# UTTAR PRADESH JAL NIGAM INDO-DUTCH RURAL WATER SUPPLY AND SANITATION PROGRAMME-INDIA/UTTAR PRADESH

FINAL REPORT ON
STUDY OF OPERATION AND
MAINTENANCE COSTS

**MARCH 1993** 

A. F. FERGUSON & CO.
INDIA

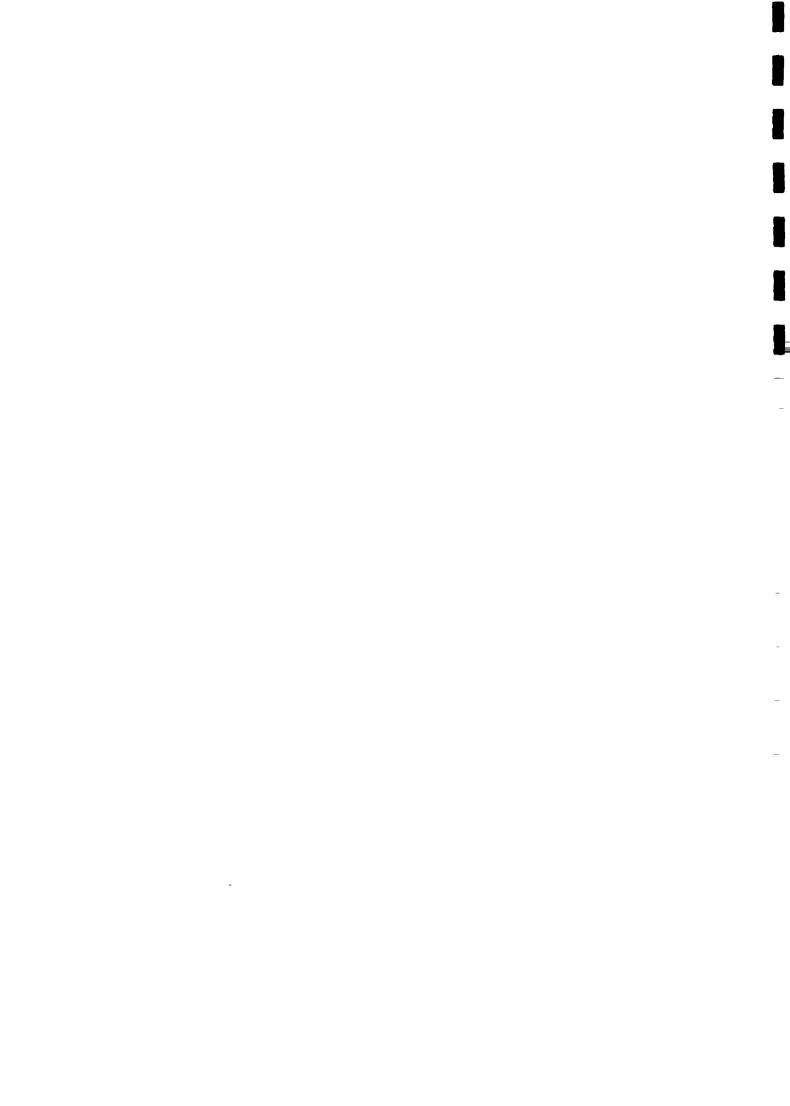
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# UTTAR PRADESH JAL NIGAM INDO-DUTCH RURAL WATER SUPPLY AND SANITATION PROGRAMME INDIA/UTTAR PRADESH

#### REVIEW OF OPERATION AND MAINTENANCE COSTS

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#### 1. INTRODUCTION

#### BACKGROUND

- 1.1 The Public Health Engineering Department (PHED) has been responsible for provision of water supply in the state of Uttar Pradesh from the year 1927 onwards. The PHED was renamed as the Local Self Government Engineering Department (LSGED). In June 1975, an autonomous corporation in the name of Uttar Pradesh Jal Nigam (UPJN) was formed to take over the functions of LSGED. At the same time, Jal Sansthans were formed for provision of water supply to the major cities/towns in the state.
- 1.2 The Kingdom of the Netherlands has been financing water supply projects in Uttar Pradesh from 1978 onwards with the basic objective of 'improvement of the health situation and the general living conditions in the rural areas of Uttar Pradesh (UP) through better drinking water supply'. The first sub project (SPI) included 22 piped water supply schemes in 724 villages in 3 districts using ground water as the source. The project was completed in 1986.

#### OPERATION AND MAINTENANCE

1.3 The schemes completed under SPI have been maintained by UPJN. The evaluation mission of May 1892 looked at the operation and maintenance (O&M) costs and mentions substantial lack of funds for O&M. The mission also felt the need for more detailed knowledge of costs and of the various components of operation, maintenance and repair costs of both piped and hand pump schemes under Dutch assisted projects.

#### NEED FOR THE STUDY

1.4 Considering the criticality of operation and maintenance of water supply schemes in providing better drinking water supply, the evaluation mission felt the need for a better understanding of the actual costs of O&M. The results of the study was proposed to be useful for

- (a) better financial justification of projects under preparation
- (b) taking steps to improve cost recovery and
- (c) better control over the cost elements.

Against this background the Review and Support Mission (RSM) approached A. F. Ferguson & Co. (AFF) to conduct the study to arrive at the actual cost of operation and maintenance of a few select schemes.

#### SCOPE OF WORK AND OBJECTIVES

- 4.

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- 1.5 The objective of the study is to arrive at the actual cost of O&M of two piped water supply schemes and of a group of hand pumps. The review and support mission to UP of November 1992 had decided on
  - one piped scheme each in Varanasi and Allahabad
  - group of hand pumps in Allahabad

for review of the OAM costs for three years.

- 1.6 The scope of work can be broadly defined as:
  - (1) Determining the actual operating hours of the piped schemes for each of the three years
  - (2) Review of the actual revenues for each scheme
  - (3) Determining the direct costs of O&M towards manpower, chemicals, power, materials etc.
  - (4) Determining the indirect cost towards manpower, vehicle usage and allocating a portion of the same to the scheme
  - (5) Providing for depreciation based on the estimated technical life of the schemes / hand pumps
  - (6) Arriving at unit cost of water produced
  - (7) Advise on procedures for better information on O&M costs of dutch assisted projects.

#### **EXCLUSIONS**

- 1.7 The following are excluded from the scope of work:
  - (1) Socio-economic survey of the benefitted population to study water usage patterns, ability to pay, actual water distribution etc.
  - (2) Development of an O&M model to provide for sensitivity analysis on critical factors like power tariff, inflation etc.

#### PURPOSE OF THE REPORT

- AFF commenced the study on 12th November 1992 at Lucknow, after an initial meeting with Mr. Robert Trietsch, member RSM to UP. Field visits were made to Varanasi and Allahabad. The preliminary findings of the study was presented to RSM on 23 November 1992 and to UPJN on 25 November 1992. A brief meeting was also held with the Secretary, Ministry of Urban Development on 25 November 1992.
- The report presents the results of the study carried out and does not intend to generalise the results of the study to evaluate applicability of the same to the whole of UP. The sample size of 2 piped schemes and a group of hand pumps is too small to do this generalisation.
- 1.10 This report presents AFF's findings and analysis of the O&M costs and is organised on the following lines:

Chapter	2	Executive Summary
Chapter	3	Background to UP Jai Nigam
Chapter	4	Approach to the study
Chapter	5	O & M Costs
Chapter	6	Analysis of O&M Costs
Chapter	7	Systems and procedures
Chapter	8	Conclusions.

#### 2. EXECUTIVE SUMMARY

#### BACKGROUND

The Government of Netherlands has been financing water supply projects in UP from 1978 onwards. The first sub project aimed at providing piped drinking water supply to 724 villages in 3 districts. This project was completed in 1986 and have been since maintained by UPJN. The Review and Support Mission [RSM] to UP felt the need for a better understanding of actual costs of Operation and Maintenance [O&M] of two piped water supply schemes and one group of hand pumps. A. F. Ferguson & Co. (AFF) were retained to conduct the study on review of O&M costs.

#### SCHEMES SELECTED AND CRITERIA

2.2 Based on the broad criteria defined by RSM, the schemes selected and reasons for the same are presented in the table below:

TABLE 2.1
SCHEMES SELECTED FOR REVIEW

SL.	SCHEME	ТҮРЕ	REASON FOR SELECTION
! ! 1. !	Saidabad, Allahabad	Piped	Smaller population 25 kms from city { rural }
2. :	Tikri, Varanasi	Piped	Larger population 5-6 kms from city [ semi-urban ]
: : 3. :	Group of hand pumps in Division VI, Allahabad	Hand pumps	Both Mark II/Mark III type of pumps maintained

#### BASIC PARAMETERS OF SCHEMES

2.3 The basic parameters of the schemes selected as originally envisaged and as of 1991-92 is presented in the table below:

TABLE 2.2

BASIC PARAMETERS OF SCHEMES SELECTED

	SAIDA	BAD	TI	KRI	HAND ;
PARAMETERS	AS ENVISAGED	1991 <b>-9</b> 2	AS ENVISAGED	1991-92	[NORM   PER   PUMP]
1. Source of water	Ground	Ground	Ground	Ground	Ground
	2 Tube wells	2 Tube wells		2 Tube wells	-
2. Villages covered	19	19	27	27	-
3. Population covered	35360 (2011)	34051	61560 (2011)	<b>5</b> 9000	250 <del>0</del>
4. Number of connections	,	890	1310 (2011)	1400	
5. Public stand post	212 8	238	219	219	
6. Production (KLD)	3888	2592	<b>3</b> 504	3866	10
7. LPCD	70 & 90+	45+	70 & 90*	45+	40
8. Pumping Hours	16 hours	(10.70 x	16 hours	(15.34 x 2)	-
9. Service Hours	8	6		; ; 6	~

NOTE: 9 50 families at 5 members per family, which is the maximum assumed in the design stage

- \* 70 LPCD for villages with less than 4000 inhabitants and 90 lpcd for villages with more than 4000 inhabitants
- + 1991-92 LPCD is calculated on water distributed

TABLE 2.3

ACTUAL DAM COSTS

1 /

(VALUE IN RS.)

; ; particulars		SAIDABAD		TIKRI			27 HAND PUMPS		
i <i>P</i>	ARTICULARS	1989-90	1980-91	1991-92	1989-90	1990-91	1991-92	1990-91	1991-92
1.	Direct cost	220100	231100	199400	27455Ø	352500	424565	7327	6973
2.	Indirect cost	69450	163250	968ØØ	62345	144035	8283Ø	735Ø	7179
3.	Depreciation	196133	196133	196133	310000	310000	310000	25032	25032
<b>:</b>	Total	485683	59Ø483	492333	646895	8Ø6535	817395	39709	39183
4.	Income collected	106000	108000	1828ØØ	94000	90000	124000	-	-
5.	Deficit	(379683)	(482483)	(329733)	(552895)	(716535)	(693395)	(397Ø9)	(39183)
; ; 6. ;	Cast recovery	21.82%	18.29%	33.03%	14.53%	11.16%	15.17%	-	-

NOTE . In the year 1990-91, arrears of salary were paid to staff and officers and that explains the reason for the large increase in indirect costs.

TABLE 2.4

#### REAL OAM COSTS - PIPED SCHEMES

(VALUE IN RS.)

PARTICULARS	SATDABAD			† TIKRI		
!	1989-90	1990-91	1991-92	1989-90	1990-91	1991-92
Direct cost	436318	488969	518786	<b>6</b> 813 <b>3</b> 5	754482	1017538
Indirect cost	69450	163250	96800	62345	144035	82830
Depreciation	196133	196133	196133	310000	310000	310000
TOTAL.	701901 = + 45 b	848352 + 44 ½	811719 +657	1053680 + 63%	1 <b>208517</b> ታ ኔን	1410368 + 73 %
Income Collected	106000	108000	162600	94000	90000	124000
Deficit	(595901)	(740352)	(649119)	(959680)	(1118517)	(1286368)
Cost recovery	15.10%	12.73%	20. <b>03%</b>	8.92%	7.45%	8.79%

The final scheme particulars were not made available and hence the following assumptions have been made:

- (a) the envisaged production in KLD for Saidabad 15 based on the release per minute (lpm) of the pumps and the expected pumping hours. For Tikri it is as per the questionnaire
- (b) the LPCD envisaged is as mentioned in the questionnaires.

#### ACTUAL OAM COSTS

2.4 The actual cost of O&N for each scheme for each year for which data was made available is presented in Table 2.3.

#### REAL OAM COSTS

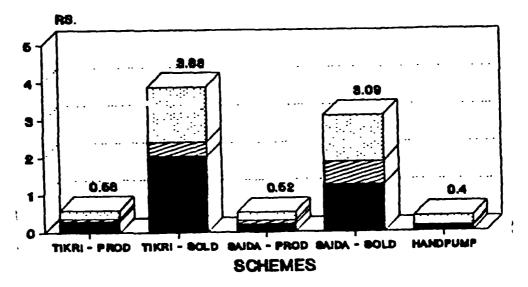
2.5 UPJN is presently not paying the power charges at the division level but the same is getting adjusted at the Government level. But power constitutes an important component of direct costs and hence to arrive at the real cost of O&M, power charges based on actual consumption and ruling tariff has been calculated and included. Table 2.4 shows the real cost of O&M for the piped schemes.

#### UNIT COST OF WATER

The total real O&M cost of water was analysed into the unit cost per kilo litre (KL) of production as well as per KL of water sold. The water sold is defined as the water billed to the private connections. The Exhibit 2.1 depicts the unit cost per KL of water produced/sold for the two piped schemes in 1991-92 and the unit cost per KL of water produced for the hand pumps in 1991-92.

#### EXHIBIT 2.1

### COMPARISON OF COST PER KL OF WATER 91-92



2.7 As can be seen from the table below the unit cost of water sold increases 5 to 6 times as compared to the cost per KL of water produced. This is due to the fact that a very small percentage of the population has private connections and this is the only available avenue for revenue generation.

TABLE 2.5

REAL UNIT COST OF WATER - 1991-92

(RS. PER KL)

	WATER PRODUCED	WATER SOLD	DEFICIT ON WATER PRODUCED	DEFICIT ON WATER SOLD
1. Saidabad	0.86	5.10	(0.69)	(4.08)
2. Tikri	1.00	6.70	~(0.91)	(6.11)
3. Handpumps	0.40	0.40	(0.40)	(0.40)

NOTE: Cost includes depreciation

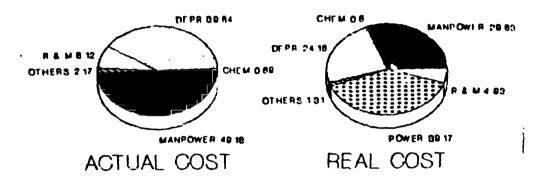
#### COMPOSITION OF COSTS

2.8 On a review of the real costs of water it can be seen that power charges account for 40-42% of the total cost in 1991-92 for the piped schemes. Manpower and depreciation costs together account for 41% in Tikri and 54% in Saidabad. The exhibits below present the composition of costs in 1991-92 for both actual and real costs.

#### EXHIBIT 2.2

COMPOSITION OF COST - SAIDABAD (1991-92)

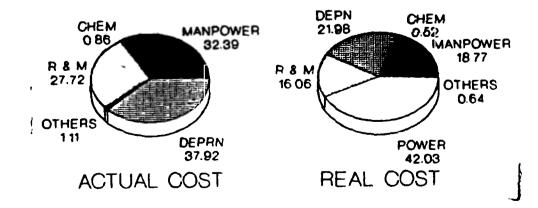
## COMPOSITION OF COST (%) SAIDABAD PIPED SCHEME 91-92



#### EXHIBIT 2.3

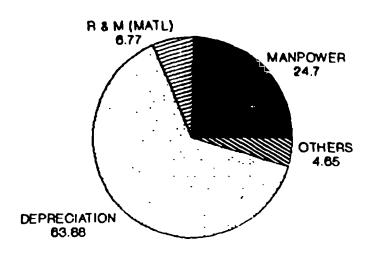
COMPOSITION OF COST - TIKRI (1991-92)

## COMPOSITION OF COST (%) TIKRI PIPED SCHEME 91-92



#### EXHIBIT 2.4

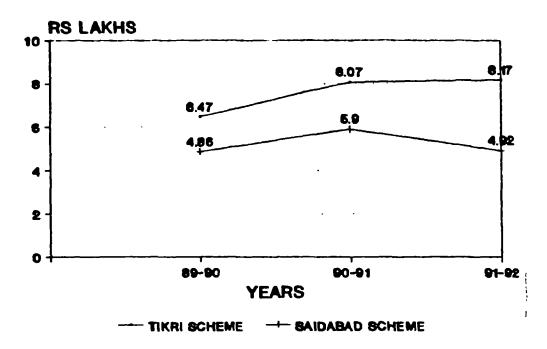
### COMPOSITION OF COST (%) KAURIHAR/CHAYAL HAND PUMP SCHEMES 91-92



#### TREND IN REAL COSTS

2.9 The total real costs of O&M in the piped schemes are showing an increasing trend essentially due to inflation, higher power costs and the revised tariff for power from 1991-92 onwards. In the year 1990-91, arrears of salary were paid to officers and staff, resulting in steep increase in costs. Exhibit 2.5 below shows the trend of costs for the piped schemes.

# EXHIBIT 2.5 TREND IN O & M COST (ACTUAL)



#### ANALYSIS OF COSTS/REVENUES

Real costs derived were further analysed into fixed and variable, in order to arrive at the contribution per KL of water produced/sold. It is interesting to note that operation of both the piped schemes results in a negative contribution meaning that for every KL of water produced UPJN is loosing money. The analysis further shows that the real O&M cost per KL of water produced is ranging from Rs.0.86/KL to Rs.1.00/KL while the tariff fixed by the UP Government is Rs.1.00/KL. But due to a very small percentage of water produced being actually sold, the cost recovery fall downs drastically. Table 2.6 below presents the analysis of costs.

TABLE 2.6

ANALYSIS OF COSTS = 1991-92

( VALUE IN RS. PER KL )

	TI	RI	SAID	HAND-	
ELEMENTS	PRO- DUCT- ION	SALES	PRO- DUCT- ION	SALES	PUMPS
1. Revenue demanded	0.15	0.98	0.17	0.99	-
2. Variable cost	0.59	3.92	0.38	2.28	0.07
3. Contribution	(0.44)	(2.95)	(0.21)	(1.29)	(0.07)
4. Fixed cost	0.41	2.77	0.47	2.82	0.33
5. Surplus/ (Deficit)	(0.85)	(5.72)	(0.68)	(4.11)	(0.40)

- 2.11 As can be seen from the above table the variable cost per KL of production in hand pumps is comparitively lower as compared to the piped schemes. This is based on the assumption of 250 people using the handpump at the rate of 40 lpcd. But according to available indications the average number of people using the handpump is around 150. In this case the variable cost per KL will go upto Rs.0.12, which is still much lower than piped schemes.
- The costs were further analysed into cost per person covered and cost per household and the following results were obtained from the same. The cost per connection in piped schemes is based on the assumption that the OAM cost for the entire scheme is borne by the population having private connections and hence a complete cross subsidy.

TABLE 2.7

ANALYSIS OF COSTS (1991-92)

(VALUE IN RS.)

	SAIDABAD	TIKRI	HANDPUMPS
REAL COSTS			
1. Total cost per person p.a. (All inhabitant)	23.84	23.90	8.00
2. Total cost per connection p.m.	76.00	83.95	2.42 [Household]
3. Variable cost per connection p.m.	33.97	49.20	0.43 (Household)
4. Fixed cost per connection p.m.	42.03	34.75	1.99 (Household)
ACTUAL COSTS			
1. Total cost per person p.a. (All inhabitant)		13.85	-
2. Total cost per connection p.m.	46.10	48.65	-
3. Variable cost per connection p.m.	4.06	13.90	· - !
4. Fixed cost per connection p.m.	42.03	34.75	i – i

The UPJN is charging Rs.15/- per month as the flat rate for unmetered connections, which does not even cover the variable real cost of O&M. The costs indicated above are total costs spread over the private connections including depreciation for the total scheme/handpump.

2.13 On an analysis of the additional costs required to support the private connections the following results are obtained.

TABLE 2.8

1991-92 ANALYSIS OF ADDITIONAL COSTS (REAL)

(VALUE IN RS.)

