examined for the Distance Learning System. This requires **additional skills**. Also, the faculty as well as the trainees require some special training to respond to this teaching system more effectively. However, this training could be easily imparted.

12.0 Fellowship

In Fellowship programmes, there are two parameters viz. areas and Work Months (WM). There are 106 areas and 247 WM. Out of targeted 106 areas, 102 have been utilized for foreign training. But the WMs consumed are only 100 against the project provision of 247. It appears that the fellowship periods in all the areas were drastically curtailed. This has been further affected by underutilisation of the truncated periods of fellowships. It is understood that the institutions giving training under fellowships took some time to understand the requirements. This had the effect of compounding both the period as well as the content. It has led inadequate exposure during some of the Fellowships. The duration provided by the training institutions also do not appear to be adequate to cover the course logistically.

However, even with these shortcomings, there has been cases where good results have been shown by the officers, who had gone on these fellowship training. **One such example is the introduction of web-based training at CTTC Chennai.**

These could be much more effective if the Work Months of Fellowships were fully utilized both in terms of contents and Work Months. This aspect will have to be examined by both BSNL and ITU. An analysis of fellowship programmes has been carried out (Annex O).

13.0 Usefulness of the Project

Wherever the actions under-taken under this project have fructified, they have borne excellent results. They have shown capability to deliver not only the desired results but have also opened new vista's

13

to be exploited. The experience gained from the Distance Learning System, experts visits, some of the fellowships, seminars and courses developed have yielded rich dividends.

14.0 Extension of the Project

14.1 In the tripartite meeting of 14.07.2000, the DOT had requested an extension of the project period by one year after it's expiry of 48 months from October 1996. However, the period was extended upto end April 2001 only. The ITU has also stated in its communications of 19.01.2001 to the UNDP that several of its actions will fructify only after April 2001. In the meeting held at UNDP on 22.01.2001, the representative of the DEA also stated that, while DEA was generally against extensions to a project, they were keeping an open mind on the issue in case of this project.

14.2 Taking into account the status of the project till now, including the inputs given by the ITU in their communication of 19.01. 2001 to the UNDP, the mission felt that there is no escaping a further but final extension. It was felt necessary to recommend a final extension upto 31 March 2002. This period would ensure that bulk of the remaining activities, such as commissioning of the LAN / WAN, ATM, Optical Fibre Equipment, External Plant Equipment in their respective laboratories would most likely be achieved. Also the testing and commissioning of the Protocol Analyzer and the ISDN loop test instrument was likely to be

completed in the second half of 2001. The arrival of experts, linked with the supply of equipment, need to be timed not only when these systems are available but also immediately thereafter to develop courses, conduct training classes and seminars. These could, most probably be completed in this period. The experts in new areas (Annex P), who have been de-linked from equipment supplies, could be used for seminars etc. during the period from September 2001 and March 2002. This could result in achieving almost all the project outputs. Hence a final extension of the project upto end March 2002 appears to be inescapable and desirable. However, the project should end March 2002.

15.0 Redeployment of Experts in New Areas

Considering the fact that all expert months are not likely to be used, due to non-availability of some of the equipment and the dropping of the Digital MARR System, and that there is a need to go into identified new technology areas and considering that the project is

14

quite flexible, there will be an advantage in re-deploying some of the provisions of expert months. However, keeping in mind the past experience, these should not be linked to any equipment procurement activities. The new areas have been identified by ALTTC vide Annex P.

16.0 Recommendations

16.1 Video Distant Learning (VDL) System

16.1.1 In view of the utility of VDL system in HRD training programmes, its capability and uses need to be further stepped up.

Justification

The VDL system, which was commissioned on 15-7-2000, is now fully operational. Twenty two batches of VDL courses have been conducted and 622 personnel have been trained till date. On the spot survey and opinion poll conducted by the team,

during its visit to BRBRAITT Jabalpur and involving the studio as well as all the six distant VDL classes, who were participating in a lecture, clearly showed that this method of conducting lectures, even during the short experience of 4 months, has made a perceivable impact on both the trainers as well as the trainees, with respect to conducting lectures as well as interaction between the lecturer and the trainees attending the lecture. The results of the survey and poll exercise are at Annex Q. This survey has also given clear-cut indications of the directions in which this system can be used to further increase its effectiveness. Since a major part of the system expenditure has already been incurred, expansion of this facility may be possible with relatively marginal investments and which will be a cost effective method of value adding to the present system with respect to both reach as well as depth.