!	REAL COSTS	SAJDABAD	TIKRI
(1)	Total cost per population covered by private connections p.a.	32.35	33.79
(2)	Total cost per KI, of water - produced - distributed / sold	0.76 1.27	0.93 1.32
(3)	Total cost per connection pm	21.57	<b>22.5</b> 2
(4)	Variable cost per connection p.m.		14.36
(5)	Fixed cost per connection p.m.	10.78	8.16

As can be seen the cost per KL of water distributed is very close to the tariff being charged today from private metered connections. In the above working depreciation on the capital cost as well as the O&M cost relevant for production for private connections alone was considered hence removing the cross subsidy assumed in Table 2.7.

#### PROCEDURAL CHANGES NEEDED

The procedural changes proposed are essentially in the nature of better information generation from available records. It is important that the persons to whom information is made available have adequate authority to take decisions to remedy the pointers from the information.

#### SUGGESTIONS

- It is clear from the analysis of costs and revenues that cost recovery is very low and for every KL of water produced the UPJN is incurring losses. It is pertinent to note that even in the scheme design [ as informed to us ] only about 20% of the population are to be covered by private connections, implying an assumed cross subsidy if the scheme is to breakeven. The possible methods to improve the situation are given below but these are not based on a field survey and hence would have to be studied in that light.
  - (1) Educating the population on the need for 'safe' water and the need to pay for it.
  - (2) Involving the population right from planning of the scheme and eventually handing over the same for maintenance to the local bodies. The decision whether to take up a scheme should be made by the local bodies and there should be a undertaking that maintenance will be their responsibility. UPJN should just execute the scheme.
  - (3) Recovering a portion of the costs through a 'Tax' on all households in the village both for handpump and piped schemes. Since there seems to be a basic lack of inclination in paying for water, this may be an indirect way of recovery. The modalities for this 'Tax' needs to be worked out.
  - (4) Conducting a socio-economic survey before a scheme is approved. This is essential to get a feel for need for water, ability to pay, intention to pay and other social factors which have a strong bearing on a sensitive issue like provision of water supply. The survey should be a prerequisite for approval of the scheme, say if the scheme value is above a certain limit.

- (5) Due to lower cost recovery, lesser money will be spent on O&M of schemes, which will have a bearing on the quality of service and hence on the collection efficiency. The revenues and O&M costs of a scheme should be closely evaluated during the planning stage itself and the sensitivity of the same to critical parameters like inflation, tariffs, wastage factor etc. need to be studied. The results of the evaluation should justify taking up the scheme. Development of a O&M financial model may be taken up for the purpose.
- (6) Involving private contractors / voluntary agencies in maintenance of piped as well as hand pump schemes.
- (7) For existing schemes, there is a tariff fixed for public stand posts also. Efforts may be taken to recover these charges from the households, which may have a good bearing on the cost recovery. The responsibility of recovering the PSP charges may be given to the local bodies / voluntary organisation.
- (8) It is to be remembered that all assets have a life span. They need to be replaced or extended. It is important to recover depreciation charges also in order to ensure availability of funds for replacements/extensions. This has a long term impact on the efficiency of the organisation.
- (9) There is need for a closer monitoring of O&M costs at various levels through improved Management Information Systems (MIS).

#### CONCLUSION

2.16 It is near impossible for a commercial organisation like UPJN to achieve the twin objectives of providing service and also breakeven on costs. The situation on O&M is quite alarming and immediate steps are needed to ensure better recovery of costs. The experience gained in the past should become inputs for future planning through better evaluation of schemes and critical importance given to review O&M costs and revenues.

#### 3. BACKGROUND TO UP JAL NIGAN

#### STATE OF UP

3.1 Uttar Pradesh (UP) had population of 139 million in 1991 constituting 16.5% of India's population but with only 9% of India's total area. The population growth in UP during the period 1981-1991 is slightly higher as compared to the All India average (ie)

1981-1991

UP

2.29% p.a.

All India

2.14% p.a.

[Source: Report of the 1992 Evaluation Mission - June 1992]

71% of the population is said to be agriculture based as compared to 60% All India average, indicating a higher component of rural population.

3.2 The state is organised on the following lines:

DIVISIONS

13

DISTRICTS

63

TEBSILS

282

DEVELOPMENT BLOCKS

859

VILLAGES

112566

The population in each village is said to be relatively small as shown below:

(a) villages with less than 500 population 47% of total villages

14% of total population

population

Average 370

population per village

(b) villages with between 500-1999 population 44% of total villages

55% of total population

Average population per village

1545

[Source: Report of the 1992 Evaluation Mission - June 1992]

- 3.3 The state can further be classified as
  - Plains (55 out of 63 districts)
  - Bills Bimalayas
  - Rocky Bundelkand

#### ECONOMIC PROGRESS OF UP

3.4 The state of UP had a per capita income of Rs.3072 in 1989-90 which is lower than the All India figure by Rs.1180. The growth in per capita income has been lower than the All India growth as shown below:

TABLE 3.1
PER CAPITA INCOME

YEAR	UP	ALL INDIA	DIFFERENCE	* OF DIFFERENCE	) 
1980-81	1286	1630	344	27 <b>X</b>	)
1984-85	1812	NA	NA	NA	)   
1989-90	3072	4252	1180	38 <b>%</b>	,

[Source : Report of the 1992 Evaluation Mission - June 1992]

#### INTRODUCTION TO UPJN

Provision of water supply in the state of Uttar Pradesh (UP) was the responsibility of the Public Health Engineering Department (PHED) from the year 1927 onwards. The PHED was subsequently renamed as the Local Self Government Engineering Department (LSGED). Considering the importance of providing water supply, an autonomous corporation in the name of Uttar Pradesh Jal Nigam (UPJN) was formed in 1975 to take over the functions of LSGED. For the provision and maintenance of water supply in major towns, Jal Sansthans were also formed.

#### ROLE OF UPJN

3.6 UPJN is responsible for the following functions:

- Provision and maintenance of water supply in the whole of UP except the major towns
- Provision and maintenance of sewerage treatment facilities (except in major towns)
- Provision of sanitation facilities (except in major towns)

The state of UP is said to possess a higher level of surface and ground water as compared to the All India figures.

- 3.7 Inspite of the higher levels of water availability and the Government's thrust towards provision of safe drinking water, specially in the rural areas, many problems have been encountered in terms of
  - large area of the state as well as higher population growth
  - wide disbursement of the population (small villages)
  - different types of terrains (hilly, rocky, plains)
  - lower economic status of the population

But still a lot of work in creation of water supply assets have been done and the focus is now on better utilisation of created assets and resources.

#### ORGANISATION OF UPJN

3.8 UPJN is managed by a Board and is headed by a Chairman. It also has a Managing Director and a Finance Director. UPJN employs around 15000 staff in addition to work charge and non-muster roll employees. It has its head quarters at Lucknow and is organised into 6 geographical areas headed by Chief Engineers (CE). The organisation structure is as depicted below:

### EXHIBIT 3.1 ORGANISATION STRUCTURE

					*				
					CHAIRN	AN	1		
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40	CIRCLE;	<b>7</b> F	rical	EDF MANA			NAGER :		
	:	6 F	roject						
D	EE's	•							

135 construction, 25 electrical and mechanical, 19 project a addition special divisions.

NOTE: (1) Organisation structure as given by UP Jal Nigam

(2) Do not necessarily indicate grades/levels.

#### INDO-DUCTH CO-OPERATION

3.9 As part of the bilateral co-operation between Government of India and Kingdom of the Netherlands, UP has been getting assistance for water supply projects from the year 1978 onwards. At the time of commencement the objectives for the Dutch assistance were

"The improvement of the health situation and the general living conditions in the rural areas of UP through better drinking water supply."

The assistance is for the creation of the scheme and the responsibility for operation and maintenance is with UPJN and the State Government.

3.10 The Dutch Government has so far financed 6 schemes [ SPI and SP JIJ to SP VII ] covering various districts and types of achemes. The profile of the projects financed by the Dutch Government are given below:

TABLE 3.2
PROFILE OF DUTCH ASSISTANCE

	SJ., ;	PROJECT	TYPE OF SCHEME	COVERAGE	NUMBER OF SCHEMES	ALLOCATION IN DG ('000)
1	.     .	Sub Project (SP) I	Piped	724 villages in 3 dists.	22	<b>2214</b> 0
2	2. ;	SP III	Hand pumps	960 villages in 6 dists.	5830 pumps	11100
3	3. :	SP IV	Piped	237 villages in 2 dists.	13	17000
4	i. ;	SP V	Sanitation	13000 house- holds 32 schools	<del>-</del>	5210
	; ; ;	SP VI	i a. Hand pumps	1638 villages in 7 dists.	13589	<b>25</b> 00 <b>0</b>
1	1 1 1 1 1		b. Commun- ity parti- cipation		-	968
; ; ;	3 . <b>;</b>	SP VII	Pipe <b>d</b>	3605 villages	10	81400

DG = Dutch Guilders

Source: Report of the 1992 Evaluation Mission - June 1992

#### PROFILE OF OPERATION AND MAINTENANCE ( RURAL )

3.11 The UPJN operates and maintains 817 piped water supply schemes and about 295000 hand pumps in rural areas as at the beginning of 1991-92. The overall profile of OAM in rural areas and some of the key ratios are presented below. These are essential to present so as to compare the same with results from the study.

TABLE 3.3

QAM OF PIPED SCHEMES - UPJN (PLAINS)

Total schemes	817
Estimated cost at the time of construction [ Rs.lacs ]	19385
Total number of tube wells	1375
Total number of overhead tanks	1020
Length of pipeline in KMS	25820
Number of private connections	205519
Number of villages benefitted	9942
Population benefitted	10595449
	Estimated cost at the time of construction [Rs.lacs]  Total number of tube wells  Total number of overhead tanks  Length of pipeline in KMS  Number of private connections  Number of villages benefitted

NOTE: Source: (1) Report on the recommendations of the committee constituted for working out norms

(2) Figures are approximate

TABLE 3.4

KEY INDICATORS - PIPED SCHEMES - PLAINS - UPJN

;	PARTICULARS	VALUE (RS.LACS)		AS	AS AX OF PROJECT ; COST ;		PER PRIVATE CONNECTION P.N.			PER PERSON   BENEFITTED P.M.			
		1989-90					1991-92						1991-92
1.	Receipts	165	2Ø5	24Ø	Ø.85%	1.06%	1.24%	6.69	8.31	9.73	0.11	Ø. 16	Ø.19
2.	Total expenditure on OâM without centage	888	1116	2252	4.58%	5. <b>76%</b>	11.62%	36.00	45.25	91.31	Ø.7Ø	Ø.68	1.77
3.	Cost recovery	19%	18%	11%	! !	i   	; ; ;			<b>!</b>	! !		

NOTE: SOURCE: (1) Report on the recommendations of the committee constituted for working out norms

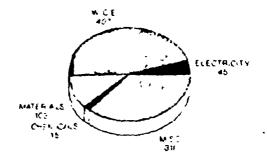
(2) 1989-90 and 90-91 are actuals while 91-92 is anticipated, costs exclude depreciation.

1 1

#### EXHIBIT 3.2

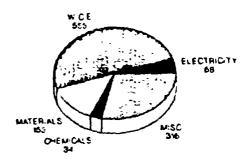
#### COMPONENTS OF OAM COST - PIPED - PLAINS - UPJN

COMPONEN'IS OF O & M COST (RS.LAKHS) PIPED SCHEME - PLAINS - UPJN - 89-90



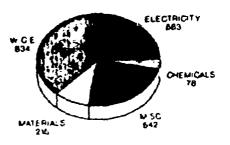
TOTAL Rs. 888 Likhs

COMPONENTS OF O & M COST (RS.LAKHS) PIPED SCHEME - PLAINS - UPJN - 90-91



TOTAL Ra.1116 Lakha

COMPONENTS OF O & M COST (RS.LAKHS) PIPED SCHEME - PLAINS - UPJN - 91-92



TOTAL Ra.2252 Lakha

3.12 The overall profile of O&M of hand pumps in rural areas by UPJN is given below:

TABLE 3.5

KEY INDICATORS - BAND PUMPS - PLAINS - UPJN

	1989-90	1990-91	1991-92
Number of hand pumps maintained [approx.]	219310	<b>25232</b> 5	296880
Total cost of OaM [ Rs. lakhs ]	604.10	806.88	945.39
Norms		# 8 5 •	,   
a. Families [ 50 per pump ]	10965500	12616250	14844000
b. Population [ 250 per pump ]	54827500	63081250	74220000
c. Kl. production [40 lpcd]	800481500	920986250	1083612000
Key Ratios		•	, , ,
a. Cost per house- hold per month	0.46	0.53	0.53
b. Cost per person per month	0.09	0.11	0.11
c. Cost per KL of production	0.08	0.09	0.09
d. Cost per pump p.a.	275.45	319.78	318.44
	pumps maintained [ approx. ]  Total cost of OaM [ Rs. lakhs ]  Norms  a. Families [ 50 per pump ]  b. Population [ 250 per pump ]  c. KI. production [ 40 lpcd ]  Key Ratios  a. Cost per house— hold per month  b. Cost per person per month  c. Cost per KI. of production d. Cost per pump	Number of hand pumps maintained [ approx. ]  Total cost of OaM [ Rs. lakhs ]  Norms  a. Families [ 50 per pump ]  b. Population [ 250 per pump ]  c. Kl. production [ 40 lpcd ]  Key Ratios  a. Cost per house-hold per month  b. Cost per person per month  c. Cost per Kl. of production d. Cost per pump 275.45	Dumps maintained   219310   252325

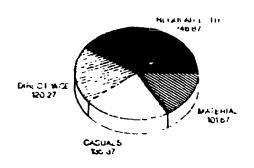
NOTE: Source: (1) Report on the recommendations of the committee constituted for working out norms

(2) Cost excludes depreciation.

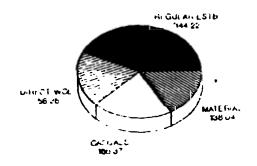
#### EXHIBIT 3.3

COMPOSITION OF O & M COST (RS.LAKHS)
HAND PUMP SCHEME - PLAINS - UPJN - .89-90

COMPOSITION OF O & M COST (RS LAKHS) HAND PUMP SCHEME - PLAINS - UPJN - 90-91

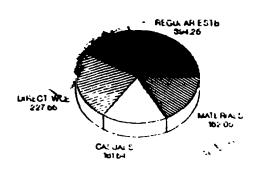


TOTAL Re.804.08 Lakhe



TOTAL Rs. 806.88

COMPOSITION OF O & M COST (RS.LAKHS) HAND PUMP SCHEME - PLAINS - UPJN - 91-92



TOTAL Re 946.39 Lakha

#### UP JAL NIGAM FINANCES

3.13 A sum of Rs.7000 million was spent during the seventh plan for water supply and sanitation in UP. Against this a provision of Rs.14500 million has been made for the eighth plan. The details are as given below, which indicate the importance being given to rural water supply.

TABLE 3.6

UP JAL PLAN ALLOCATION

( RS. MILLION )

HEADS	VII PLAN	x	VIII PLAN BUDGET	×
(1) Rural water supply	5570	80	10250	71
(2) Rural sanitation	230	3	150	1
Total	5800	83	10400	72
(3) Urban water supply	1090	16	3200	22
(4) Urban sanitation	110	1	900	6
Total	1200	17	4100	28
GRAND TOTAL	7000	100	14500	100

- Source: (1) Indo-Dutch rural water supply and sanitation projects UP India Report of 1992 Evaluation Mission June 1992
  - (2) Includes assistance under Netherlands Assisted Projects (NAP)

#### FINANCIAL POSITION OF UP JAL

- 3.14 The UP Jal Nigam essentially depends on the State Government through the Minimum Needs Programme (MNP) and the Central Government through the Accelerated Rural Water Supply Programme (ARWSP) for financing new projects. In addition funds are obtained under the NAP. For maintenance of schemes and hand pumps funds are received from
  - water charges recovery
  - percentage of plan funds allotted by government for O&M and
  - government subsidy.

3.15 UPJN has been continuously incurring deficits which essentially means that the cost of supervision of projects and maintenance is much more than the centage being charged. The following table presents the overall financial performance:

TABLE 3.7

UPJN OVERALL FINANCIAL PERFORMANCE

(RS. MILLION)

YEARS	INCOME	X INC.	EXPENDITURE	X ;	DEFICIT	% OF
1984-85	193	!	338	}	145	75
1985-86	305	58	<b>3</b> 95	17	90	29.
1986-87	316	4	447	13	131	41
1987-88	352	11	525	17	173	49
1988-89	407	16	664	26	257	63
1989-90	391	(4)	724	9	333	85
1990~91	326	(17)	948	31	622	191
Average	p.a.	11		30		

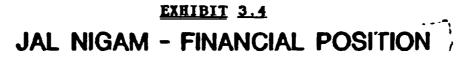
NOTE: Source: (1) Report of the 1992 evaluation mission June 1992

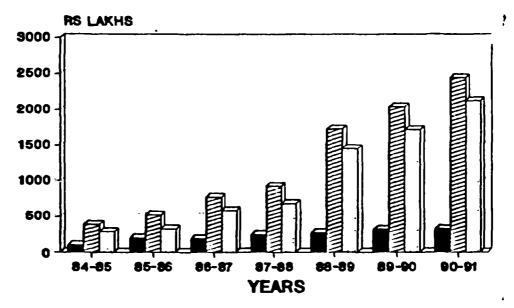
(2) Income excludes state government grants but includes centage.

As can be seen the rate of increase in expenditure is almost thrice that of increase in income resulting in higher percentage of deficits.

# OAM - FINANCIAL POSITION

3.16 The financial position on operation and maintenance is no different, with increasing deficits each year. The following exhibit presents the income, expenditure and deficit on O&M account.





INCOME EXPENDITURE DEFICIT

3.17 On an analysis of the costs the following are indicated:

- deficit as a % of income has been growing consistently in the last 4-5 years to stand at 657% in 1990-91
- the average increase in income is 37% during 1984-85 to 1990-91 as compared to a 88% increase in expenditure thus contributing to the growing deficits
- the cost recovery has fallen from about 26% in 1984-85 to 13% in 1990-91.

# STUDY ON OAM COSTS

Considering the alarming situation of UPJN finances on O&M, the RSM felt the need for a clearer understanding of the actual costs of O&M. This is essential to ensure that the resources created over a period of time are actually used effectively and the objectives set out for the assistance is met. As already indicated SPI provided 22 piped schemes in the districts of Rai Bareli, Varanasi and Allahabad. The RSM decided on a review of O&M costs of SPI schemes, since they have been in operation from 1986 onwards.

# SCHEMES SELECTED AND CRITERIA

The RSM decided on one piped scheme each in Varanasi and Allahabad and a group of hand pumps in Allahabad for review of O&M costs. It was decided to take only dutch assisted piped schemes, though it would have been difficult to adopt that for hand pumps. The final selection of schemes was based on population coverage and the distance of the scheme from the nearest city. Table 3.8 below shows the selection of schemes and the criteria adopted for the same.

TABLE 3.8
SCHEMES SELECTED

SL.	SCHEME	TYPE	REASON FOR SELECTION
1.	Saidabad, Allahabad	Piped	Smaller population 25 kms from city [ rural ]
2,	Tikri, Varanas)	Piped	Larger population 5-6 kms from city [ semi-urban ]
3. !	Group of hand pumps in Division VI	Hand pumps	Both Mark II/Mark III type of pumps maintained

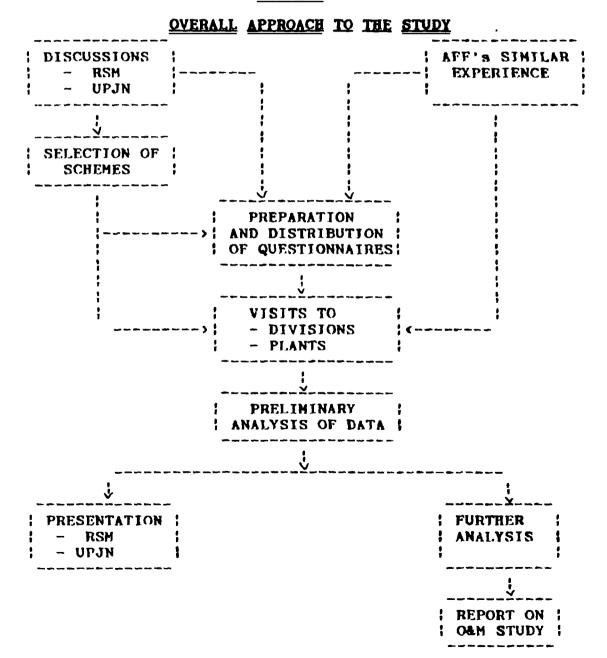
3.20 The schemes selected were discussed with RSM and agreed upon. Subsequent to this a detailed plan for conduct of the study was drawn up. The approach to the study, data collected and analysis of the same are presented in the subsequent chapters.

# 4. APPROACH TO THE STUDY

## BASIC APPROACH

4.1 The study was commenced on 12 November 1992 with discussions on the objectives of the study and the schemes to be selected with Mr. Robert Trietsch of the RSM. The overall approach to the study was based on the combination of our experience in conducting similar studies and actual field visits to divisions/plants to get a first hand feel of the operation and maintenance aspects. Exhibit 4.1 depicts the overall approach to the study.

EXHIBIT 4.1



4.2 Some of the critical steps in the approach are discussed in detail in the subsequent paragraphs. The critical assumptions in analysing the costs and revenues are also indicated under 'Analysis'.

### QUESTIONNAIRE

4.3 After discussions with RSM and UPJN, detailed questionnaire, one each for piped schemes and hand pumps, was prepared and sent to the divisions concerned for updation. The questionnaire is broadly organised as follows:

### Piped

- (1) Schemes detail at project completion time
- (2) Scheme/yearwise details [1989-90 to 1991-92]
  - (a) physical parameters
  - (b) financial parameters
  - (c) operation and maintenance costs

#### - various heads

- (3) General [ problems faced, suggestions ]
- (4) List of records maintained
- (5) Enclosures, if any

# Hand pumps

- (1) General [ Location, Make, Cost of purchase etc. ]
- (2) Norms for maintenance [ manpower, materials ]
- (3) Physical parameters
- (4) O&M Costs [ headwise ] for the pump
- (5) Division Old costs on hand pumps
- (6) General
- (7) Records maintained
- (8) Enclosures, if any

Copies of the questionnaire are enclosed as Annexure I.

## VISITS TO DIVISION/PLANTS

- Visits were made to the divisions responsible for O&M of the piped schemes and the group of hand pumps and in addition the pumping plants at Tikri. Varanasi and Saidabad, Allahabad were also visited. The focus of the visit, apart from helping UPJN divisions to update the questionnaire, was to get a first hand feel of O&M by talking to the people at the plant and division office. The visits were aimed at
  - (a) review of the log books / sheets maintained at the plant to derive / judge
    - service hours
    - number of hours of pumping for each tube well per day for each year
    - chemicals consumption per day
    - days on which plant/(s) not working
  - (b) review of other records to look at
    - type of complaints received & quickness of action taken
    - availability of chemicals
  - (c) getting ca feel of the time spent by each category of labour / cstaff on various activities of O&M by talking to them
  - (d) talking to the people in the nearest village, very briefly, on water availability, hours of supply, whether meters available, why not paying for water etc.
- The Executive Engineer (EE) in charge of the division and the Assistant Executive Engineer (AEE) in charge of the scheme were also met to understand the problems in O&M and to estimate the time spent by each of them on O&M of the scheme concerned. Records maintained at the division for expenditure was also briefly reviewed.

- 4.6 For hand pumps, details were essentially obtained through the questionnaires but wherever made available the cards maintained to record the repairs carried out and the cost of materials and casual labourers reviewed. In addition details on number of hand pumps maintained by the JE/AE/EE concerned were obtained to help in allocation of indirect manpower cost.
- 4.7 To the extent available, the annual balance sheet of the division, at least for the year 1991-92 was obtained to get an overall view of the total cost of O&M for that division.
- 4.8 The list of people met during the study is enclosed as Annexure II.

### ANALYSIS

- 4.9 The data obtained from the field visit and from the questionnaires was critically reviewed and analysed with a view to derive :
  - (a) Total cost of operation and maintenance [split into direct and indirect] as well as the revenues demanded and collected
  - (b) Composition of total cost in to manpower, power, chemicals, other expenses and depreciation
  - (c) Cost per KL of water produced, distributed and sold for piped schemes and cost per KL of water and per pump for hand pumps
  - (d) Contribution in total and per KL after splitting costs into fixed and variable elements
  - (e) Cost per connection and person covered.

The power charges that would have been due based on actual pumping hours was added to the actual costs to derive the real costs. The detailed analysis mentioned above was also carried out on the real costs.

4.10 The analysis of the data was carried out by using a financial model developed for this purpose on Lotus 1-2-3.

### **ASSUMPTIONS**

4.11 The assumptions made in working out the actual OaM costs are listed below:

# Piped Schemes

- (1) To arrive at the population covered by private connections, the average household size was taken as 8 for Tikri and Saidabad schemes. The balance population was presumed to be covered by Public Stand Posts (PSP).
- (2) The actual pumping hours were compiled from the log books available at the plant. If particular year's log book were not made available the previous years average was considered. Wherever log books were not made available for a month, the average pumping hours per month in each season was assumed to derive year / monthwise pumping hours. For this purpose the year was split into two seasons [ie.] summer and winter [ April to September and October Most of the data for the March ]. year 1991-92 was available for both the schemes.
- (3) Water distribution was difficult to assess due to lack of records in this regard. This was essentially picked up from the questionnaire but suitably adjusted for
  - lpcd in each category
  - revenue demand from private connections

For eg. - in the Tikri scheme while distribution to metered connections was given as 370679 KL, the actual revenue demand was only Rs.2.06 lakhs. In this case, the revenue demand was taken as the basis for arriving at water distribution. It has been assumed that water demand has been at Rs.1/- per KL (ie.) without the rebate for early payment.

- (4) Water sold excludes distribution through public stand posts.
- (5) The indirect manpower cost was arrived at on the following basis:

LEVEL	; TIKRI	SAJDABAD
	* ASSUMED	* ASSUMED
EF.	5	5
AE	; 20	; 15
JE	; 50	; 85
Admn.	; 5	5
staff	;	;
	;	;

These were based on discussions with respective level of people as well as indications in the questionnaire. The EE's X was also assumed for administration staff.

(6) The real power charges (which are not based on bills received or on the flat rate) were arrived at based on the following formula:

Number of hours of pumping x BP x 0.735 x rate per unit

The power tariff assumed are

1989-90	Rs.1.10/unit
1990-91	Rs.1.10/unit
1991-92	Rs.1.60/unit

Since proper data on the load factor of the pump was not made available, the same has been assumed as 1. But in most cases the load factor may be less than 1 and hence the power charges may be lower. The power charges worked out are as if for metered power connections. But meters have not been installed for both the schemes visited. The electricity board is charging only a flat rate per month, which also are not being paid.

(7) The price for bleaching powder was assumed at:

1989-90 Rs.3.75/kg. 1990-91 Rs.3.90/kg. 1991-92 Rs.5.13/kg.

- (8) Cost of O&M of vehicles was as mentioned in the questionnaire
- (9) Other administration overheads was allocated at 5%
- (10) Depreciation was provided on straightline method based on 30 years life.
- (11) The cost per connection is arrived based on the assumption that the population covered by private connections bears the total O&M cost of the entire scheme resulting in a complete cross subsidy.
- (12) Interest factor is not considered in the calculations since the capital and O&M cost is today funded from interest free sources. If interest is included the O&M cost would go up. The ruling risk free rate is about 10% p.a. and the bank rate for cash credit is around 18-20% p.a.

### **Band pumps** (HP)

(1) 27 hand pumps were chosen for a detailed analysis

15 in Kaurihar 12 in Chayal

- (2) Data for 1989-90 was not available in full and hence results are presented only for 1990-91 and 1991-92.
- (3) The salary of the work charged establishment (WCE) directly involved in hand pumps maintenance was equally distributed over the handpumps maintained by the group of WCE.
- (4) 33% of the JE's time was presumed to be spent on hand pumps maintenance and the proportional salary thus derived was distributed equally over the number of hand pumps maintained. Similarly 11% of AE's salary and 16% of EE's salary were assumed.

(5) The average number of hand pumps maintained in each year was arrived at based on the formula

HP at beginning of year + HP at closing of year

2

- (6) Cost per KN of vehicle was indicated in the questionnaire along with estimated number of kms run for each hand pump; which was the basis for vehicle expenditure per pump.
- (7) The administrative overheads were distributed along the same basis as the EE's salary.
- (8) Depreciation was arrived at based on straightline method with 15 years life.

# **PRESENTATION**

4.12 The detailed analysis of the data based on assumptions mentioned above was carried out and the preliminary results presented to RSM and the UPJN.

### REPORT

4.13 Further analysis, essentially in the nature of different assumptions on distribution, revenues from PSP's, proportional depreciation on private connections were carried out and the results are presented in this report. The detailed findings from the study are presented in the subsequent chapters.

# 5. OAM COST OF SCHEMES

# BACKGROUND

The data collected on the piped schemes and the group of hand pumps was analysed to arrive at the total cost and unit cost per KL. As explained in the previous chapter, further analysis on the components of costs and the nature of costs [ie.] fixed/variable was also carried out. This chapter presents the results of this analysis.

# SCHEME SPECIFIC INFORMATION

5.2 At the time of design of the piped schemes, various parameters were decided and the same are presented below:

TABLE 5.1

DESIGN PARAMETERS - PIPED SCHEMES

PARAMETERS :	SAIDABAD	TIKRI
1. Scheme completed in	1983	1983
2. Source of water	2 tube wells	2 tube wells
3. Villages to be covered	19	27
4. Population in design year (2011)	35380	61560
5. Pumping station and capacity	30 HP and 40 HP 1950 lpm and 2100 lpm resp.	45 HP and 40 HP 2100 lpm each
6. Capacity of over- head tank	650 KL	1200 KL
7. Length of distri- bution lines	59 kms	i   80 kms 
8. Number of metered connections(2011)	1458	1312

TABLE 5.1 (CONTD.)

PARAMETERS :	SATDABAD	TIKRI
9. Number of PSP's planned	212	<b>2</b> 19
10. LPCD assumed *	70/90	70/90
II. Anticipated O&M cost per KI. of water production	Rs.0.24	Rs.0.13
12. Total actual scheme cost [Rs. lakhs]	58.84	92.78

<sup>\* 70</sup> lpcd for villages with less than 4000 inhabitants and 90 for villages with more than 4000 inhabitants.

NOTE: Information as provided in the questionnaire. Actual design records not made available and hence not verified.

5.3 The hand pumps were planned with the following norms:

Number of persons per pump

1 pcd

Number of families per pump

50 6 5 per family.

(being the maximum assumed in the design stage)

5.4 The key physical parameters of the piped schemes as of 1991-92 as compared to the design parameters are presented below to enable evaluation of certain parameters like population and service hours, which seem to have undergone drastic changes.

TABLE 5.2

<u>KEY PARAMETERS PIPED SCHEMES</u>

	SAID	ABAD	TI	KRI ;
PARAMETERS	AS ENVISAGED	1991-92	AS ENVISAGED	1991-92
1. Source of water	Ground	Ground	Ground	Ground
water	2 Tube wells	2 Tube		2 Tube
2. Villages covered	19	19	27	27
3. Population covered	35360 (2011)	34051	615 <b>6</b> 0 (2011)	59000
4. Number of connection	i   1458  s (2011)	890	131 <b>0</b> (2011)	1400
5. Public stand post	; ; 212 s	238	219	219
6. Production (KLD)	388 <b>8</b>	2592	3504	3866
7. LPCD	70 & 90*	45+	70 & 90 <del>*</del>	45+
8. Pumping Bours	16 hours	(10.70 x 2)	16 hours	(15.34 x 2)
9. Service Hours	8	6	8	6

 <sup>70</sup> lpcd for villages with less than 4000 inhabitants and 90 lpcd for villages with more than 4000 inhabitants

NOTE: The final scheme particulars were not made available and hence the following assumptions have been made:

- (1) the envisaged production in KLD for Saidabad is based on the release per minute (lpm) of the pumps and the expected pumping hours. For Tikri it is as per the questionnaire
- (2) the LPCD envisaged is as mentioned in the questionnaire

<sup>+ 1991-92</sup> LPCD is calculated on water distributed

# ORGANISATION OF THE SCHEMES

5.5 The organisation structure for operation and maintenance of the schemes as of 1991-92 is shown below. The salary cost of these people have been allocated to the scheme based on the assumptions given in chapter 4.

TABLE 5.3
ORGANISATION

LEVEL OF PEOPLE	SAJDABAD	TIKRI	KAURTHAR HPS	CHAYAL HPS
INDIRECT				
1. Executive Engineer	1	3	1	1
2. Assistant Engineer	1	1	1	1
3. Junior Engineer	1	1	1	1
TOTAL	3	3	3	3
<u>DIRECT</u>			2*	4.
4. Pump operators	2	50		
5. Tax collector	1	1		
8. Filter	1	2		
7. Beldar	1	2		
8. Sweeper [ part time ]	1	-		
9. Pump attendants	5	~	_	
TOTAL	11	10	2	4
GRAND TOTAL	14	13	5	7

May include attendants also

Levels not available.

5.6 It is pertinent to note that inspite of Tikri being a bigger scheme with more private connections and distribution lines it has lesser number of direct labour as of 1991-92.

# ACTUAL COST OF OAM

5.7 The actual cost of O&M of the piped schemes and of the group of hand pumps is presented in Table 5.4. As can be seen the cost recovery is very low in the piped schemes and nil for the hand pumps. While the Tikri scheme is showing consistent increase in costs, Saidabad scheme is showing lower direct cost in 91-92, compared to 89-90. This is due to lower repairs cost even in absolute terms which may not be healthy for maintenance of the system.

TABLE 5.4

ACTUAL OAM COSTS

(VALUE IN RS.)

!	ARTICULARS		SAIDABAD			TIKRI			27 HAND PUMPS	
!	ARIICULARS	1989-90	1996-91	1991-92	1989-90	1990-91	1991-92	1990-91	1991-92	
1.	Direct cost	220100	231100	199400	27 <b>4</b> 55Ø	352500	424585	7327	6973	
2.	Indirect cost	69450	163250	95800	62345	144035	8283Ø	7350	7179	
3.	Depreciation	196133	196133	196133	310000	310000	310000	1 25Ø32	25Ø32	
	Total	485683	59Ø483	492333	646895	8Ø6535	817395	39709	39183	
4.	Income collected	108000	108000	182800	94000	90000	124900	-	-	
5.	Deficit	(379683)	(482483)	(329733)	(552895)	(716535)	(693395)	(397Ø9)	(39183)	
6.	Cost recovery	21.82%	18.29%	33.03%	14.53%	11.16%	15.17%	-	-	

NOTE: In the year 1996-91, arrears of salary were paid to staff and officers and that explains the reason for the large increase in indirect costs of piped schemes.

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| | | |

## REAL COST OF OMM

The real cost of O&M includes the actual cost and in addition the power charges calculated based on actual operating hours of the pumping station. In the real costs, power charges become a very important component as is evident from the increased direct costs. The real costs of O&M of the piped schemes are presented in Table 5.5 below:

# TABLE 5.5

### REAL OAM COSTS

(VALUE IN RS.)

PARTICULARS	!	SAIDABA	D	† TIKRI		
PARTICULARS	1989-90	1990-91	1991-92	1989-90	1990-91	1991-92
Direct cost	436318	488969	518786	681335	754482	1017538
Indirect cost	69450	; 163250	96800	62345	144035	82830
Depreciation	196133	; 196133	196133	310000	310000	<b>3</b> 10000
TOTAL	701901	848352	811719	1053680	1208517	1410368
Income Collected	106000	108000	162600	94000	90000	124000
Deficit	(595901)	(740352)	(649119)	(95 <b>9</b> 680)	(1118517)	; )(12863 <b>6</b> 8
Cost recovery	15.10%	12.73%	20.03 <b>x</b>	8.92 <b>%</b>	7.45%	8.79%

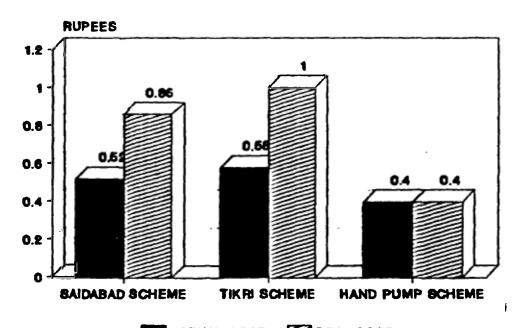
### COST PER KL OF WATER

The actual and real cost of water was distributed over the extent of water produced, distributed and sold to arrive at the unit cost of water. Since 1991-92 is a representative year, because of revised pay scales from 1990-91, the cost per KL of water produced in 1991-92 will be a good indicator of the costs. The following exhibit presents the cost per KL of water produced in 1991-92.

# EXHIBIT 5.1

# COST PER KL OF WATER PRODUCED - 1991-92

# **COST PER KL OF WATER PRODUCED 91-92**



ACTUAL COST REAL COST

5.10 Table 5.6 gives the actual and real cost per KL of water produced and sold. Two interesting inferences can be made from this table [ ic. ]

- (1) The cost per KL of water sold in piped schemes goes up 5 to 6 times as compared to the cost per KL of water produced
- (2) The deficit of Rs.O.40 in O&M of hand pumps is comparable with the actual cost deficit in piped schemes in terms of KL of water produced (Rs.O.35 and Rs.O.49). But the real cost of O&M in piped schemes per KL of water produced is much higher.

TABLE 5.6

OAM COST OF WATER PER UNIT (1991-92)

B & B COS: OF MIE

T[#:19		(CBS) PE PIPEE SC				PER PUMF) BANDPUMPS	(COST P	
o				DAS AC	21 MA	DPURPS	27 BAN	
	PRODUCED	<b>30</b> L0	PRODUCED	<b>20.</b> 0	4110	BITHOUT	MILH	#11MOC:
ACTUAL COST		•			ÐEP	<b>9</b> ( P	DEP	<b>●</b> [ F
BRDAC COST ELEMENTS								
(1) DIRECT COST	0.30	2.0	0.21	1.25	258.00	258.00	0.12	0.12
(2) INDIRECT COST	0.06	0.39	9 0.10	0.61	266.00	<b>266.0</b> 0	€.63	0.03
(3) DEPRECIATION	0.22			1.23	927.00		0.26	
TOTAL	0.58	3.6	ε 0.52	3.09	1451.00	524.00	0.40	0.15
(4) INCOME RECEIVED	0.09	0.5	9 4.17	1.02			0	0
(5) SURPLUS/(DEFICIT)	-0.49	-3.2	9 -0.35	-2.07			-0.40	-0.15
(6) RECOVERY & ON TOTAL								
· <b>C8</b> \$1	15.52	74 15.7	22.69	<b>133.0</b> 1	1		0.00	0.001
REAL COST								
GROAD COST ELEMENTS								
(1) DIRECT COST	●.7	2 4.	84 0.5	5 3.20	6			
(2) INDIRECT COST	●.●	6 <b>0</b> .	35 0.1					
(3) DEPRECIATION	0.2	n 1.	47 0.2	1 1.2	3			
101A:	1.0	6.	70 0.0	6 5.1	0			
(4) INCOME RECEIVED	•.0	<b>9</b> •.	.59 0.1	7 1.0	2			
(5) SURPLUS/(DEFICIT)	-0.9	91 -6.	.11 -0.0	19 -4.0	€			
(4) RECOVERT & ON TOTAL	L							
<b>COS</b> 1	9.	001 B	.814 19.	774 20.6	10t			

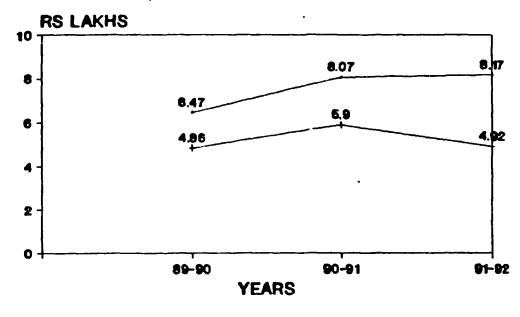
# TREND IN COSTS

5.11 The real costs have been showing an increasing trend essentially due to inflation, increase in manpower costs and the revised tariff for power from 1991-92 onwards. The salary scales were revised from 1990-91, arrears of salary were also paid and hence the steep increase in cost, during that year. Exhibit 5.2 below shows the trend in costs.