Proposed Action Plan:

1. Widely publicize the availability of this facility.
 2. Conduct lecture courses as frequently as possible.
 3. Develop "Course Development" expertise using this facility.
 4. Develop course material oriented towards using this facility.
 5. Examine extending this facility to other Training Centres ensuring compatibility with the present system.
 6. Examine the feasibility & possibility of a few mobile class rooms, which can be hooked up to this system to serve the needs of far flung areas, as well as meet the training needs of any place in the country, which is not equipped with this facility.
- 15**
7. Examine the possibility of improving the camera & lighting arrangement at the studio / class rooms to improve the return video quality.

16.1.2 A series of intensive training for the faculty of all the RTTC's, CTTC's and DTTC's to be imparted through distance learning system in a time bound programme.

Justification

This system enables pooling of faculty expertise, irrespective of the geographical location of classroom where the classes are to be conducted. This will however be limited to those classrooms, equipped with VDL facilities. Starting with the present level of trained faculty, and recognizing the need to expand it further rapidly, the training faculties of the RTTC's, CTTC's and DTTC's need to be trained as a time bound programme. This enables minimizing the movement of faculty as well as making available trained faculty to the trainees. VDL facility was recently put to great use in a recent case where training was to be imparted at Bhubaneswar in the CDOT Technology and no trained faculty was locally available. This training class was conducted using the trained faculty available at BRBRAITT Jabalpur through this VDL facility. This will also ensure better availability of trainers for courses, as the periods for which they have to be made available for training purposes will be optimized.

Proposed Action Plan:

1. The training courses to be conducted by various RTTC's, CTTC's and DTTC's have to be pooled for availability of faculty expertise.
2. Those courses, for a start, where faculty expertise is not locally available, need to be conducted using VDL facility. It should be possible to impart training using VDL facility as a resource pool. BRBRAITT needs to be developed as a resource centre of further expertise in all the training areas.
3. To reduce movement of trainees, the number classrooms, equipped with such VDL facility should be increased to be available in greater numbers.
4. Trainees in far-flung areas also have an equally important need for these facilities. Moving trained faculty to these areas would quite expensive as well as difficult. Probably mobile classrooms could provide the answer.
5. BRBRAITT will also need to maintain an information bank on experts who can be called upon to deliver lectures on their expertise through VDL system at Jabalpur.

16

16.1.3 As far as possible, trainers trained should be retained at Training Centres

Justification

The expertise in conducting lectures and classes using VDL system, calls for higher skills and more training. The effectiveness of the course increases substantially with availability of trained faculty. As training strengths and expertise are paramount inputs for development in telecommunications, built with great effort and expense, retention of trained staff is very important. For this purpose however, their career interests need to be protected and ensured so that this valuable resource is not lost. Personal upgradation and personal pay compensation package may help in this direction and should be considered by the BSNL and policies laid down in this regard.

Proposed Action Plan:

1. Trained VDL faculty should be considered as experts.
2. While retaining them at the training centre, their career prospects should be kept in view so as to benefit them.
3. Payment of special pay or personal up-gradation is necessary in view of their specialized skills.
4. Policy covering this aspect should be laid down by the BSNL.

16.1.4 System hardware and software upgradation should be undertaken on periodic basis, in conjunction with the system supplier

Justification

The two important issues are the maintainability of the system and upgradation, with respect to both hard-ware and soft-ware. Similar VDL systems are in use abroad. The system supplier would have obtained feed back from his customers. Upgrading of system and newer and better versions need to be implemented by them, keeping view the feed back received by them. Regarding maintainability, some degree of training backed up by support from the system supplier is necessary. Annual maintenance contract (AMC) or any other long-term maintenance of the system with the supplier will ensure reliability and full time availability of the system.

Proposed Action Plan:

1. A dialogue should be initiated between system supplier and BSNL to take stock of feed back of the system performance.
2. The system to be assessed by BRBRAITT to make it more effective.
3. Maintainability and sustainability of the system should be ensured following the dialogue with system suppliers and working out suitable mechanism with them.
4. Some of the staff at Jabalpur should undergo some training in the system maintenance.
5. A list of essential spares should be worked out in conjunction with the system supplier so that it is available on the spot.
6. Entering into a long term AMC with the supplier needs to be considered.