# EXHIBIT 5.2

# TREND IN COSTS

# TREND IN O & M COST (ACTUAL)



# COMPOSITION OF COSTS

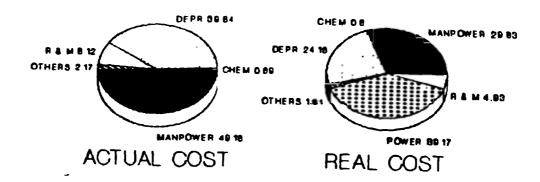
5.12 The major components of actual cost of O&M of piped schemes are

- manpower
- repairs and maintenance and
- depreciation.

These three account for more than 95% of the total costs. These three components also account for about 95% of O&M of hand pumps. In the components of real cost power charges make about 40% of the total cost. The components of actual and real costs for 1991-92 are presented diagrammatically in Exhibit 5.3 to Exhibit 5.5.

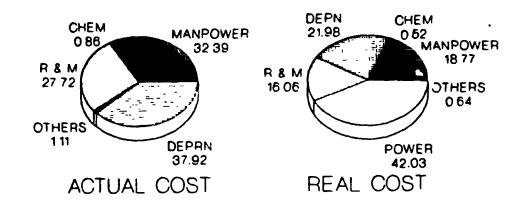
# EXHIBIT 5.3

# COMPOSITION OF COST (%) SAIDABAD PIPED SCHEME 91-92



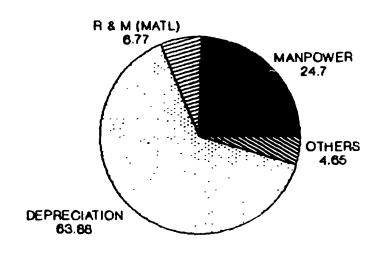
# EXHIBIT 5.4

# COMPOSITION OF COST (%) | TIKRI PIPED SCHEME 91-92



# EXBIBIT 5.5

# COMPOSITION OF COST (%) KAURIHAR/CHAYAL HAND PUMP SCHEMES 91-92



### ANALYSIS OF COSTS

The costs derived were further analysed into cost per private connection and cost per person covered by the scheme in both piped as well as hand pumps. The real cost per connection for the year 1991-92 comes in the region of Rs.77/- to Rs.84/- per month, which is about 5.5 times the minimum charge of Rs.15/- being levied today. This difference explains the cost recovery being as low as 15-20%. Table 5.7 gives an idea of the cost per person/connection for both types of schemes. As can be seen the cost per household in hand pumps (assuming 50 families per pump) works out to less than Rs.3 per month.

TABLE 5.7

COST PER CONNECTION/HOUSEHOLD - 1891-92

(VALUE IN RS.)

	SAIDABAD		TIKR	HAND :	
	ACTUAL COST	REAL COST	ACTUAL. COST	REAL COST	PUMPS COSTS
1. Cost per person pa (All inhabitants)		23.84	13.85	23.90	6
2. Cost per connection pa	553.18	912.04	583.85	1007.41	29
3. Cost per connection pm	46.10	76.00	48.65	83.95	2.42

The above figures have been worked out after considering the entire cost of O&M, including depreciation, being paid for by the private connections in piped schemes and by all households to be covered by the hand pumps. As far as piped schemes this would mean a complete cross subsidy with the population covered by private connections bearing the O&M cost for the entire scheme. Even if a recovery of Rs.3/- per household per month is made for hand pumps, an attempt can be made to recover the entire cost of O&M of hand pumps.

### Additional real cost for private connections

5.15 The additional real cost for private connections was worked out and the following results obtained:

TABLE 5.8

1991-92 ANALYSIS OF ADDITIONAL COSTS (REAL)

(VALUE IN RS.)

	REAL COSTS	SAJDABAD	TIKRI
(1)	Total cost per population covered by private connections p.a.	32.35	33.79
(2)	Total cost per KL of water - produced - distributed / sold	0.76 1.27	0.93 1. <b>3</b> 2
(3)	Total cost per connection pm	21.57	22.52
(4)	Variable cost per connection p.m.	10.79	14.36
(5)	Fixed cost per connection p.m.	10.78	8.16

The above was worked out on the following assumptions:

- (1) The design LPCD of 70 was used to derive the water distributed to private connections based on population covered. The wastage factor for each scheme was applied to arrive at water produced for private connections
- (2) The real variable cost per KL was applied to the water produced to arrive at the variable cost for private connection
- (3) Depreciation on capital cost was arrived at after giving weightage to design population to be covered by private connections and the lpcd of 70
- -(4) Fixed cost per person covered was used to derive fixed cost relevant to private connections.
- 5.16 As can be seen the real cost per KL of production for the private connections at 0.93 is less than the tariff charged today at Re.1/- per KL. Further the total cost per connection per month comes down to about Rs.22 as compared to Rs.76-Rs.83 if a complete cross subsidy is assumed.

# CONTRIBUTION ANALYSIS

The costs were further analysed into fixed and variable, in order to arrive at the contribution per KL of water produced/sold. It is interesting to note that operation of both the piped schemes results in a negative contribution meaning that for every KL of water produced UPJN is loosing money. The analysis further shows that the real O&M cost per KL of water produced is ranging from Rs.0.86/KL to Rs.1.00/KL while the tariff fixed by the UP Government is Rs.1.00/KL. But due to a very small percentage of water produced being actually sold, the cost recovery fall downs drastically. Table 5.9 below presents the analysis of costs.

TABLE 5.9
CONTRIBUTION ANALYSIS

( VALUE IN RS. PER KI. )

!	TI	(RT	SAID	HAND-	
ELEMENTS	PRO- DUCT- ION		PRO- DUCT- ION	_ :	PUMPS
1. Revenue demanded	0.15	0.98	0.17	0.99	-
2. Variable cost	0.59	3.92	0.38	2.28	0.07
3. Contribution	(0.44)	(2.95)	(0.21)	(1.29)	(0.07)
4. Fixed cost	0.41	2.77	0.47	2.82	0.33
5. Surplus/ (Deficit)	(0.85)	(5.72)	(0.68)	(4.11)	(0.40)

As can be seen from the above table the variable cost per KL of production in hand pumps is comparatively lower as compared to the piped schemes. This is based on the assumption of 250 people using the handpump at the rate of 40 lpcd. But according to available indications the average number of people using the handpump is around 150. In this case the variable cost per KL will go upto Rs.0.12, which is still much lower than piped schemes.

5.19 The costs were further analysed into cost per person covered and cost per household and the following results were obtained from the same.

<u>TABLE 5.10</u>

<u>COST ANALYSIS (1991-92)</u>

(VALUE IN RS.)

	SAIDABAD	TIKRI	BANDPUMPS
REAL COSTS			
1. Total cost per person p.a.(All inhabitants)	23.84	23.90	6.00
2. Total cost per connection p.m.	76.00	83.95	2.42 (Household)
3. Variable cost per connection p.m.	33.97	<b>49.2</b> 0	0.43 (Household)
4. Fixed cost per connection p.m.	42.03	34.75	1.99 (Household)
ACTUAL COSTS		, , ,	; ; ;
1. Total cost per person p.a. (All inhabitants)	14.46	13.85	~
2. Total cost per connection p.m.	46.10	48.65	-
3. Variable cost per connection p.m.	4.06	13.90	-
i 4. Fixed cost per connection p.m.	42.03	34.75	-

# PHYSICAL RESULTS

5.20 The analysis of costs was done based on the approach and assumptions indicated in chapter 4. The analysis also indicated certain key physical parameters, which are shown below. These resultant parameters have to be studied in relation to the assumptions. Further these are derived from the records available and hence may not reflect the actual situation on the ground in terms of water distribution, wastage, actual lpcd etc.

# **WORKINGS**

5.21 A set of outputs from the model showing the calculations and workings are enclosed as Annexure III.

TABLE 5.11

SCHEME SAIDABAD - PHYSICAL PARAMETERS

	1989-90	1990-91	1991-92
1. Pumping hours - Pump 1	4354	4354 <b>0</b>	3608
- Pump 2	3096	4776	4201
2. No. of days not worked		<b>- (</b> 1)	47/305
- Pump 1 - Pump 2	- (1) - (1)	- (1)	51/274
3. Production KI.			
( Total )	910836	1107396	946125
4. lpcd calculated	27.4		60
- domestic metered	NA ! 62	NA : 62	62
<ul><li>domestic unmetered</li><li>PSP</li></ul>	40	40	40
- rar	40	, 49 !	1 40
5. Average production	2495	3034	2592
per day in KL		1	
6. Chemicals	 	* 	
Number of days not treated	1 6 1	•	Full of March
	 	† † 1	192 no treat- lment was done
Average per day	• • •	6 3 5 6	2.75 kg/day
Per KL of production	1 9 1	† ! !	1.06 gm/KL
7. Composition of repairs			207
- Pumping station	34%	43%	48%
- Distribution system	61%	57%	52%
- Others	5%	; –	- i
8. Revenues (Rs.lacs)	, !	•	}
- Demand	0.92	; 0.97	1.58
<ul> <li>Collection (incl)</li> <li>arrears</li> </ul>	1.06	1.08	1.63

NOTE: 8 Since 1990-91 log books not made available, 1989-90 figures assumed

<sup>(1)</sup> Full details of daily pumping not made available.

TABLE 5.12

SCHEME - TIKRI - PHYSICAL PARAMETERS

;	1989-90	1990-91	
1. Pumping hours			!
- Pump 1	5162	5163	5884
- Pump 2	5902	590)	5317
2. No.of days not worked			-
- Pump 1	-	-	18/335
- Pump 2		-	43/335
3. Production KI	1394138	1384094	1411269
4. lpcd calculated			
- domestic metered	!	42	52
- domestic unmetered	51	7£	51
- PSP	59	48	43
5. Average production per day in KL	3820	3819	3866
6. Chemicals			
Number of days not treated			Full of April October and November 91 Inot treated
Average per day		8.19 kg	2.83 kg.
Per KL of production		2.14 gms	0.73 gms
7. Composition of repairs	!		9 3 3
- Pumping station	25 <b>%</b>	47%	40%
- Distribution system	57%	46%	54%
- Overhead tank	1%	2%	- ( <1%)
- Others	17%	5 <b>%</b>	6 <b>%</b>
8. Revenues (Rs.lacs)		- B B B	
- Demand	1.63	i 1.58	2.06
- Collection	0.94	0.90	1.24
- Efficiency	58%	<b>57%</b>	60%

# B. ANALYSIS OF OAM COSTS

- 6.1 The costs derived, as indicated in chapter 5, were further reviewed with a view to
  - compare the same across schemes and with UPJN as a whole
  - do sensitivity analysis on certain key parameters.

The results of this review are described in the subsequent paragraphs.

## COMPARISON ACROSS SCHEMES - PIPED

- 6.2 On a comparison of the real cost per KI. of water produced in 1991-92 the conclusions that may be drawn are:
  - (a) Saidabad scheme has been spending less each year on repairs resulting in lower repair cost per KL
  - (b) Tikri scheme has been operating at a higher capacity resulting in higher power charges and lower manpower cost per KJ. of water produced
  - (c) In other aspects of revenues/costs they present almost a similar picture.

Table 6.1 below presents the comparison.

REAL COST PER KL OF WATER PRODUCED - 1991-92

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
	SAIDABAD	TIKRT
1. Income demanded	0.17	0.15
COSTS	i !	i : :
2. Manpower	0.26	0.19
3. Power	0.34	0.42
4. Chemicals	0.01	0.01
5. Repairs	0.04	0.16
6. Others	0.01	0.01
7. Depreciation	0.21	0.22
TOTAL.	0.86	1.01
SURPILUS/ (DEFICIT)	(0.69)	(0.85)
	•	1

# COMPARISON WITH UPJN

6.3 The overall profile of O&M of piped and hand pumps schemes in UPJN has been presented in chapter 3. Some of the key parameters are compared here. Table 6.2 depicts the cost analysis of piped schemes in comparison to O&M of piped schemes in UPJN (plains).

PIPED SCHEMES - COMPARISON WITH UPJN (PLAINS)

!	بر هوا هي هو هو هو الله من الله هو الله الله الله الله الله الله ا	1	989-90		18	990-91			1991-9	2
:		UPJN (ACT- UALS)		}	UPJN (ACT- UALS)	ABAD		UPJN (EST)		TJKRI
1.	Revenue receipts									;
	a. % of project cost	0.85	1.80	1.01	1.06	1.84	0.97	1.24	2.77	1.34
, , ,	b. Per con- nection (Rs.pm)		10.54	7.09	8.31	10.53	5.86	9.73	15.22	7.38
,	c. Per person (Rs.pm)	0.13	0.28	0.16	0.16	0.28	0.13	0.19	0.40	0.18
2.	O&M Cost [without centage and depreciation			; ; ; ; ;						
	a. % of project cost	4.58	<b>8,6</b> 0	8.02	5.76	11.08	9.69	11.62	10.47	11.86
i.	b. Per con- nection (Rs.pm)	•	50.30	56.08	45.25	63.57	58.50	91.31	57.64 	65.50
	c. Per person (Rs.pm)	0.70	1.36	1.23	0.88	1.67	1.30	1.77	1.51	1.55
3.	Cost recovery %	19	21	13	18	17	10	11	26	11

The O&M cost as a % of project cost for Tikri and Saidabad (ie) 11.86% and 10.47% compares favourably with the UPJN average of 11.62%.

6.4 A similar review for hand pumps was also done and the results are as shown below:

TABLE 6.3

HAND PUMPS - COMPARISON - PLANS - UPJN

PARAMETERS	19:	90-91	1991-92		
FARAREIERS	UPJN	27 HPS	UPJN	27 HPS	
(1) Cost per household per month	0.53	1	0.53	1	
(2) Cost per person per per month	0.11	0.17	0.11	0.17	
(3) Cost per KL of production	0.09	0.15	0.09	0.15	
(4) Cost per pump p.a.	319.78	545	318.44	524	

Unlike in piped schemes, the cost for the 27 handpumps looks to be higher then that for UPJN as a whole which can be explained by the fact that a greater percentage of pumps may not undergo any repair or limited number of repairs. Further UPJN costs do not seem to include vehicle expenditure and allocated administrative overheads.

### SENSITIVITY ANALYSIS

# Recovery of PSP charges

As per the tariff fixed by the State Government an amount of Rs.3/50 per month per household is to be collected for usage of public stand posts. This rate is effective from 1/7/91. Earlier the rate was Rs.2/50 per month per household. Due to various reasons this charge is not being 'demanded' from households.

- 6.6 Sensitivity analysis was done on the working based on the following assumptions:
  - demand will be net rate (ie) after discount

Rs.2 per household/month
90-91 Rs.2 per household/month
91-92 Rs.2.50 per household/month

- collection efficiency of 50% of current demand.

The results obtained from the analysis are:

Tikri Cost recovery improves to 26% in 1991-92 on actual cost basis and to 15% on real cost basis

Saidabad Cost recovery improves to 43% in 1991-92 on actual cost basis and to 26% on real cost basis.

6.7 There is almost a doubling of the cost recovery if PSP charges are recovered at 50% collection efficiency. If depreciation is not considered the recovery would be much higher.

Tikri 42% on actual costs 19% on real costs

Saidabad

72% on actual costs 35% on real costs

### Normal lpcd distribution

- 6.8 The water distributed in the workings was based on the revenue demanded/ruling tariff for the private connections. A sensitivity of the workings assuming the lpcd as below was attempted:
  - domestic metered 70 - domestic unmetered - 100 - PSP - 40

Accordingly the water revenue demanded was also suitably adjusted at the ruling tariff.

6.9 The cost recovery in Tikri on income demanded/real costs goes up from 15% to 20% in such a situation in the year 1991-92. Similarly in Saidabad the cost recovery goes up to 19%. Further this brings down the wastage in Tikri and Saidabad to around 30%.

# <u>Depreciation only on private connections</u>

6.10 The depreciation charge relevant for the private connections only based on weightage for the population coverage and higher lpcd was allocated and costs worked out. The results are as shown below:

TABLE 8.4

COST - DEPRECIATION ONLY FOR PVT CONNECTIONS

(1991-92) (VALUE IN RS.)

SCHEME	PROI	PRODUCED		JD	DISTRIBUTED		
	ACT-	REAL.	ACT- UAI.	REAL	ACT- UAL	REAL	
Cost per KL				,		;	
Tikri	0.42	0.84	2.81	5.63	0.61	1.23	
Saidabad	0.38	0.72	2.25	4.26	0.65	1.23	
Cost per connection pm			   				
Tikri	35.28	70.57	7 # 1 !				
Saidabad	33.57	63.47	f 1 7 9				

6.11 Even with proportional depreciation for private connections the real cost per KL of water distributed is Rs.1.23 in Tikri and Saidabad against a tariff of Rs.1/- per KL. The real cost per connection is around Rs.70.57 per month in Tikri and Rs.63.47 per month in Saidabad.

# CRITICAL PROBLEMS

6.12 From the review of costs and revenues an attempt has been made to derive the critical problems which need to be addressed by UPJN. This list is not to be taken as an exhaustive one but only indicative. Further, a detailed analysis of the problems can be done only after a socio-economic survey of the population is carried out.

### Design related

- (1) The design provides only for 20-25% of households being provided private connections. The rest are to be supplied by PSF's. It is very difficult to justify the scheme based on revenues from only 25% of the population, unless a large cross subsidy had been assumed.
- (2) The decision on taking up the scheme to have been made by UPJN without a detailed analysis of the socio-economic conditions in the rural area concerned (ie) need for drinking water, water quality today, inclination and ability to pay for water, other sources of water, need water for other purposes etc. In effect the decision has been made without a request and hence the non-participation of the people concerned. This results in a feeling that the system is being owned by UPJN and not by the people/society.
- (3) The location of the plant itself is not sometimes central to the area to be covered, say for eg. in Tikri. This effects distribution to the tail end areas resulting in poor service. This observation is based on the drawing of the scheme and no further technical analysis has been carried out.
- (4) The population projections in both the schemes has been grossly underestimated, with the design population being reached halfway through the scheme itself.

# O&M related

- (1) It is observed from the log books that one of the two pumping plants are not function—\ ing sometimes for long periods of say a month. During the visit to Saidabad scheme, one of the plants was undergoing repair. For eg.; in Tikri, one of the pumps was not used from 5-12-91 to 1-1-92. Similarly in Saidabad the plant with 40 BHP was not used for the whole of October 1991. It is essential that preventive maintenance of these plants are done at regular intervals so as to avoid long breakdowns.
- (2) It is also clear from the log books that for days at a stretch treatment with bleaching powder is not being done due to non-availability of stock. This has a critical effect on the quality of the water and subsequently on quality of service to the consumers.
- (3) In Saidabad scheme, it was mentioned that no documents / records are kept of the chemical analysis or tests, if any, being conducted. This is also absolutely essential to ensure quality of water being distributed.
- (4) On the discussion with division officers and staff there is a feeling that due to non-availability of sufficient funds many repairs and maintenance jobs are getting postponed. In fact in Saidabad scheme we can see a fall in the absolute amounts being spent on repairs and maintenance. Even though it is difficult to estimate the extent of repairs to be carried out, the feeling is we are a year behind in repairs. The lesser importance to repairs will have long term consequences in terms of quality of service, collection efficiency etc.
- (5) The collection efficiency is in the region of 55-60% resulting in a reasonably huge accumulation of arrears. This might be re- lated to the poor service levels and even delays in carrying out repair jobs.

- (6) By not providing for power charges and depreciation, the expenditure on O&M is being understated with resultant implications on incorrect figures being reported. It is to be remembered that all assets have a life span and hence need to be replaced at some future date. It is very important that depreciation charge is provided for in the accounts.
- (7) The most difficult part of the study was to 'estimate' the distribution of water in total and to individual category of consumers. No records are available for the purpose. For private connections the income demanded might be a good indication. A study on water distribution was done at Tikri scheme by installing bulk meters at certain villages. This can give important pointers on water distribution, wastage and the problem locations.
- (8) There is very little of analytical ing on O&M costs on a regular basis to divisions and other administrative offices. The reporting today is restricted to copies of log books being sent to the divisions by Further, very little informatthe plants. ion was made available to us from the head quarters at Lucknow either due to nonavailability of records or difficulty in consolidation / analysing the available records. Timely information reporting very critical for control of O&M aspects and costs.

#### HANDPUMPS

- 6.13 The critical problems on hand pumps, as analysed from the questionnaires and records made available to us are:
  - (1) It is told to us that the hand pumps are actually used by around 125-150 people which is only 50% of the design population. This implies that
    - (a) either the distance to be covered for reaching the hand pump is much longer than envisaged or

(b) the design objective of two identified groups (socially weaker section and others) to have atleast one hand pump in each hamlet is being adhered to.

It may not be right to assume the common norm for all pumps. This may have to be revised based on the location concerned, dispersement of population etc.

- (2) Similar to piped schemes, there is very little information on actual usage of hand-pumps, water wastage, quality of water etc. An analysis of these aspects is critical for a comparison with piped schemes and for future decision making.
- (3) It is observed that for all most any kind of repair a team of 4-5 people are engaged on a daily basis. It is informed to us that for most repairs the time required will be in the region of 4-5 hours. This means that 4-5 people are engaged for 5 hours but get; paid for eight hours. The wages for the 5 people was Rs.120/- day of 8 hours and hence, on an average, Rs. 45/- is wages for which labourers may not be working. It is told to us that from 92-93 onwards the practice of engaging daily labour has been stopped.
- (4) Depreciation on hand pumps is not being provided, even for analysis sake. As indicated earlier this is essential to get the real picture on O&N costs.
- (5) It is observed that the 27 hand pumps put together were not working for 139 days, in 1991-92. This works out to 5 days on an average per pump per year.

- The problems highlighted above may be known by prople at various levels in UPJN. But the problem is quite alarming. In a few years, if the same trend continues, it would be difficult to operate and maintain many schemes without a huge subsidy from the government. The thinking now should be to make UPJN, over a period of time, a self sustaining institution at least as far as O&M is concerned. It is difficult for a commercial organisation like UPJN to meet the twin objectives of providing service as well as breaking even on costs.
- 6.15 Some suggestions to rectify some of the problems listed above are discussed in chapter 8. These suggestions have been made based on discussions with UPJN staff, review of records made available to us and our experience in conducting similar studies. As indicated earlier these are not made after a socio-economic survey and hence have to be studied in that light.

#### 7. SYSTEMS AND PROCEDURES

#### BACKGROUND

- One of the components of the study is to look at existing records maintained for O&M and to recommend changes, if any, for improved reporting on O&M costs and revenues. It is to be remembered that information availability is not an end in itself but a beginning for better decision making. Hence it is essential that people reviewing the information have adequate authority to take decisions.
- 7.2 A brief review of records maintained at divisions and at the plants was made and brief recommendations on information that needs to be captured is presented in this chapter. A much more detailed study needs to be done covering more schemes/divisions before recommendation on formats for the records/MIS can be made.

#### INFORMATION CAPTURE

7.3 The information that needs to be captured and source for the same are mentioned below:

!	Information	Source
1.	Number of days on which each pumping plant not working	Log book/sheet
2.	Actual operating hours of plant and service hours. Power availability	Log book/sheet
3.	Results of chemical analysis	Needs to be recorded in the log book itself
4.	Number of days on which bleaching powder not available	Stock register
5.	Extent of bleaching powder used on a daily basis	Log book/sheet

Information	Source
6. Complaints received classified into categories such as	Complaints register to be modified to include such a classification
<ul> <li>taps broken</li> <li>tap missing</li> <li>water not flowing</li> <li>chockages/leakage in pipelines</li> <li>water quality not good (blackish etc.)</li> </ul>	
7. Days within which each complaint was repaired and if delayed reasons there-for such as	Complaints register to be modified
- material not available - labour not available etc	
8. Other repairs carried out with details of	Repair register to be introduced, wherever not existing
<ul> <li>when problem detected</li> <li>nature of problem</li> <li>reason for the problem</li> <li>(old equipment, lack of maintenance etc.)</li> <li>when repair completed</li> <li>cost (material and labour</li> <li>days on which service could not be provided</li> </ul>	
9. Villagewise and assessee- wise demand raised, coll- ected and arrears	Demand register
10. Cost of labour directly involved in scheme main- tenance	Work register of scheme
11. Cost of casual labourers involved in repair and maintenance	To be separately recorded in works register

Information	Source
12. Record of inspections carried out by	To be introduced wherever not available
- JE - AEE - EE	
with time spent for each scheme and purpose of inspection	
13. Usage of vehicles to be identified to schemes	Log book to include this in a form such that compilation becomes easier
•	

## NOTE: (1) List may not be exhaustive

- (2) Where ever applicable similar records to be maintained for hand pumps also
- (3) Existing records should be continued.

#### RECOMMENDED MIS

7.4 The MIS that needs to be generated are essentially from the records to be maintained at the plant and at the divisions.

#### MIS

- 7.5 (1) Schemewise/plantwise number of days on which plant not working and % of total number of days in a period. The same compared with % in last 2 years for the same period.
  - (2) Actual average operating hours per day of the plant pumpwise for a particular period and average service hours per day. Same compared with data for last two years.
  - (3) Production in total KI. per pump and in total for the scheme for a period as compared with production during the same period in the last 2 years.
  - (4) Periodic reporting of actual distribution in KL to various points arrived at by installation of bulk meters and calculation of wastage in total and as a %. Result to be compared with last two similar studies.
  - (5) Schemewise number of days on which chemical tests not carried out and corresponding chlorine content in those days.
  - (6) Analysis of complaints received and arriving at % for each category in relation to the total number of complaints.
  - (7) Arriving at cost per KL of water produced, distributed and sold split into direct costs, indirect costs and depreciation.
  - (8) Comparing revenue demanded/received per KL with cost per KL.
  - (9) Analysis of costs into variable and fixed and deriving contribution per KL.

A similar MIS can be prepared for a 'block' of hand pumps.

- 7.5 An yearly analysis of these MIS can be done, which can be an important input to the budgeting exercise. These MIS can also point to major repairs that need to be carried out on schemes. Further inter-scheme comparison in the same division/circle can be attempted to decide on schemes where revenues have to improve or costs are to be controlled.
- 7.6 Circlewise, consolidated costs per KL of water produced, distributed and sold (for piped and hand pumps separately) should be sent to region and to Lucknow head quarters. These will be important pointers for tariff suggestions and for identifying problem locations for cost control.

#### 8. CONCLUSION

- 8.1 The report so far has presented the background to the study, actual and real cost of O&M and an analysis of the problems in O&M of rural piped and hand pump schemes. Even though this study does not intend to project the results of the study to UPJN as a whole, the problems may be similar.
- 8.2 In the following paragraphs a few suggestions to correct some of the problems facing UPJN have been recommended. As told earlier, these are not based on a socio-economic survey and hence have to be read in that light.

## OVERVIEW OF SUGGESTIONS

- 8.3 The suggestions are essentially aimed at
  - proper evaluation of schemes at design stage
  - critical importance to evaluation of O&M costs and revenues before scheme finalisation
  - better revenues through taxes
  - involving voluntary organisations / private contractors in O&M.

The objective should be to take up only those schemes which are financially viable and where O&M will be the responsibility of local bodies or voluntary organisations. These drastic steps are needed to make UPJN a self sustaining commercial organisation.

#### **SUGGESTIONS**

- 8.4 The suggestions for overcoming some of the identified problems are listed below. These have to studied more carefully and supported by field studies before a final decision can be taken.
  - (1) A comprehensive education effort to tell the population about the need for safe drinking water and the consequences if this is not available. The need to pay for water should also be emphasised.

- (2) The decision to have a rural water supply scheme (either piped or hand pumps) should be made by the population represented by the local bodies. The local bodies should then approach the UPJN for taking up the scheme. UPJN should take up the scheme only after an undertaking that maintenance will be the responsibility of the local body concerned. The responsibility of UPJN will be to execute the scheme and hand it over for O&M.
- (3) It may be essential to involve the people right from the planning and design stages of the project. This may be in identifying location of pumps, stand posts, hours of supply needed, area to be covered etc. A few persons identified at this stage from the population can later be involved in O&M.
- (4) Conducting a socio-economic survey before a scheme is approved. This is essential to get a feel for need for water, ability to pay, intention to pay and other social factors which have a strong bearing on a sensitive issue like provision of water supply. The survey should be a prerequisite for approval of the scheme, say if the scheme value is above a certain limit.
- (5) Due to lower cost recovery, lesser money will be spent on O&M of schemes, which will have a bearing on the quality of service and hence on the collection efficiency. The revenues and O&M costs of a scheme should be closely evaluated during the planning stage itself and the sensitivity of the same to critical parameters like inflation, tariffs, wastage factor etc. need to be studied. The results of the evaluation should justify taking up the scheme. Development of a O&M financial model may be taken up for the purpose.

- (6) Voluntary organisations may be asked to take up O&M of rural water supply schemes. These organisations may be asked to make each scheme self sustaining. Some of these organisations are available at village/district levels.
- (7) The O&M of rural water supply schemes may be given to private contractors who will also have responsibility for revenue collection. It may also be worthwhile to include the private contractors in design and construction of the schemes.
- (8) For existing schemes, there is a tariff fixed for public stand posts also. Efforts may be taken to recover these charges from the households, which may have a good bearing on the cost recovery. The responsibility of recovering the PSP charges may be given to the local bodies.
- (9) Recovering a portion of the costs through a 'Tax' on all households in the village both for handpump and piped schemes. Since there seems to be a basic lack of inclination in paying for water, this may be an indirect way of recovery. The modalities for this 'Tax' needs to be worked out.
- (10) It is to be remembered that all assets have a life span. They need to be replaced or extended. It is important to recover depreciation charges also in order to ensure availability of funds for replacements/extensions.
- (11) There is need for a closer monitoring of O&M costs at various levels through improved Management Information Systems (MIS).

(12) A periodic analysis of actual distribution at various points may be made for each piped scheme by installing bulk meters for a fixed number of days. This will also be useful in analysing wastage and the problems in the distribution lines.

#### CONCLUSION

a.4 It is near impossible for a commercial organisation like UPJN to achieve the twin objectives of providing service and also breakeven on costs. The situation on O&M is quite alarming and immediate steps are needed to ensure better recovery of costs. The experience gained in the past should become inputs for future planning through better evaluation of schemes and critical importance given to review O&M costs and revenues.

QUESTIONNAIRES

F

U.P.JAL NIGAM

REVIEW OF OWN COSTS
OF SELECT SCHEMES
(PIPES WATER SUPPLY)
OVESTIGMHAIRE

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# QUESTICHNAIRE

MANE OF SEE SCHEME :

DIVISION

SUB DIVISION

EECTION

#### I. GEMERAL:

- Scheme completed in the year :
   Number of years for completion :
- 2. Source of Water for the scheme :
  - (a) Tube well
  - (b) River (Specify name)
  - (c) Ponds
  - (d) others (Specify)
- If surface water, sterage capacity.
- 4. Final project parameters
  - (a) Supply areas to be covered.
  - (b) Villages to be covered
  - (c) Total population in the area
  - (d) Population merage
  - (e) Pumping stations and their especity:
  - (f) Overhead tanks and their storage capacity
  - (g) Length of distribution lines.
  - (h) Number of connections planned
    - metered
    - unmetered
  - (1) Mumber of public stand posts planned.
  - (j) Expected leveled water production (kld)

(k)	Expected level of wa distribution (kld)	ter	
(1)	Wastage anticipated (kld)		
<b>(=)</b>	Lpcd assumed.		
Final	project cost partic	ulars :	
<b></b>	Cost component		b. (lace)
1.			
2.			•
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
		Totals	<del></del>
•	ng pattern for the s ced By	cheme :	Amount (%. lac
<b>F2D 6</b> D			
Antic	ipated O&M Cost he time of project i		

( if any) YEAR b. (Lacs) Targetted benefits (a) Population coverage **(P)** Villages coverage Number of connection (c) (a) Number of stand posts 9. Manpower required for O&M of Total the scheme Level of person 51. Number of Desires Qualification No. persons II. SCHEME/YEAR SPECIFIC (details for the years 1989-90, 1990-91, 1991-92) 1990-91 1991-92 1989-90 A. PHYSICAL PARAMETERS 1. Villages covered 2. Population covered Population not covered 3. Total number of connections 4. (a) domestic metered (b) domestic unmetered industrial/commercial (c) (metered) (a) others - metered (e) others - www.etered Number of public stand posts. 5.

Cost of expansion of the scheme :

8.

Total b.

- 6. Number of working meters
  - (a) domestic
  - (b) industrial/commercial
  - (c) others.
- 7. Actual operating hours of the pumping station.
- 8. Rate of pumping per hour(ltrs) :
- 9. Calculated production (kl)

  (mention the number of days on which pumping station was working ----
- 10. Hours of supply maintained (or an average perday )
- 11. Water distribution (kl)
  - (a) domestic metered
  - (b) domestic unmetered
  - (c) industrial/commercial
  - (d) others metered
  - (e) others un-metered
  - (f) Public stand posts

NOTE: (Mention below the method of calculating the distribution)

12. Wastage of water (total Kl.)

Reasons (with %)

- (a) Mormal
- (b) leakages
- (c) Illegal tapping
- (d) others specify.
- 13. Estimation of lpcd.

# B. <u>PINANCIAL PARAMETERS</u> (in b.) <u>1989-90</u> <u>1990-91</u> <u>1991-92</u> REVENUES

- 1. Water charges demanded
  - (a) domestic metered
  - (b) domestic unmetered
  - (c) industrial/commercial
  - (d) others.

## Total :

- 2. Tariff structure (Enclose for the three years)
- 3. Revenues collected
  - (a) domestic metered
  - (b) domestic unmetered
  - (c) industrial/commercial
  - (d) others.

#### Total :

- 4. What would have been the demand if all domestic/ industrial connections were metered?
- 5. Arrears of demand
  - (a) demestic metered
  - (b) domestic unmetered
  - (c) industrial/commercial
  - (d) others.

#### Total :

What % of total arrears will be greater than 3 years.

6. Other income collected (specify by name)

COSTS			1990-91
BALARIBENMAGES			
Manpewer emple	yed on the		
- Direct			
- Indirect			
- Total			
Details			
LEVEL	Direct/ Indirect	Skilled/ Unskilled	% Time
	-		
Total	<u> </u>		
Note: 1. For o		rers, indicat	e no. of
Note: 1. For offer v  2. Skill	esual labou mich used.	rers, indicat	
Foto: 1. For of for v  2. Ekill  only  Actual manpower levels defined	easual labou mich used. led & unskil for WCE	·	
Foto: 1. For of for v  2. Ekill  only  Actual manpower levels defined	easual labou hich used. led & unskil for WCE or cost at lin (1)	·	
Note: 1. For offer v  2. Skill only  Actual manpower levels defined	easual labou hich used. led & unskil for WCE or cost at lin (1)	·	
Note: 1. For offer v  2. Skill only  Actual manpower levels defined	easual labou hich used. led & unskil for WCE or cost at lin (1)	·	

NOTE: 1. If for some levels the costs are directl included in some other head of account, kindly indicate actual most and also the fact that the same is included in another head of account and specify the head of account.

<u>1989-90</u> <u>1990-91</u> <u>1991-92</u>

(3) Actual direct mempewertest by sub head of account

SUB HEAD

Tetal-

(4) Extent of mempower cost as paid in each year.

Page 12 (C) POWER 1989-90 1990-91 1991-92 (1) Herse power of the pumping station. (2) Rate charged by EB (enclase tariff for lest 3 years) (3) Minimum amount chargeable by EB(&)per menth (4) Value of Bills received from EB (5) Power charges paid (6) Calculated power consumption based on hours pumped & HP. (7) Calculated power charges. CHEMICALS

(1) Quantity of chemicals comsumed:

Item Unit of Measure

(c)	CHEMICALS (CONTD)	1989-90	1990-91	1991-92
(2)	Actual cost of chemicals consumed - Total(%)			
	ITEM			
			,	
				·
(3)	Nerms for usage per KL of production			-
	ITEM			
			4	
			•	
			•	

ì

Page 14

1989-90 1990-91 1991-92

(4) Average prices of chemicals—east year

ITEM

(5) Stock of major chemicals in quantity as at 30/9 every year.

ITEM

Unit of Measure

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## REPAIRS AND MAINTEN AN CE COST

- (1) Specify various kinds of maintenance and repair carriedout and for each.
  - The material and quantity of the same required
  - The bine required to be spet by U.P.Jal Higam.

1989-90 1990-91 1991-92

(2) Actual cost of repairs and maintenance (Total (%)

SUB HEAD

METERIAL/ LABOUR

TOTAL:

Number of direct labour actually involved in R & M.

1989-90 1990-91 1991-92

(3) Number of repair job carried out.

١

SUB HEAD TYPE OF JOB

(4) Number of days on which water not supplied and reasons therefore (in percentage terms).

(5) Estimate of repairs and maintenance cost as budgeted (what should have been the cost)

(b) Estimate of repair works to be carried out a value terms as a date.

## EQUIPMEN TS/VEHICLES

1989-90 1990-91 1991-92

(1) Equipments/Vehicles used in operation & maintenance and numbers used.

(2) Year of procurement and cost of purchase of the above

(3) % utilisation of the above for 0 & M.

1991-92

(4) Cost of maintenance of these equipments/cars.

## - Total (b)

Cost per unit of usage (say hours for equipments and Kms.for cars).

## GBN ERAL

- (1) Difficulties faced by the scheme in 0 & M.

  (List down the problems)
- (2) Main reasons for the lev cost recovery.
- (3) Suggestions on methods to improve recovery.

(4) Other reserks.

\_b

## RECORDS MAINTAINES

Give a list of records maintained at various offices alongwith purpose for the same.

Kindly enclose the following (for 1989-90, 1990-91, 1991-92)

- (1) Budget decument
- (2) Amnual maintenance budget
- (3) Capital budget
- (4) Annual accounting statements
  - -P&L
  - B/S
- (5) Report on pilet studies on 0 & M.
- (6) Find project cost document

REVIEW OF O & M COST

OF HAND PUMP SCHEME

NOVERMBER 1992

## REVIEW OF O & M COST OF HAND PUMPS

G	BN	ER	ΑL

(1)	Lecation of the Hand Pump	
(2)	Type of Hand Pump	
(3)	MARK II/ MARK III	
(4)	Year of installation and mon	th
(5)	Original cost	Basic price k.
		Installation cost &.
		Total:h.
(6)	Proposed life of the pump :	
(7)	Cost funded by :	
	AT THE TIME OF INSTALLATION	
(1)	Area to be covered	
(2)	Pepulation to be covered	
(3)	Lpcd essumed	
(4)	Production assumed(KLD)	
	MAJOR REPLACEMENTS CARRIED O	UT AFTER INSTALLATION
(1)	Year of replacement	
(2)	Cost of replacement (Co.)	

## MAN POWER ANTICIPATED AS REQUIRED FOR MAINTENANCE

Level of person Indirect/direct Time PGR DAY

Person Indirect/direct Time PGR DAY

1 N HON RS

## SPARE PARTS REQUIRED FOR MAINTENANCE-NORMS

METERIAL/SPARE

HOW OFTEN REQUIRED TO BE RE-PLACED

TYPE OF REPAIR

TIME REQUIRED TO BE SPENT FOR REPAIRS (HOURS TOBE SPENT)

TYPE OF REPAIR

LEVEL OF PEOPLE Coolers / South Chy HOURS TO BE SPEAL

(Prevetive maintenance should be included as a type of repair)

## PHYSICAL PARAMETERS 1991-92 1989-90 1990-91 (1) Population covered (2) Lpcd assumed/expected (3) Water production (KLD) (4) Expected wastage of water as a % of production. (5) Number of days on which has dough was not working. (6) Reasons for non-working of the pump: (percentage of total above)

- (7) Total number of handpump:
  - within the division
  - within the jurisdiction of the JE concerned.

**REASONS** 

<u>1989-90</u> <u>1990-91</u> <u>1991-92</u>

O & M COST

## MAN POWER

(1) Manpower employed on the pump:

LEVEL DIRECT/ SKILLS/
IN DRECT UN SKILLSEO

(2) Actual hours spat by the direct manpower for this handpump (from log book and job card)
I includes both repair and maintenance)
LEVEL •

(HOURS SPENT)

- (3) Total menhours available to the direct labour tobe spent on a group of hand pumps.
  - For casual labour indicate mandays for which used in each year.