16.1.5 Improving the effectiveness of the VDL system by integration of various audio visual aids

Justification:

Audio Visual Aids are employed as teaching aids to improve the effectiveness of the lecture process as well as increase the impact. Use of transparencies, video clips, power point presentations as well as Computer based training process are to be seen in the context of the VDL System. The team examined this aspect during its visits to BRBRAITT, Jabalpur, CTTC Chennai and DTTC Mumbai. The integration of all the above audio visual aids was discussed with the lecturer as well as the system expert at the studio at Jabalpur. It was established that it **was** possible to integrate these into the VDL System adhering to some standard practices.

Proposed Action Plan:

1. While the performance of the present VDL system is very good, some points of action are indicated for improving the system further based on interaction with the faculty & trainees. These involve the projection system itself, the classrooms, & standards for audio visual aids.

2. Guidelines for preparation of transparencies especially with respect to the overall size, number of lines of written matter, figures and diagrams, size of the lettering and colour contrast should be laid down.
3. The method of putting the transparencies in suitable frames to prevent them curling up and getting de-focused, should be standardized.
4. Faculty should be trained in use of video clips.

18

5. Video clips should be tailored for such presentations. Digital still cameras as well as movie cameras are a must for preparing video clips.
6. In the case of power point presentations, the standards for the type of font including the size and colour contrast should be drawn up and issued as guidelines for the faculty prior to their preparation of the Audio Visual Aids.
7. The integration of CBT courses with VDL system needs to be examined in more depth. If need be, up-gradation of hardware / software be obtained to upgrade CBT courses with the VDL system.
8. Training of faculty in preparation and presentation of these aids is necessary.

16.1.6 Establish standards for class rooms Justification

In order to ensure a minimum standard of quality of picture, audio, colour contrast and facilities, the class rooms should follow a standard specification.

Proposed Action Plan:

1. A standard specification for class rooms should be prepared as a timebound programme.

16.1.7 A new project be started, on a similar basis for establishing similar distance learning facilities at the remaining 12 RTTC's in a time bound programme.

Justification

The advantages of pooling of trained faculty resources have already been brought out even in the limited period of use of a few

months. This will further be augmented with more and more availability and usage of the VDL system. Providing a few mobile classes equipped with suitable facilities, which are compatible with the existing system, can extend the reach further

Proposed Action Plan:

1. Equip all RTTC's with VDL facilities.
2. Provide mobile VDL facilities to enable extension to rural and far-flung area.
3. Up-grade hardware / software for continued usefulness
4. Integrate CBT courses with the VDL system.
5. Formulate a new project involving the above points.

19

16.2 Equipment for Laboratories at ALTTC:

- 16.2.1** Equipment for laboratories at ALTTC, which can be ordered by the ITU, should be ordered without further loss of time so as to be commissioned by end June 2001. Suppliers should ensure that these equipment are in a working condition as installed at site, backed by suitable warranties.

Justification:

Infrastructure for LAN/WAN, SDH/ATM, BISDN/Telematics, IDN/ISDN (narrow band) + CCS 7, OPTO-ELECTRONICS are available for a long time and which are awaiting equipment which can be readily installed in them. Want of equipment is coming in the way of commissioning these Laboratories. and using them for training purposes. All actions on part of ALTTC have been completed. Currently, only theoretical courses in these areas are being conducted. Availability of equipment, which will enable supplementing theoretical courses with practical training, is essential.

Proposed Action Plan:

1. The delivery schedule of LAN / WAN Equipment, which has been ordered by ITU, should be firmed up so that following actions can be taken up.
2. C.Vs of installation team, identified for LAN / WAN has been forwarded o ITU. The selection of the expert and his programme should be finalized by the ITU in consultation with ALTTC.

3. Test schedule for LAN/WAN prepared by the proposed installer has been received by ALTTC. Comments have been forwarded to ITU.
4. The mission expert should be available at ALTTC, in final stages of testing, commissioning and system integration, after the receipt of equipment in working condition at ALTTC. During this period, the installer should be present and work in coordination with ITU / ALTTC.
5. Ordering of the ATM equipment by the ITU should be done very early.
6. Installation of ATM is to be organized by ITU as soon as the equipments are delivered in ALTTC.
7. ITU should inform BSNL whether negotiations are over and when the purchase order will be placed as well as the delivery schedule at site.
8. Expert for ATM should be arranged during the time of installation, testing and commissioning of the equipment at ALTTC.
9. The ITU should inform BSNL the status of the purchase order of the Optical Fibre Instruments and its delivery at site.
10. ITU has to chase the issue of the purchase order of the ISDN Local Loop Test Instrument and intimate the status to BSNL. The expert programme has to be coordinated with the receipt of the equipment at site.
11. The placement of firm purchase for External Plant Equipment needs to be expedited by ITU.

20

16.2.2 Equipment, which ITU is not in a position to order so as to be available by end June 2001 at ALTTC, should be reviewed by BSNL I ITU regarding further action.

Justification:

Since the procurement process for BISDN/Telematics, IDN/ISDN/ CCS 7, Opto-Electronics is delayed and ITU may not be in a position to order these equipments to ensure delivery by June 2001, there is a need for

BSNL to decide the future course of action. At the request of the team, an impact analysis caused due to this scenario has been carried out by the

ALTTC. Close monitoring of this situation is necessary.

Proposed Action Plan:

1. This issue needs to be taken up with the ITU at the BSNL Board Level immediately.
2. A two-member team comprising ranking officers from Training Cell (BSNL) and ALTTC should be deputed immediately to the ITU for discussions.
3. The terms of reference of the team, on basis of which a dialogue can be conducted with the ITU needs to be spelt out by the BSNL Board.
4. The team members should be empowered to take decisions immediately following discussions with the ITU within the gambit of the terms of reference.
5. The team should enter into a formal agreement with the ITU on completion of these discussions.
6. The funds for their travel etc. should come from this project.
7. In case, after discussions with the ITU, it is decided that procurement of some of the delayed equipment are to be dropped, it is recommended that the funds allocated for procurement of these items be made available to the ALTTC to enable them to procure these items directly, after reviewing the need for equipping these laboratories or reused for expert assistance in new areas.
8. Consequently it is recommended that the requirement of experts from the ITU and fellowships require to be reworked keeping these changes in view.
9. For tackling all these important issues, as well as adhering to the tight time frame, it is essential to provide undivided attention as well as monitoring the project & to ensure that it is satisfactorily terminated by 01-04-2002. It is recommended that a dedicated cell under a Director level officer and suitably equipped with computer, laser printer, fax

21

be made available to the National Project Director and his team at headquarters.

10. The BSNL should also review the activities it can carry out, as a consequence of the above changes.
11. BSNL should examine the possibility of getting the Proxima Desk Top Projector repaired locally.
12. On equipment supplies, the BSNL should take it up with the ITU at a higher level.
13. The method of interaction between the ITU and the BSNL needs to be strengthened.

16.3 Course Development

16.3.1 It is recommended that Course Development skills be further enhanced and skills required using the VOL system and other modern techniques be integrated with the current course development activities.

Justification:

Course Development Activity is a specialized activity having two components viz. expertise in course development techniques and expertise in course content for a particular faculty. Currently both of these activities are carried out for conventional classroom training. With the induction of VDL system, where the lecturer is at one location and is handling keyboards and interacting with trainees through the computer screen etc, the skills required for teaching and course development are of a higher order. To make the method of training more effective and meaningful, special emphasis on proper course development of VDL courses is essential, so that effective learning takes place.

Proposed Action Plan:

1. Course development skills for courses conducted using VDL system is of a higher order and needs to be developed along with normal course development activity.
2. Course development technique expertise, using VDL should be acquired by fellowships.
3. Audio visual aids, such as video clips, transparencies and power point etc. need to be integrated into this system.
4. Standards for the above audio visual aids need to be evolved to increase their effectiveness.
5. Computer based training programmes also needs to be standardized with respect to font size, colour contrast etc.

22

6. Course development process should include integration of practical classes along with theory classes. Combination of 3, 4 and 5 will make the course and training classes more effective and useful.
7. A programme to develop course development expertise in RTTCs needs to be taken up in time bound manner.
8. Since this is a very special and very important activity, special allowances be granted to Course Developers to act as an incentive to attract the best talent. This expenditure will be more than offset by the resultant impact.
9. Fellowship programmes needed to give boost to the course development activities should be worked out.
10. Trained faculty should be used in course development activity using VDL.
11. Course development cell should be equipped with all facilities like computer, high speed printer, CD writer, page maker etc.

16.3.2 Course Development in Regional Languages:

It is recommended that course development in various regional languages should be taken up as a time bound programme, taking into account the considerable effort already put up in this direction.

Justification:

One of the important objectives of this project is to train 300,000 restructured staff at various levels, including grass root level spread in all the states and union territories of country. This has almost been achieved. However, this is an ongoing process as the scenario is constantly undergoing a change.