>

Manpower ( ( )

1989-90

990-91

1991-92

Cost of Manpower -Total &s.
LEVEL

INDIRECT

## DIRECT

## <u>MATERIALS</u>

Number/type of repair job carried out on the pump: TYPE OF REPAIRS (Number of repairs)

(2) Spareparts used in repair <u>1989-90</u> <u>1990-91</u> of the Hand pump: SPARE PART

1991-92 (Numbers used)

(3) Cost of Spare parts used SPARE PART

(Costs) 🤝

(4) Average Prices of Spare 1989-90 1990-91 1991-92
Parts
SPARE PART

### VEHICLES USED

- (1) Extent of Kms run for maintenance of the pump
- (2) Average cost per km of running the vehicle
- (3) Cost of vehicle for hand pump maintenance

(hours spent)

(1) Extent of time spent on inspection by various levels of people to LEVEL

(2) Total time spent by various levels of people in all hand pump maintenance <u>LEVEL</u>

## TOTAL MAINTENANCE COST FOR HAND PUMPS IN THE DIVISION

(1) Direct Cost of maintance 1989-90 1990-91 1991-92

DIRECT COST

a)

B)

c)

d)

(2) Total value of spare parts
parchased for hand pumps
maintenance

#### CENERAL

(1) Number and type of complaints received on the handpum<sup>†</sup>
TYPE OF COMPLAINT

(2) Problems faced in maintenance of hand pumps.

(3) Suggestions for improvement

(4) Records maintained for hand pump maintenance at various offices (indicate name of record and purpose)

LIST OF PEOPLE MET

# ANNEXURE II

# UP JAL NIGAM - OAM STUDY LIST OF PEOPLE MET

1.	Mr.	Robert Trietsch	Member, RSM
2.	Mr.	R. S. Singh	Managing Director, UPJN
3.	Mr.	Y.N. Chaturvedi	Chief Engineer, South + 'Dutch Co-ordinator
4.	Mr.	V.P. Gupta	Chief Engineer at Lucknow
5.	Mr.	S. K. Singh	SE, JJ, Circle, Allahabad
6.	Mr.	R. K. Sharma	SE, VII Circle, Varanasi
7.	Mr.	Mahendra Singh	EE, Construction Division, Allahabad
8.	Hr.	N.C. Gupta	EE, Additional Construction Division, Allahabad
9.	Mr.	J.B. Bats	EE, VI Construction Division, Allahabad
10.	Mr.	S. K. Srivatsava	EE, Maintenance Division, Varanasi
11.	Mr.	P. N. Shukla	AEE, Saidabad Scheme, Allahabad
12.	Mr.	R.P. Sharma	JE, Saidabad plant
13.	Mr.	S.K. Verma	Allahabad AE, Hand pumps, Allahabad
14.	Mr.	D.M.P. Singh	JE, Tikri, Varanasi
15.	Mr.	Panna Lal	Divisional Accountant, Tikri, Varanasi

SET OF OUTPUTS

UP JAL NIGAN INDO DUTTCH PROJECT

REVIEW OF OWN COSTS

PIPED SCHEME: SAIDABAD

	i.	TOTALS				t COST	PER KL OF	WATER PRODUCED	t COST F	ER KL OF W	MATER DISTRIBUTED	: COST P	ER KL OF N	ATER SOLD	COMPO	SITION OF	TOTAL
PARTICULARS	:19 <del>99-9</del> 0 x INC	1990-91	1 INC	1991-92	X DC	1989-90	1990-91	1991-92	11 <del>997-9</del> 0	1990-91	1991-92	:1 <del>707-7</del> 0	1990-91	1991-92	1989-90	1990-91	1991-92
SUMMARY OF ACTUALS	†					 !			} !						1		
(1) Direct cost	220100	231100	5.001		-13.72%		0.21	0.21	i 0.44	0.44	0.36	1 1.46	1.50	1.25		39.14X	
(2) Indirect cost	69450	163250	135.063	94800	-40.70%		0.15	0.10	1 0.14	0.31	0.18	1 0.46	1.06	0.61	14.30%	27.45%	
(3) Depreciation	196133	196133		196133		0.22	0.18	0.21	1 0.39	0.37	0.36	1 1.30	1.27	1.23	1 40.38%	33.223	39.84
(4) Interest	;		ERR		ERR	<b>:</b>			- {			1			<b>!</b>		
Total	485683	590483	21.58%	492333	-16.62%	0.53	0.53	0.52	0.96	1.12	0.89	3.22	3.84	3.10	100.00%	100.00%	100.00
(4) Income demanded	1 92000	97000	5.43X	158000	62.89%	0.10	0.09	0.17	0.18	0.18	0.29	0.61	0.63	0.99			
(5) Income collected	106000	108000	1.891	162600	50.56X	0.12	0.10	0.17	1 0.21	0.20	0.29	: 0.70	0.70	1.02	1		
(6) Other sucone	1		ERR		ERR	ŧ			1			}			<b>!</b>		
Total demended	: ! <b>92000</b>	97000	5.43%	158000	62,89%	. 0.10	0.09	0.17	0.18	0.19	0.29	0.61	0.63	0.99	:		
Total received	106000	108000	1.891	162600	50.561	0.12	0.10	0.17	1 0.21	0.20	0.29	1 0.70	0.70	1.02	: }		
(7) Surplus/(Deficit) on		407.407	26 764	-334333	-32.25%	: : –0.43	-0.45	-0.35	0.78	-0.93	-0.61	1 -2.61	-3,21	-2.10	<b>:</b> !		
denand	; -393 <del>68</del> 3	-473483	(J.3)A	-23-023	-32.234	0.43	-0.40	0.30	1	V	0.01	1	J.2.	•	:		
(8) Surplus/(Deficit) on received	: -379683	-482483	27.08X	-529755	-31.66%	-0.42	-0.44	₹2.0~	-0.75	-0.91	-0.60	-2.52	-3.14	-2.07	! !		3
Cost recovery on received	21.82%	18.291	-16.20X	23.03	6 BO.57%	; ; ;			1			1			! ! !		
SUMMARY OF REAL COSTS	1 1					! ! !			; ; ; ;			1			i ! !		
(1) Direct cost	436317	488769	12.071		6,10%		0.44	0.55	1 0.84	0.93	0.94	2.89	3.18	3.26	1 62.16%	-	
(2) Indirect cost	1 69450	163250	133.061		-40.70%		0.15	0.10	1 0.14	0.31	0.18	0.46	1.06	0.61	9.89%	19.24%	
(3) Depreciation (3) Interest	: 196123	196133	ERR	196133	ERR	≀ 0.22 :	0.18	0.21	1 0.39	0.37	0.36	1 1.30	1.27	1.23	: 27.94% !	23.125	24.16
		010780	20.879	811719	-4,32%	! ! 0.77	0.77	0.86	1 1.39	1.61	1.47	1 4.65	5.51	5.10	; ; 100.00%	100.00%	100.00
Total	1 701901 1	848352	24.071	011/17	-4.328	1	0.77		ł			1			! '	••••	**********
(4) Income demanded	92000	97000	5.43%	158000	62,89%	0.10	0.09	0.17	1 0.19	0.18	0.29	1 0.61	0.63	0.99			
(5) Income received	1 106000	108000	1.871	162600	50,565	0.12	0.10	0.17	1 0.21	0.20	0.29	0.70	0.70	1.02			
(6) Other income	1		ERR		ERR	1			l I			Į,			1 1		
Total demended	; 92000	97000	5.43)	158000	62.89%	0.10	0.09	0.17	0.18	0.18	0.29	0.61	0.63	0.99			
Total received	106000	108000	1.891	162600	50.561	1 0.12	0.10	0.17	1 0.21	0.20	0.29	: 0.70	0.70	1.02	1		
(7) Surplus/(Deficit) on	1					i			i	_		•			1		
denand	i -609901	-751352	23.191	-653719	-12.99%	-0.67	-0.68	-0.69	-1.21	-1.42	-1.18	-4.04	-4.88	-4.11	i		
(8) Surplus/(Deficit) on	1					1			<b>1</b>		=	!	4 04	_ 4 ^6	i		
recessed	! - <del>5959</del> 01	-740352	24.249	-649119	-12.323	1 -0.65 !	-0.67	-0.69	1 -1.19	-1.40	-1.18	1 -3.95	<b>~4.8</b> 1	-4.08	1		
Cost recovery on received	1 15.10%	12.73	K -15.701	20.03	¥ 57.39¥	;	•		i			1			l .		

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UP JAL NIGAM INDO DUTCH PROJECT REVIEW OF DAM COSTS

PIPED SCHEME: SAIDABAD

	(	TOTALS	l 			i COST	PER KL OF	WATER PRODUCED	L COST P	ER KL OF I	ATER DISTRIBUTED	( COST (	PERKLOF (	MATER SOLD	: COMPO	SITION OF	TOTAL
PARTICULARS	(1989-90 % INC	1990-91	K INC	1991-92	X INC	11 <del>999-9</del> 0	1990-91	1991-92	11999-90	1990-91	1991-92	119 <del>87</del> -90	1990-91	1991-92	11999-90	1990-91	1991-92
CONFONENTS OF COST-ACTUAL	 					1			<u> </u>			1			!		
(1) Hanpower costs (2) Power	; 202150	325600	61.071 ERR	242150	-25.63X ERR		0.29	0.26	0.40	0.62	0.44	1.34	2.12	1.52	41.62%	55.14¥	49.16
(3) Chesicals	; 3100	3100		3400	9.68%	0.00	0.00	0.00	1 0.01	0.01	0.01	1 0.02	0.02	0.02	0.64%	0.52%	0.69
(4) R & H materials	76000	56000	-26.32	40000	-28.57%	0.08	0.05	0.04	- 0.15	0.11	0.07	: 0.50	0.36	0.25	15.65%	9,48%	8.12
(5) Others	1 8300	9650	16.271	10650	10.36%	10.01	0.01	0.01	: 0.02	0.02	0.02	1 0.06	0.06	0.07	1.71%		
(6) Depreciation	196133	196133		1%172		0.22	0.18	0.21	0.39	0.37	0.36	1.30	1.27	1.23	40.38%	33.22	39.84
(7) Interest	1		5589		ERR	<b>}</b> <b>!</b>			1			1			} :		
Total	485683	590483	21.589	49222	-16.62%	0.53	0.53	0.52	0.96	1.12	0.89	3.22	3.84	3.10	100.00%	100.00%	100.00
(B) Centage	1		ERR		ERR				ì			•			}		
Total	485683	590483	21.581	492333	-16.62%	i i 0.53 i	0.53	0.52	0.96	1.12	0.89	3.22	3.94	3.10	; } {		
COMPONENTS OF COST-REAL	!				:	<b>1</b> !			1			1			1 ! !		
(1) Manpower costs	-; ; 2021 <b>5</b> 0	325600	61.07%	242150	-25.63%		0.29	0.26	0.40	0.62	0.44	1.34	2.12	1.52		39.38%	29.83
(2) Power	1 215902	256650	18.87%		23.88%		0.23	0.34	1 0.43	0.49	0.58	1 1.43	1.67	2.00		30.25%	39.17
(3) Chemicals	: 3416	4319	26. 44X		12,30%		0.00	0.01	1 0.01	0.01	0.01	1 0.02	0.03	0.03		0.51%	0.60
(4) R & M materials	1 76000	56000	-26.32X		-29.57%		0.05	0.04	: 0.15	0.11	0.07	; 0.50	0.36	0.25		6.601	4.93
(5) Others	8300	9650	16.27%		10.36%		0.01	0.01	1 0.02	0.02	0.02	1 0.06	0.06 1.27	0.07	_	1.14% 23.12%	1.31 24.16
(6) Depreciation (7) Interest	196133	196133	ERR	196123	ERAS	0.22	0.18	0.21	; 0.39 ;	0.37	0.36	1.30	1.2/	1.23	. 11.74k	۵.12*	44.10
•	1	040750	20,87%	811719	-4,32%	0.77	0.77	0.86	i i 1.39	1.61	1,47	1 4.65	5.51	5,10	1 100.00%	100.00%	100.00
Total	; 701901 ;	848352		711110		l	0.77	0.50	1.37	1.01	417/	1 7.60	3.31	3110	1	100,002	100.00
(8) Centage	!		ERR		ERA				; }			1			; ;		
Total	701901	B48352	20.67%	811719	-4.32%	0.77	0.77	0.86	1 1.39 1	1.61	1.47	1 4.65 1	5.51	5.10			
HYSICAL PARAMETERS	!	·				<del></del>									! 		
(1) Population covered (a) Domestic metered	1		ERR	1920	ERR :										1		
(h) Dumestic unmetered (c) Industrial/commel	1 6704 1	6840	5.02X	5200	-23.98% ERR				: !			1		1	1 !		
(d) Others metered	}		ERR		ERR (							1			i		
(e) Others unactered	1		ERR	014	ERR				i			1		i			
(f) Public stand posts	1 24296	25660	5.61%	26931	4.95%				ì			1			i		
TOTAL	31000	32500		34051					1			1			<b>`</b>		

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REVIEW OF OWN COSTS

PIPED SCHEDE: SAIDABAD .

FIFE SCIENCE SHOWER	1		TOTALS			·	ı 006T	PER KL OF	WATER PRODUCED	ı COST	PER KL OF 1	WATER DISTRIBUTED	t COST	PER KL OF I	ATER SOLD	; COMPI	SITION OF	TOTAL
PARTICULARS	11 <del>989-9</del> 0	X INC	1990-91		1991-92	% INC	11999-90	1990-91		11989-90		1991-92	; 1 <del>989-9</del> 0	1990-91		119 <del>09-</del> 90		1991-92
(2) Total connections	;		<del></del>				1			1						1		
(a) Domestic matered	ł			err,	240	err				1			1			1		
(b) Domestic unaetered	: 638		855	2.03%	650	-23.98%	1			;			;			1		
(c) Industrial/commel	ŧ.			ERR		ear	<b>:</b> (			1			:			1		
(d) Others metered	1			ERR		err	1			<b>(</b>			1			1		
(e) Others unsetered	į			ERR		ERA				;			1			į.		
(8) 04419 4411111	i i						•			:			:			}		
	÷						•			i			i			i		
	;						` !			į			i			;		
										i			;			;		
(3) Public standposts	: 195		210	7.69%	238	13.33	it			i			i			i		
PUMP 1							:			1			1			;		
	4354		4354		3608	-17.133	:			i			i			i		
(4) Pumping hours p.a	1 2100		2100		2100		;			i			i			i		
(5) flate of pumping (lpm)	1 2100		2100	ERR	2.00	ERR	•			ì			;			ì		
(6) No. of days worked	548604		54B604		454608	-17.13%				i			i			•		
(7) Production (KL)	1 340504		<b>J-1001</b>		WIOW	4/11/4	•			•			•			•		
PUMP 2	3096		4776	54.26X	4201	-12.04%												
(4) Pumping hours p.a			1950		1950	12.012												
(5) Rate of pumping (Lpm)	1950		1730	ERR	1750	ERA												
(6) No. of days worked	367232		358792	-	491517													
(7) Production (KL)	302234		330/12															
(7a) TOTAL PLEPING HRS	7450		9130			-14.471												
(76) TOTAL PRODUCTION IN I	(L 910836		1107396	21.581	946125	~14.561	\$											
							<b>;</b>			:			1			1		
(8) Average consumption(ip	od!						i			ì			i			i		
(a) Domestic metered	- {			ERR		err	1			1			ł			ł		
(b) Dosestic unsetered	1			ER#R		ERR	1			i			<b>'</b>			1		
(c) Industrial/commel	. 1			ERA		ERR	1			l			ı			1		
(d) Others metered	;			97KR		ETRR	1			ſ			1			1		
(e) Others unsetered	1			ERR		ERR	1 ,			1			;			:		
(f) Public standposts	i			ERR		ERR	1			ı			ł			1		
()) (0) ()	i						1			1			1			1		
	i						!			1			1			t		
	i						i			1			i			}		
	-						·			i			1			:		
ION Makan diabarkukian IVI N							•			i			•			İ		
(9) Mater distribution(KL)	, ,			ERR	42048	ERR	;			ì			i			i		
(a) Domestic metered	1 150040		153900			-23.98%				i			i			i		
(b) Donestic unsetered			133700	Z.USA ERR	11/000	ERR				•			;					
(c) Industrial/connel	. i									1			1					
(d) Others metered	i			ERA		ERA				:			1			;		
(e) Others unsetered	!			ERR	70740-	ERR							1			;		
(f) Public standposts	1 354722		374636	5.61%	393193	4.951	i			ı			1			1		
	1						1						i ,					
TOTAL	1 505562		328536	4.541	352241	4.48%	l			i			i			i		

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UP JAL NIGAM INDO DUTCH PROJECT REVIEW OF OWN COSTS

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PLPED SCHENE: SALDABAD

	1	TOTALS				COST	PER KL OF	WATER PRODUCED	1 COST	PER KL OF I	MATER DISTRIBUTED	: COST	PER KL OF 1	MATER SOLD	: COMPI	SITION OF	TOTAL
PARTICULARS	:19 <del>89-90</del> % INC	1990-91 X I	INC 1	991-92 1	INC :	1 <del>989-9</del> 0	1 <del>990-9</del> 1	1991-92	:1 <b>989-9</b> 0	1990-91	1991-92	19 <del>89-9</del> 0	1990-91	1991-92	:1 <del>989-9</del> 0	1 <del>990-9</del> 1	1991-92
(10) Water wastage(KL)	405274	578860	42.83X	393884	-31.96XI				1			1			1 1		
(11) Wastage on productio	n: 44.49%	52.27%	17.48%	41.63%	-20.36X	<b>!</b>			!			1			! !		
(12) Mater sold (KL) (a) Domestic metered			ERR	4204B	ERR I										1		
(b) Domestic unestered (c) Industrial/comme)	150840	153900	2.03¥ ERR	117000	-23.98X				Ì			1					
(d) Others metered	1		erk erk		ERR :	}						1			1		
(e) Others unmetered (f) Public standposts	1		ERR		ERR				ì			i			i		
TUTAL	150840	153900	2.03%	159048	3.35%				i			1			ŧ		
(13) X sold an production	16.56%	13.90%		16.81%		ŀ			1			1			!		
(14) Ipcd calculated	i 	ERR	ERR	60	ERR :	l			Ì			1			!		
(a) Domestic metered (b) Domestic unmetered		62	-	62	ERR S	l			į			į					
<pre>(c) Industrial/commel (d) Others metered</pre>	) ERR	ERA Era	err err	ERR Err	ERR :							}					
(g) Others unmetered (f) Public standposts	) ERR , 40	ERR 40	ERR	ERR 40	ERR							1			}		
	1								i			i			i		

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PIPED SCHEME! SAIDABAD .