The medium of instruction has to be the regional languages for better understanding and meaningful training of the restructured cadres. However, in order to ensure uniformity as well as ensure standards of teaching, these have to be developed from a single source. This source would be courses, developed by the course development cell of BRBRAITT, Jabalpur.

Proposed Action Plan:

1. Expertise available at RTTC, CTTC and DTTC needs to be harnessed for development of courses in regional languages.
2. The courses developed in the course development cell to be used as a basis for developing regional language courses.
3. This activity should be done jointly between the central course development cell and the regional training centres.
4. Those involved in such regional language course development should be paid an honorarium for this purpose.

23

16.4 International Experts:

16.4.1 It is recommended that the expert assistance needed in the remaining part of the project should be reworked, taking into account technology changes and needs of the telecom market.

Justification:

Provision of the ITU experts in implementing the project form an important component of the project. The total provision is 84 expert WMs. Out of this, experts visits have already been

utilized productively involving 47.5 WMs leaving a balance of 36.5 WMs. Past few years has seen some rapid changes in the telecom scenario. There have been technology changes such as the advent of the Internet, rapid increase of data traffic vis-a-vis voice traffic, rapid increase in mobile telephony using GSM, use of optical fibre technology for making very high bandwidth available. WLL has been adopted by the country in a big way. Apart from technology changes, the telecom market has also changed from monopolistic to open competition. The employees and management cadres need to be trained to survive in competitive environment. Hence there is a need to have a re-look at the balance expert WMs.

Proposed Action Plan:

1. The Experts visits are to be linked up with the availability and commissioning of equipment to be installed at ALTTC Viz. ATM, LAN/WAN, and Opto-Electronics and system integration along with the installation at ALTTC.
2. The report of members of the high level team from BSNL (Refer para 6.3.xiv of the executive summary) should indicate the equipments whose procurement may not takes place on account of unacceptable delays. The expert months saved on this account should be re-utilised in new and emerging areas like Voice over internet protocol, GSM, WLL Telecom Management, Fibre in local loop, DSL technologies, E-Commerce , Web technology etc.
3. The project managers, on account of experience gained in fellowship and study tour programmes, may be in a position to identify international experts in new and emerging areas. They make be asked to form a panel of experts, who could be called under the aegis of the ITU. The resources of the ITU must be used for providing expert services.

24

16.5 Chief Technical Advisor

16.5.1 The need or otherwise for the Chief Technical Advisor (CTA) needs to communicated by the BSNL to the UNDP / ITU.

Justification

Out of the total period of 24 months comprising 4 missions of 6 months each, only 12 months and 2 missions are completed. A decision has to be taken regarding the utilization or otherwise of the balance missions and periods.

Proposed Action Plan: -

1. The BSNL should examine this situation critically and reach a decision regarding the need for a CTA and it should inform the UNDP and the ITU immediately of its decision.
2. In case the CTA, who is also an expert, is not required, the expert months released should be examined by the BSNL in consultation with the ITU for alternative usage in new areas.
3. The selection process and the timing of these programmes should then be finalized quickly.

16.6 Project Advisory Committee(PAC)

16.6.1 This committee should meet as early as

possible. 16.7 Project Extension

16.7.1 In view of the various actions required and yet to be taken in this project, it is recommended that the project be extended from May 2001 up-to 31 March 2002.

Justification

The ITU is expected to be in a position to supply equipment and commission **as** well as provide expert support for some more laboratories only after April 2001 and during 2001. This should be utilized and capitalized.

The project **has** provided the VDL System equipment for laboratories, Course Development **at** BRBRAITT and ALTTC, services of experts, fellowships, study tours, seminars and workshops. However, in each of these sectors, some work remains to be done and benefits derived.

25

Since the project has already overshoot the provision of **48** months made in it and is currently valid till April 2001, **a** further and final extension of 11 (eleven) months up-to 31.03.2002 would enable maximum advantage of this project for benefit of the country. However there should be a finality of this extension and the project should terminate as on 01.04.2002.

Proposed Action Plan: -

1. Extend the life of this project up-to 31.03.2002.
2. Wind up the project as on 01.04.2002.
3. TPR meeting be held in April 2001 and October 2001
4. Identify progress and winding up activities at these TPR meetings.
5. Chief General Managers of BRBRAITT & ALTTC and DEA attend these meetings.
6. The BSNL should frame a detailed work plan for the extended period for action from May 2001 to end March 2002 immediately.