	:		TOTALS	<b>i</b>			: 0061	PER KL OF	MATER PRODUCED	1 2057 5	PER KL OF	WATER DISTRIBUTED	: COST F	PER KL OF	MATER SOLD	r COMP	SITION OF	TOTAL
PARTICULARS .	11 <del>707-7</del> 0	X INC	1990-91	K INC	1991-92	X INC	11989-90	1990-91	1991-92	11 <b>989-9</b> 0	1990-91	1991-92	(1 <del>787-7</del> 0	1990-91	1991-92	11997-90	1990-91	1991-92
FINANCIAL PARAMETERS	!						1						!			!		
REVENUES	1						;		•	ì			ì			;		
(1) Water charges demanded	1						1			1			1			1		
(a) Domestic metered	1			ERR		ERR				1			1			Į.		
(b) Domestic unmetered	92000		97000		158000	62.89%				- !			ł			1		
(c) Industrial/commel	1			EPAR		ERR				:			1			1		
(d) Others metered	1			ERR		ERR				1			1					
(e) Others unsetered	1			ERR		err	} !			{ !		•	:			1		
TOTAL	92000		97000	5.43	158000	62.89%	1 1						1					
	<b>:</b>						!			<b>:</b>			ł			:		
(2) Charges collected	i			ERR	57600	ERR	1			1			<u> </u>			;		
(a) Domestic metered	1 101000		108000			-2.78%				:			;			;		
(b) Domestic unmetered	1 106000		100000	ERR	100000	ERR				1						į		
(c) Industrial/commel				ERR		ERR				í						•		
(d) Others metered	1			ERR		ERR				•			1			ì		
(e) Others unmetered	; :			EW		CJVI	:			i			;			i		
TOTAL	106000		108000	1.891	162600	50.56X	<b>:</b> :			} !			1			1		
470 Bar and	1						1			;			1			<b>!</b>		
(3) Demand of all private	<i>;</i>						1			1			1			1		
connections were metered			154000		15900	a				:			;					
(a) Donestic metered	151000		134000	ERA	13300	ERAR	,			,			•			1		
(b) Domestic unmetered (c) Industrial/commel				ERR		ERR				,			•			•		
(d) Others metered	•			ERR		ERR				i			ì			;		
(e) Others uncetered	:			ERR		ERR				i			i			·		
(6) Others Chestered	ì						ì			i			ì			i		
TOTAL	151000		154000		15900	0	:			<u> </u>			1			;		
	1						i !			i			1			1		
(4) Arrears of demand	;						!			ì			ì			•		
(a) Donestic metered	!			ERR		err	•			í			1			•		
(b) Donestic unsetered	132000		149000		260000	74.50%				1			;			;		
(c) Industrial/commel	1		• • • • • • • • • • • • • • • • • • • •	ERR		ERA				1			1			1		
(d) Others setered	ì			ERR		ERR				1			1			1		
(e) Others unsetered	i			ERR		ERR				1						Į.		
TOTAL	132000		149000	12.00	260000	74.501	} !			i			1			:		
TOTAL	1 132000		11,000	(2100		711002	ì			i			ì			ĺ		
	1						1			1			1			1		
(5) Collection efficiency	1						1			I .			1			i		
(a) Domestic metered	1			ETKA		ERR				1			ı			1		
(b) Domestic unsetered	1			err		ERA				;			1			į		
(c) Industrial/commel	1			err		ERR				4			t			1		
(d) Others setered	1			ERR		ERA				t			}					
(e) Others unsetered	1			ERR		ERR	l.			1			1			1		
	1		444 ==	<del>.</del>			i			1			!			i		
TOTAL EFFICIENCY	1 115.22	i.	111.34	s -3.37	102.91%	-7,57%	i			i			i			i		

and the contraction of the first of the first and the firs

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Demand if all private connections were metered is worked out as water distributed to private connections at Re.l/- per KL.

UP JAL NIGAM INDO DUTCH PROJECT REVIEW OF OWN COSTS

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PIPED SCHENE: SAIDABAD

	1	TOTA	LS			: 0067	PER KL OF	HATER PRODUCED	: COST F	ERKLOF I	MATER DISTRIBUTED	: COST I	PER KL OF I	ATER SOLD	: COMP	OSITION OF	TOTAL
PARTICULARS	11 <del>787-7</del> 0 1	INC 1990-1	1 X INC	1991-92	X INC	11989-90	1990-91	1991-92	11989-90	1990-91	1991-92	:1 <del>997-9</del> 0	1990-91	1991-92	11 <del>989-9</del> 0	1990-91	1991-9
(6) No. days arrears	1					!			1			1			1		
(a) Domestic metered	I ERR	Ε	ra err	era	ERR	:			ł			1			ł		
(b) Domestic unastered	1 524	5	61 7.06	X 601	7.13X	1			1			1			1		
(c) Industrial/commel	ERA	E	ra err	ERR	err	1			1			;			; '		
(d) Others metered	: ERR	Ε	ar err	err	err	ŀ			;			}			1		
(e) Others unsetered	; ERR	Ε	RR ERR	ERR	ERR				i,			!			!		
	1					;			i			i			i		
	1					} }			\ 1			\ 			<b>{</b> <b>{</b>		
(7) Other Income			ERA		ERR	<b>!</b>			1			1			:		
(8) Total cash income	106000	1080			50.56%							į					
9) Total real income	1 <b>92000</b>	970	00 5.43	158000	62.89%	i i			1 1			;			i I		
	:					{ !			ł !			t :			<b>!</b>		
	:					}			i			i			i		
	1					1			;			1			1		
	1					!			1	,		1			1		
	:					:						1			!		
	1					ŧ.						1			1		
	;					:			•			1			<u>:</u>		
	t .					i						1			<b>.</b>		
COSTS	1														i		
1) HAMPOMER COSTS	1					i			į			•			i		
. Direct labour	1					i 				0.04	A 10	i	A 70	0.17	i		
(a) Pumping station	96000	1260			-15.87%		0.11	0.11	0.19	0.24	0.19	: 0.64	0.82	0.67			
(b) Distribution system		400			10.00%		0.04	0.05	0.07	0.08	0.08	0.23	0.26	0.28			
(c) Others	11000	60	0 -45.45	6000		0.01	0.01	0.01	0.02	0.01	0.01	1 0.07	0.04	0.04	i 1		
TOTAL	141000	1720	0 21.99	156000	-9.30x	0.15	0.16	0.16	0.29	0.33	0.29	: 0.93	1.12	0.78	1		
	1					;						1			1		
	1				1				i .			1			i		
	ł											•			•		
	1				1				ì			i			i		
	ŧ					i			i			i					
. Indirect labour(Total)									1	۸	0.44	i	A 40	0.40	i		
(a) EE	66000	750			4.00%		0.07	0.08	0.13	0.14	0.14	0.44	0.49	0.49			
(b) AE	43000	870			-31.03%		0.08	0.06	0.09	0.16	0.11	0.29	0.37	0.38			
(c) IE	30000	610			-27.87%		0.06	0.05	0.06	0.12	0.08	0.20	0.40	0.28			
(d) Admn staff	1 518000	16990	0 227.991	717000	-57.80%	0.57	1.53	0.76	1.02	3.21	1.30	3.43	11.04	4.51	i !		
TOTAL	: 1 657000	192200	n (97 54)	999000	-53.23X	0.72	2.11	0.99	1.30	3.64	1.63	4.36	12.49	5.63			

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UP JAL NIGAM (NOQ DUTCH PROJECT REVIEW OF OW). COSTS

PIPED SCHEME: SAIDABAD

	:	TOTALS				: COST	PER KL OF	WATER PRODUCED	t COST I	ER KLOF I	ATER DISTRIBUTED	£ COST F	ER KL OF I	MATER SOLD	: COMP(	SSITION OF	TOTAL
PARTICULARS	11989-90 X INC	1990-91	X INC	1991-92	X INC	11989-90	1990 <del>-9</del> 1	1991-92	:1 <del>787-7</del> 0	1990-91	1991-92	:1 <b>997-7</b> 0	1990-91	1991-92	:1989-90	1990-91	1991-9
. Time spent by ind. X	<u> </u>											:			:		
(a) EE	5.00%	5.001	ł	5.007		0.00	0.00	0.00	1 0.00	0.00	0.00	1 0.00	0.00	0.00	i .		
(b) AE	15.00%	15.002	(	15,001		0.00	0.00	0.00	1 0.00	0.00	0.00	1 0.00	0.00	0.00	1		
(c) JE	85.00%	85.001		85.001		0.00	0.00	0.00	1 0.00	0,00	0.00	1 0.00	0.00	0.00	ł		
		5.001		5,00		0.00	0.00		: 0.00			1 0.00	0.00				
(d) Adam staff	: 5.00% :	3.00	•	3,00	•	; 0.00 ; ;	V.W	v	1	V.VV	0100	t	V. <b></b>	0100	; t t		
	1					; ; ;			; ! ;			1 1			1 1 1		
). Cost of indirect labour						i			i 1 001	4 41	0.01	1 000	A A7	۸ ۸۸			
(a) EE	: 3300	3750		_	4.00%		0.00		1 0.01			0.02	0.02				
(b) AE	6450	13050	102,33	9000	-31.03X	0.01	0.01	0.01	1 0.01	0.02		1 0.04	0.08				
(c) JE	25500	51850	103.33	37400	-27.87%	: 0.03	0.05	0.04	0.05	0.10	0.07	1 0.17	0.34	0.24	(		
	25900	84950	227,991		-57.80%		0.08		0.05	0.16	0.06	1 0.17	0.55	0.23	<b>!</b>		
(d) Aden staff	. ωτω !	04730	247 (117			į			1			1			:		
TOTAL	1 61150	153600	151.197	B6150	-43.91%	0.07	0.14	0.09	1 0.12	0.29	0.16	0.41	1.00	0.54	} }		
	; ;					i			i			1			ĺ		
	1					:			;			!			! !		
. Casual labourers	1 3600	5000	38.891	4	-100.00X	: : 0.00	ERR		10.0	ERR		0.02	ERR		!		
. Total mangomer cost	í					, 1			1			1			,		
(a) Direct	1 141000	172000	21,997	156000	-9.30%	: 0.15	0.16	0.16	0.28	0.33	0.28	1 0.93	1.12				
(b) Indirect	1 61150	153600	151,193	B6150	-43.91%	0.07	0.14	0.09	0.12	0.29	0.16	0,41	1.00	0.54	ŀ		
LATOT	202150	325600	61.07%		-25.63%		0.29	0.26	: 0.40	0.62	0.44	1.34	2.12	1.52	1		
. Cost not paid	1					i			į						:		
(a) Direct	:		erar		ERR	;			:			1			1		
(b) Indirect	1		ÐRR		err	1			ŀ			1			1		
	,					1			1			1			1		
. Real cost of manpower	1 111000	172000	21.991	156000	<del>-9</del> .30%	0.15	0.16	0.16	1 0.28	0.33	0.29	1 0.93	1.12	0.9B	1		
(a) Direct	141000						0.14	0.09	0.12	0.29	0.16	1 0.41	1.00	0.54			
(b) Indirect	1 61150	153600	151.192	86130	-43.91%	: 0.07	0.14	0.07	1 0.12	4127	0.10	1		V.0-1			
TOTAL	202150	325600	61.07%	242150	-25.63%	0.22	0.29	0.26	0.40	0.62	0.44	1 1.34	2.12	1.52	} !		
	:					; 1			i			i					
	Ì					1			1			1			; !		
	} }					i !			1			i			:		
2) POMER COSTS	i				,	Į			1			;			į		
PRATING - PUMP 1 40																	
P RATINS - PUMP 2 30	,					<b>:</b>			;			;			ł		
. Bills received	85000	91000	7.06	97700	7. <b>36</b> %	0.09	9.08	0.10	1 0.17	0.17	0.18	0.56	0.59	0.61	<b>!</b> !		
. Bills paid	! !		ERIA		ERR	i : !			1						! !		
. Actual consumption	1					}			1			1			ŧ		
PUMP 1	129008	129008		106075	-17.131	0.14	0.12	0.11	0,25	0.24	0.19	0.65	0.83	0.67			
PUMP 2	68267	105311	54.261		-12.04%		0.10	0.10	0.14		0.17	0.45	0.68	0.58			
runt 4	00421	100211	VT. 220			1			1			1			;		

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UP JAL NIGAN I REVIEW OF OWN COSTS

INDO DUTCH PROJECT

PIPED SCHENE: SAIDABAD

	1	TOTALS				1 0061	PER KL OF	WATER PRODUCED	: COST P	ER KL OF I	ATER DISTRIBUTED	: COST F	PER KL OF I	MATER SOLD	: COMP	OSITION OF	TOTAL
PARTICULARS	:1999-90 % INC	1990-91	X INC	1991-92	X INC	1999-90	1990-91	1991-92	:1989-90	1990-91	1991-92	11999-90	1990-91	1991-92	11999-90	1 <del>990-9</del> 1	1991-9
D. Actual power charges	1					:		,	:		·	1			:		
PUMP 1	140808	140808		169720	20.53%		0.13	0.18	0.28	0.27	0.31	1 0.93	0.91	1.07			
PUMP 2	75093	115842	54.26	148211	27.94%	1 0.08	0.10	0.16	1 0.15	0.22	0.27	1 0.50	0.75	0.93	:		
TOTAL	215902	256650	18.97	317932	23.00%	i i 0.24	0.23	0.34	0.43	0.49	0.58	1.43	1.67	2.00	; ! !		
3) CHEMICALS COST	1					1			1			! !			1		
A. BLEACHING POMDER		7.44				i 											
a. Actual cost	3100	3100		3400	9.68%	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.02			
b. Norm in grams per KL	1 1					<u>.</u>						į			:		
c. Average price (NG)	3.75	3.90			31.54%										i		
d. Real cost of cheescals	51 3416	4319		4654			0.00	0.01	0.01	0.01	0.01	1 0.02	0.03	0.03	i		
e. Stock (gty in Kgs)	1		ERA		ERR							•			ł .		
f. Number of days stock	!	•	ERR		ERR	:			1			i					
	1					i			•			1			i		
	i					i I			1			:			1		
	1					i			;			1			1		
	i					i			:								
	ì.								1			i .			1		
(4) REPAIRS & MAINTENANCE	!					i			:			į			i		
A. Material cost	i					i 			i						ì		
(a) Pumping Station	26000	24000					0.02	0.02	1 0.05	0.05	0.03	0.17		0.12			
(b) Distribution system	1 46000	32000					0.03	0.02	0.09	0.06	0.04	0.30	0.21	0.13	ļ.		
(c) Overhead tanks	1		ERR		ERA							7			1		
(d) Others	1 4000		-100.001	4	ERR	0.00			0.01			0.03					
TOTAL	76000	56000	-26.32	40000	-28.571	0.08	0.05	0.04	0.15	0.11	0.07	0.50	0.36	0.25	i		
	:					<b>{</b> }			i I			1			1		
	1					1						1			; }		
B. Labour cost	•					<u>.</u>			i			į			ì		
(a) Pumping station	i		ERR		ERR				1		•	1			i.		
(b) Distribution system	1		ERR		ERR				ı			1			1		
(c) Overhead tanks	1		ERR		ERR				1			!			1		
(d) Others	1		ERR		ERR	<b>:</b>			1			;			1		
	:											1					
TOTAL	1		ERR		err	1			į			i			;		
	1					1			1			ł.			!		
	1					1			i			1			•		
	•					<u>.</u>			ì			1					
	1					i			i			1			i		
C. Total cont	i					1			1								
(a) Pumping Station	26000	24000	-7.691		-20.B3%		0.02	0.02	: 0.05	0.05	0.03	0.17	0.16	0.12			
(b) Distribution system	1 46000	32000	-30,433	21000	-34.38X		0.03	0.02	0.09	0.06	0.04	1 0.30	0.21	0.13	1		
(c) Gverhead tanks	1		ERR		ERR				l			1			!		
(d) Others	1 4000		-100.00%	i	ERR	0.00			0.01			1 0.03			!		-
TOTAL	1 1 76000	56000	-26.328	40000	-28.57%	0.09	0.05	0.04	; ; 0.15	0.11	0.07	; ; 0.50	0.36	0.25			
I LI I PRE	(GAV	للسود	-40.30	70000	-40.3/2	U.UE	0.43	V. 04	1 0.13	0.11	U.U/	ı u.əu	U.36	U. Z3			

REVIEW OF OWN COSTS

UP JAL NIGAM INDO DUTCH PROJECT

( 1

PIPED SCHEME: SAIDABAD

	1		TOTALS				: 0067	PER KL OF	MATER PRODUCED	c COST !	ER KLOF	ATER DISTRIBUTED	: COST I	PER KLOF	WATER SOLD	t COMP	OSITION OF	TOTAL
PARTICULARS	/ <del>/1997-9</del> 0	I INC	1990-91	X INC	1991-92	X INC	11989-90	1990-91	1991-92	11989-90	1990-91	1991-92	11 <del>707-7</del> 0	1990-91	1991-92	119 <del>09-9</del> 0	1990-91	1991-92
D. Maintenance budget	1						1			!						1		
(a) Pumping station	ł.			ERR		ERR				l I			1			i.		
(b) Distribution system	1			err err		ERR Err				i !			1			1		
(c) Overhead tanks (d) Others	!			ERR		ERR				ì			1			ì		
(U) Genera	;						i			1			1			i		
TOTAL	1 '			ERR		ERR	t			ì			1			1		
	1															i.		
	1						i !			1			ì			1		
	1						}			;		•	•			ì		
(4) OTHER COSTS	i						1			1			1			1		
A. Equipments	1						1			<u> </u>			1			!		
(a) Total cont	1			ERR		ERR	}			) !			1			1		
(b) X for OMM (c) OMM cost	i		,	ERR		ERR	1						i			1		
(C) (MEN COME	}						1			1			Į.			1		•
1	İ						1			1			1			1		
B. Vehicles	1				****	40.00		0.00	0.00	1 0,01	0.01	0.01	1 0.02	0.03	20.0	i		
(a) Total cost	1 3300		3900 100.00		4400 100.00%	12,82%	0.00	0.00	0.00	!	0.01	0.01	1 0.02	0.00	٧.٧٠	}		
(b) % for GM (c) GM cost	1 3300		100.00			12.82%	0.00	0.00	0.00	: 0.01	10.0	0.01	1 0.02	0.03	0.03	i		
(C) DBU COST	}						1			1			I			ŀ		
	1						!			1					0.04	1		
C. Others	1 5000	)	5750	15,001	6250	8.70%	0.01	10.0	10.0	1 0.01	0.01	0.01	1 0.03	0.04	0.04	!		
TOTAL	1 : 8300	1	9650	16.277	10650	10.36%	0.01	0.01	0.01	0.02	0.02	0.02	1 0.06	0.06	0.07	ì		
IUIAL	; 200	·	1000				1	****		1			t			ŧ.		
	1						į.			}						!		
	1						:			i !		_	i !			1		
(6) DEPRECIATION	1 196133		196133		196133		0.22	0.18	0.21	, 0.39	0.37	0.36	1 1,30	1.27	1.23	i		
10/ PEPRECIALIUM	1 170130	1	. 70100				1	• • • • • • • • • • • • • • • • • • • •		1			1			1		
(7) INTEREST	i			ERR		ERR	}			!			1			}		
	1						:			i			i			i		

UP JAL NIGAN INDO DUTCH PROJECT REVIEW OF CHIN COSTS

PIPED SCHEME: SALDABAD

	ŧ	TOTALS	1			: COST	per Kl of	WATER PRODUCED	a COST A	ER KL OF	ATER DISTRIBUTED	t COST F	ER KLOF I	ATER SOLD	r COMPO	SITION OF	TOTAL
PARTICULARS	1989-90 % INC	1990-91	x INC	1991-92	X INC	19 <del>99-9</del> 0	1990-91	1991-92	11989-90	1990-91	1991-92	:1 <del>989-9</del> 0	1990-91	1991-92	11989-90	1990-91	1991-92
REAL COST BASIS	}					!			}			1			1		
TOTAL REVENUE	: : <b>92000</b>	97000	5.431	158000	62.87%	; ; 0.10	0.09	0.17	0.18	0.18	0.29	1 0.61	26.0	0.99	1		
	Į.					l			1			1					
WARIABLE COST			40.00		~ ~~	i 	A 777	. 74		A 40	A 80	1.43	1.67	2.00	30.76%	30.25%	39.17
(a) Power	215902	256650			23.98%		0.23	0.34	1 0.43	0.49	0.58		0.03	0.03			-
(b) Chemicals	: 3416	4319			12.38%		0.00	0.01	1 0.01	0.01	0.01	1 0.02					
(c) Repair materials	1 76000	56000		40000	-28.571		0.05	0.04	1 0.15	0.11	0.07	1 0.50	0.36	0.25	10.83%	6.60%	4.93
(di Casuals	1		ERR		ERR	•			ł			:			i		_
Total	295317	316969	7.331	362785	14.45%	0.32	0.29	0.3B	( 0.58	0.60	0-66	1.96	2.06	2.28	42.07%	37.361	44.69
	ł					<b>:</b>						·			į		
CONTRIBUTION	: -203317	-219969	8.19%	-204765	-6.90%	-0.22	~0.20	<b>-0.22</b>	i.			1 -1.35	-1.43	-1.29	i		
	ŀ					ł.			1			{			•		
FIXED COST	ı					1			1			1	_		1		
(a) Manpower	; 202150	325600	61.07%	242150	-25.63X	0.22	0.29	0.26	: 0.40	0.62	0.44	1 1.34	2.12	1.52		39.38%	
(b) Others	8300	9450	16.27%	10650	10.36%	0.01	0.01	0.01	1 0.02	0.02	0.02	1 0.06	0.06	0.07		1.14%	
(c) Depreciation	196133	196133		196133		0.22	0.18	0.21	1 0.39	0.37	0.36	1.30	1.27	1.23	1 27.94%	23.12X	24.16
(d) Interest	1		ERR		ERR	1			1			1			1		
Total	406583	531383		448933	-15.52¥	0.45	0.48	0.47	: 0.80	1.01	0.81	2.70	3.45	2.82	: 57.93X	62.64%	55.31
10042		30,1							:			t .			t .		
SURPLUS/DEFICIT	1 -609901	-751352	23.191	-653719	-12.99%	-0.67	-0.68	-0.69	-1.21	-1.42	-1.18	-4.04	-4.88	-4.11	1		
STA COLNE LOLL	!					1			1			1			:		
TOTAL COST (FIXED COST+VC	701901	848352	20.97%	811719	-4.32x	0.77	0.77	0.86	1 1.39	1.61	1.47	4.65	5.51	5.10	100.00%	100.00%	100.001
THE COST TREES COSTA	1 101701	04004	2010/8				****		1		•	•			1		