16.8 Two member high powered team from BSNL for discussions with ITU It is recommended that a two member team from BSNL, armed suitably to take on the spot decisions, be sent to ITU to discuss and settle the various actions to be taken in this project.

Justification

16.8.1 There are several issues for which a final view need to be taken very urgently. Exchange of letters and Faxes has not served the purpose. It was felt that direct discussions between the ITU and the BSNL at a high level is necessary. For this purpose, it felt that a two member high powered team from the BSNL visit ITU Geneva. The agenda for this meeting could be the following:

- a) Equipment
- Supplies b) Experts
- Visits c) Fellowships
- d) Study Tours e)
- Coordination f) New
- Areas

16.8.2.1 This team can be empowered to negotiate and reach an agreement on all the above issues at Geneva itself to enable action to be started immediately after discussions. Further slippages are not acceptable. Firm commitments and follow up action is the only solution. The Team can also finalize comprehensive and firm action plan in consultation with ITU for the period upto March 2002, in which all the activities are finding a place. There can be clearly identified milestones in this plan for

the purpose of monitoring and taking timely and corrective action, as and when they arise.

Proposed Plan of Action

- i. BSNL to form this team comprising the National Project Coordinator and the CGM ALTTC
- u. Delegate suitable powers for them to negotiate and
finalize action plan upto 31.03.2002 with the ITU.
- iii. The agenda for the team is suggested in 16.8.1 above. This can be considered for this purpose.
- iv. The visit of the team should be as early as possible.

17 Lessons Learnt

17.1 Project Flexibility and Manpower. Development

17.1.1 The flexibility element built in the project has been a major saving advantage. It has enabled absorbing major changes of structure, technology, environment and preparing restructured manpower by training. The massive manpower development program, undertaken under this project has ensured that bulk of the 300,000 staff would be better prepared to meet these massive changes. However, the training exercise is an on-going exercise and needs to be carried on as an ongoing programme.

17.1.2 It is also necessary to constantly assess the impact of the training programmes, not only after lectures, workshops and seminars, but also get an objective feed back from the field, where these trained staff are deployed. This feed-back will serve to improve the training content of the programmes as also serve to improve effectiveness of the courses developed in an on-going manner.

17.2 Manpower Policies

17.2.1 It is understood that the BSNL is preparing a policy paper on **Manpower Planning and Career development**. This is a laudable activity and all inputs necessary for this need to be made available to them. Perhaps the meeting between Director (HRD) BSNL and the ITU expert will provide useful

Inputs. This has since been held. It is understood that the ITU expert is preparing a paper for submission to him as well as meet him.

- 17.2.2 While freezing the staff levels, the injection of fresh blood while considering filling posts vacated due to retirement with a proportion of better qualified and directly recruited staff is a forward looking step.

27

17.3 Equipment Procurement

- 17.3.1 Keeping in view its experience in equipment supplies, when effected through the ITU, it would be better for the BSNL to consider undertaking direct procurement as it is already doing so for all its other requirements on a commercial basis for several years. This will avoid co-ordination problems.

17.4 Expert Services

- 17.4.1 ITU is the best source for getting expert services. While the BSNL may be able to identify experts in some of the areas, they would not be in a position to take on this activity themselves. In case the BSNL undertakes to directly procure equipment and systems, it will be necessary to time the requirement of experts with the availability of the equipment. This will require closer co-ordination with the ITU. Where BSNL has identified experts in any of the new areas, they may inform the ITU so that appropriate action can be taken by them.

17.5 Assessment of outputs from Workshops and Seminars

- 17.5.1 Since the BSNL, which is both a high technology as well as a huge commercial organization facing competition, with a manpower of about 300,000 and which provides telecom services in the infrastructure area, it is necessary to assess the impact of these workshops/seminars as an HRD improvement process in quantitative terms. For this, a close interaction and assessment between the field units and the training centers needs to be evolved on an on-going basis.

17.6 Closer interactions

- 17.6.1 During the remaining period of this project, two tripartite meetings have been suggested spaced April 2001 and October 2001. This may ensure closer monitoring and timely corrective actions.

17.7 **Study Tours**

- 17.7.1 The methodology of organizing study tours needs to be examined closely with respect to both duration and content.

17.8 Interaction between ITU and BSNL

- 17.8.1 Interactive sessions between ITU and BSNL are to be held frequently.