UP JAL NIGAN INDO DUTCH PROJECT REVIEW OF OWN COSTS

PIPED SCHEME: TIKRI

		TOTAL	S			: COST F	ER KL OF E	ATER PRODUCED	r COST P	ER KL OF I	ATER DISTRIBUTED	LCOST PER	KI. OF WATE	R SOLD	: COMPOS	SETEON OF	TOTAL
PARTICULARS	1989-90 % INC	1990-91	X INC	1991-92	X INC	1989-90	1990-91	1991-92	1999-90	1990-91	1991-92	1989-90	1990-91	1991-92	1989-90	1990-91	1991-92
SUMMARY OF ACTUALS	; ;					!					·	- <b>!</b>					
(1) Direct cost	274550	352500	28.393	424565	20,441	0.20	0.25	0.30	0.26	0.36	0.44	1.68	2.23	2.02	42.44%	43.71X	51.94
(2) Indirect cost	62345	144035	131.037		-42, 49%		0.10	0.06	: 0.06	0.15	0.09	: 0.38	0.91	0.39	9.64%		10.13
(3) Depreciation	1 210000	310000		310000		0.22	0.22	0.22	{ 0.29	0.31	0.32	1.90	1.96	1.47	47.924	38.44X	37.93
(4) Interest	!		ERR		ERR	<b>!</b>			<b>!</b> !			1			1		
Total	646895	804535	24.6B%	817395	1.35%	0.46	0.58	0.58	0.61	0.82	0.85	3.97	5.10	2.89	100.00%	100.00%	100.007
(4) Income demanded	163000	158000	-3.071		30.38%		0.11	0.15	0.15	0.16	0.21	1 1.00	1.00	0.99	ì		
(5) Income collected	1 94000	90000	-4.26)	124000	37.7BX		0.09	0.09	1 0.09	0.09	0.13	0.58	0.57	0.59	:		
(6) Other Income	•		ERR		ERR :	<b>;</b>			} !			} !			<b>!</b>		
Total demanded	163000	158000	-3.071		30.38%		0.11	0.15	0.15	0.16	0.21	1 1.00	1.00	0.99			
Total received	1 94000	90000	-4.26%	124000	37.78X	0.07	0.06	0.09	: 0.09 !	0.09	0-13	: 0.58	0.57	0.59	; ;		
(7) Surplus/(Deficit) on	}						A 43	0.47	1	0.11	0.47	1 -2.07	.4.46	-2.90	1		
desand	1 -483895	-648535	34.023	-611395	-5,73%	-0.35	-0.47	-0.43	1 -0.46	-0.66	-0.63	-2.97	-4.10	-2.70	!		
(8) Surplus/(Deficit) on received	1 -552995	-716535	29.60%	-693395	-3.23%	-0.40	-0.51	-0.49	-0.53	-0.73	-0.72	-3.39	-4.54	-3.29			
Cost recovery on received	14.53%	11.16%	-23.21%	15.17%	35.951				i !			1 1			! !		
SUMMARY OF REAL COSTS	1				; ;	<b>!</b> !			1			! !			1 { { {		
([] Direct cost	681333	754482		1017538	34.87%		0.54	0.72	0.65	0.77	1.05	1 4.18	4.78	4.83	64.66%	62.43X	72.151
(2) Indirect cost	62345	144035	131.03X		-42.49%		0.10	0.06	1 0.06	0.15	0.09	0.38	0.91	0.39	5.92%	11.92%	5.97¥ 21.98¥
(3) Depreciation (3) Interest	; <b>310000</b>	210000	ERR	310000	ERR :	0.22	0.22	0.22	; 0.29 ;	0.31	0.32	1 1.90	1.96	1.47	29.42%	25.651	21.70
Total	1053680	1208517	14.69%	1410368	16.70%;	0.76	0.87	1.00	1.00	1.23	1.46	6.46	7.65	6.70	100.00%	100.00%	100.00%
(4) Income demanded	1 163000	158000	-3.07%	206000	30.38%	0.12	0.11	0.15	0.15	0.16	0.21	1.00	1.00	0.98			
(3) Income received	1 94000	90000	-4.26¥	124000	37.78%	0.07	0.06	0.09	: 0.09	0.09	0.13	0.58	0.57	0.59	1		
(6) Other income	ł,		err		ERR I				} }			1			1 }		
Total desended	163000	158000	-3.07%	206000	30.38X	0.12	0.11	0.15	0.15	0.16	0.21	1.00	1.00	0.98			
Total received	94000	90000	-4.26X	124000	37.78%;	0.07	0.06	0.09	; 0.09	0.09	0.13	; 0.58 ;	0.57	0.59	i !		
(7) Surplus/(Deficit) on	;				,							ì					
desand	-970680	-1050517	17.95X	-1204368	14.65%;	-0.64	-0.75	-0.65	: -0.85	-1.07	-1.25	: -5.46	-6.65	-5.72	ì		
(8) Surplus/(Deficit) on	1	=:=			10.00				1 000		-1.77	1	7 60	_4 11	•		
Pecesyed	1 -959680	-1118517	16.55%	-1286368	15.01%	-0.69	-0.80	-0.91	; -0.91	-1.13	-1.23	1 ~5.89 1	-7.08	-6.11	:		
Cost recovery on received	8.924	7,45%	-16.52%	8.79%	18.0621				1			1	,		<b>!</b>		

UP JAL NIGAN INDO DUTCH PROJECT REVIEW OF OWN COSTS

PIPED SCHEME: TIKRI

	:	TOTA	LS			: COST F	er kilof i	iater produced	: COST P	ER KLOF I	ATER DISTRIBUTED	ICOST PER	KL OF WATE	ER SOLD	: 001490	SITION OF	TOTAL
PARTICULARS	11 <del>989-9</del> 0 X INC	1990-91	x INC	1991-92	X INC	1 <b>999-9</b> 0	1990-91	1991-92	11 <del>789-9</del> 0	1990-91	1991-92	11989-90	1990-91	1991-92	11999-90	1990-91	1991-92
COPPONENTS OF COST-ACTUAL	!					 !						- [- <del></del>		·	; ;		
(I) Hampower costs (2) Power	227800	221600	41.189 ERR	264750	-17.68% ERR		0.23	0.19	0.22	0.33	0.27	1,40	2.04	1.26	35.213	39.87	32.39
(3) Chemicals	1000	6000		7000	16.67%	0.00	0.00	0.00	: 0.00	0.01	0.01	1 0.01	0.04	0.03	: 0.151	0.74%	0.86
(4) R & M materials	98550	161500	62.881	226565	40.29%	0.07	0.12	0.16	1 0.09	0.16	0.23	1 0.60	1.02	1.08	: 15.23x	20.021	27.72
(5) Others	9545	7435	-22.11	9080	22.13%	0.01	0.01	. 0.01	: 0.01	0.01	0.01	1 0.06	0.05	0.04	1 1.489	0.925	1.11
(6) Depreciation	: 310000	310000	1	310000		0.22	0.22	0.22	: 0.29	0.31	0.32	1.90	1.96	1.47	47.92	38.441	37.93
(7) Interest	1		ERR		ERR	{ :			1			1			!		
Total	646895	806533	24.681	817395	1.35x	0.46	0.58	0.58	0.61	0.82	0.65	3.97	5.10	2.86	100.009	100.001	100.00
(8) Centage	1		ERR		ERR										1		
Total	1 646873	806533	24.681	817393	1.35%	; ; 0.46 ;	0.58	0.58	0.61	0.82	0.85	i i 3.97	5.10	2.88	} { }		
Components of Cost-Real	1					1 !			1			!			:		
(1) Hangower costs	—; ; 227800	321600	41.189	264750	-17.68%		0.23	0.19	0.22	0.33	0.27	1.40	2.04	1.26			
(2) Power	402557	402545	0.001	592733	47.25%		0.29	0.42	1 0.38	0.41	0.61	2.47	2.55	2.81			
(3) Chemicals	5229	- 5437			33.16%		0,00	0.01	1 0.00	0.01	0.01	0.03	0.03	0.03			
(4) R & M materials	1 98550	161500			40.29%		0.12		1 0.09	0.16	0.23	1 0.60	1.02	1.08			
(5) Others	: 9545	7435			22.13X		0.01	0.01	0.01	0.01	0.01	1 0.06	0.05	0.04			
(6) Depreciation	310000	310000		. 310000		0.22	0.22	0.22	0.29	0.31	0.32	1.90	1.96	1.47	29,421	25.651	21.98
(7) Interest	1		ERR		ETAR	; }			1			1			{ }		
Total	1053690	1209517	14.69%	1410368	16.70%	0.76	0.87	1.00	1.00	1.23	1.46	6.46	7.65	6.70	100.00%	100.00%	100.00
(B) Centage			ERR		ERR	 !			1			1			1		
Total	1053480	1208517	14.69%	1410368	16.70%	0.76	0.87	1.00	1 1.00	1.23	1.46	1 6.46	7.65	6.70	! !		
PHYSICAL PARAMETERS	!	<del></del>				  			1			-					
(1) Population covered	1		_									1			}		
(a) Domestic metered	;	10240		10416	1.72%				1			i					
(b) Domestic unsetered	1 8840		-100.001	794	ERR				i			í			i		
(c) Industrial/commel	!		ERR		ERR :				1			-			i		
(d) Others metered	į		ERR		ERR				;			;			ι ι		
(e) Others unmetered	1 44840	47474	ERR	47000	ERR :				!			,			!		
(f) Public stand posts	i 41500	47430	14.29%	47900	U./UX	•			i			i			;		
TOTAL	50340	57670	14.56X	59000	2.31%	}			ł			t			:		

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UP JAL NIGAM INDO DUTCH PROJECT REVIEW OF OWN COSTS

PIPED SCHOKE: TIKRI

PMETICIALINGS   1999-90   1 loc   1990-91   2 loc   1990-91   2 loc   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990-91   1990		:	TOTA	LS			( 0067	PER KL OF	WATER PRODUCED	: COST F	PERKLOFI	WATER DISTRIBUTED	1006T PER	KL OF WATE	ER SOLD	1 COMP	OSITION OF	TOTAL
(a) Dessitic unstreed   1.00	PARTICULARS	119 <del>99-9</del> 0 % INC	1990-91	X INC	1991-92	X INC	:1989-90	1990-91	1991-92	11989-90	1990-91	1991-92	11999-90	1990-91	1991-92	1989-90	1990-91	1991-92
B) Desettic unstatement   1100		:					1						!			1		
C.   Incustrial/Commel.   SR	(a) Domestic metered	i .	1290							1			1			1		
Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Company   Comp	(b) Domestic unnetered	1105								;			}			1		
Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comment   Comm	(c) Industrial/commel	:		ERR		err	į.			;			;			1		
13   Public standposts   219   219   219   219	(d) Others setered	1		ERR	l	err	1			;			ł			1		
	(e) Others unsetered	<b>:</b>		erk		err	l			ł			<b>!</b>			1		
UPP		1					;			;			ł			1		
##   ##   ##   ##   ##   ##   ##   #		1					ł			1			ì			ł		
##   ##   ##   ##   ##   ##   ##   #		1					ł			1			1			1		
		;					Į.			;			ł			1		
149   Pagning   hours p. a   5162   5162   50.02%   5984   13.93%	(3) Public standposts	; 219	219		219		;			;			١.			1		
33 Rate of pumping (lga)   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2	UPP 1	<b>;</b>					ŀ			ı			;			:		
33 Rate pf pumping (lopa)   2100   2100   2100   2100		1 5162	5163	0.02	% 5884	13.951	li .			1			1			;		
Social days worked   327   334   5.581%   17 Production (KL)   550444   650580   0.073   741334   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13.75%   13		2100	2100		2100		1			<b>{</b>			1			1		
7) Production (Ki)   650444   650580   0.07X   741334   13.75Xi   1   1   1   1   1   1   1   1   1		1 327	3227		346	5.813	it .			ŀ			ł			1		
All Pumping Nouris p. a   5902   901   -0.02x   5317   -9.90x     State pf pumping (lips)   2100   2100   2100     Bill No. of days worked   349   349   319   -8.60x     Production (ICL)   743675   743515   -0.02x   664736   -9.90x     Tay TUTAL PUMPING MES   11065   11064   0.00x   11201   1.23x     Total PRODUCTION IN No.   1394138   1394094   0.00x   1411269   1.23x     Bill Regrage Consumption (lipd   6   6   6   6   6   6   6     Call Dessetic setered   ERR   ERR       Call Dessetic unsetered   ERR   ERR       Call Dessetic unsetered   ERR   ERR       Call Dessetic unsetered   ERR   ERR       Call Dessetic setered       Call Dessetic setered		650444	650580	0.02	X 741334	13.95%	1			;			1			1		
Pumping hours p.a	UPP 2																	
State of pumping (1pm)   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   2100   210		5902	5901	-0.02	<b>3</b> 5317	-9.90%												
10   10   10   10   10   10   10   10		2100	2100		2100													
7) Production (KL) 743475 74331 -0.02% 669736 -9.90%  7a) TUTAL PRODUCTION IN KL 1374138 1394094 0.00% 141029 1.23%  7b) TUTAL PRODUCTION IN KL 1374138 1394094 0.00% 1411229 1.23%  8) Average consumption(Ipd)  (a) Desestic extered (			349		319	-B.60%												
B  Average consumption(lpd:		743695	743515	-0.02	% 6 <del>69</del> 936	-9.901	•											
B) Average consumption(lpd:   (a) Domestic setered   ERR ERR     (b) Domestic unsetered   ERR ERR     (c) Industrial/commel   ERR ERR     (d) Others natered   ERR ERR     (d) Others unsetered   ERR ERR     (e) Public standposts   ENR   ERR     (f) Public standposts   ENR   176,000     (a) Domestic astered   158,000 ERR 176,000     (a) Domestic unsetered   163,000 -100,00% 143,74 ERR     (c) Industrial/commel   ERR ERR     (d) Others astered   ERR ERR     (d) Others unsetered   ERR ERR     (d) Others unsetered   ERR ERR     (d) Others unsetered   ERR ERR     (e)			11064	0.00	11201	1.23%	ı											
(a) Domestic setered	(76) TOTAL PRODUCTION IN KL	1394138	1394094	0.00	% 1411 <i>269</i>	1.231	1											
(a) Domestic setered		:					ł.			1			Į.			:		
(b) Domestic unmetered   ERR   ERR		l <del>l</del>					i			1			i					
(c) Industrial/commel   ERR   ERR		1								į			1			i		
(d) Others metered   ERR   ERR   (e) Others unmetered   ERR   ERR   (f) Public standposts   ENR - ERR    9) Mater distribution(KL)   (a) Demestic metered   158000   ERR   196000   24.05%   (b) Demestic unmetered   163000   -100.00%   14594   ERR   (c) Industrial/commel   ERR   ERR   (d) Others metered   ERR   ERR   (e) Others unmetered   ERR   ERR   (e) Others unmetered   ERR   ERR		}																
(#) Dithers unmetered   ERR   ERR    (#) Public standposts   ENR - ERR    9) Mater distribution(XL)    (a) Domestic metered   158000 ERR 196000 24.05%;    (b) Domestic unmetered   163000 -100.00% 14394 ERR    (c) Industrial/commel   ERR ERR    (d) Others metered   ERR ERR    (e) Others unmetered   ERR ERR		1											1			1		
(f) Public standposts   ERR - ERR		ł								- :			i					
9) Mater distribution (KL)   (a) Domestic metered   158000 ERR 196000 24.05%; (b) Domestic unmetered   163000 -100.00% 14394 ERR   (c) Industrial/commel   ERR ERR   (d) Others metered   ERR ERR   (e) Others unmetered   ERR ERR   (e) Others unmetered   ERR ERR		1								i			-			i		
(a) Domestic metered   158000 ERR 196000 24.05%; (b) Domestic unmetered   163000 -100.00% 14594 ERR   (c) Industrial/commel   ERR ERR   (d) Others metered   ERR ERR   (e) Others unmetered   ERR ERR	(f) Public standposts	1		E144	١.	FIG	<u>.</u>			:			i					
(a) Domestic metered   158000 ERR 196000 24.05%; (b) Domestic unmetered   163000 -100.00% 14594 ERR   (c) Industrial/commel : ERR ERR   (d) Others metered : ERR ERR : (e) Others unmetered : ERR ERR :		)					1			ì		,						
(a) Domestic metered : 158000 ERR 196000 24.05%; (b) Domestic unmetered : 163000 -100.00% 14594 ERR : (c) Industrial/commel : ERR ERR : (d) Others metered : ERR ERR : (e) Others unmetered : ERR ERR :		}											:			:		
(a) Domestic metered : 158000 ERR 196000 24.05%; (b) Domestic unmetered : 163000 -100.00% 14594 ERR : (c) Industrial/commel : ERR ERR : (d) Others metered : ERR ERR : (e) Others unmetered : ERR ERR :		1					i			1			i			i ,		
(a) Domestic metered : 158000 ERR 196000 24.05%; (b) Domestic unmetered : 163000 -100.00% 14594 ERR : (c) Industrial/commel : ERR ERR : (d) Others metered : ERR ERR : (e) Others unmetered : ERR ERR :		<u> </u>					i			:			;			;		
(b) Dusestic unsetered   163000 -100.00% 14594 ERR		1	,				i 			1						1		
(c) Industrial/commel.: ERR ERR: (d) Others metered : ERR ERR: (e) Others unmetered : ERR ERR:		1	158000							:			:			1		
(d) Others metered : ERR ERR :										i			i			;		
(a) Others unmetered : ERR ERR :		:								i			:					
/at adiata designation	(d) Others metered	:								į			i			i		
(f) Public standposts   889164   827623 -6.928 754597 -8.828;		}								Į.						i		
	(f) Public standposts	1 889164	827623	-6.92	<b>3. 75459</b> 7	-0.825	11			}			i			i		
TUTAL : 1052164 985623 -6.328 965191 -2.07k1		1				_	l			i			i			•		

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INDO DUTCH PROJECT

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UP JAL NIGAM II REVIEW OF DWA COSTS

PIPED SCHENE; TIKRI

	:	TOTA	N.S	_		: COST	PER KL OF	MATER PRODUCED	: COST I	PER KL OF	MATER DISTRIBUTED	COST PER	KL OF WATE	R SOLO	: 0000	ISITION OF	TOTAL
PARTICULARS	1 <del>787-70</del> x	INC 1990-91	X INC	1991-92	K INC	1 <del>787-7</del> 0	1990-91	1991-92	11989-90	1990-91	1991-92	11989-90	1990-91	1991-92	11 <del>789-9</del> 0	1990-91	1991-92
(10) Mater wastage(KL)	341974	408471	19.441	446078	9.21%			-							;		
(11) XMastage on production	24.53%	29.30	n 19.451	31.61%	7.88%	<b>!</b>			:			1					
(12) Water sold (KL)	; ;					: }			}						1		
(a) Domestic metered (b) Domestic unmetered	163000	158000	ERR -100.001	196000 14594	24.05% ERR				! !			; }			1		
(c) Industrial/commel (d) Others metered	) !		err err		err err	ł			! 			\ !-			1		
(e) Others unsetered			ETAR ETAR		err err				;			!			!		
(f) Public standposts	•					ı			•			•			•		
TOTAL	163000	158000	-3.071	210594	33.29%				1			1			1		
(13) % sold an production	11.69%	11.33	X	14.92%	,				; 1			1			:		
(14) lpcd calculated		42	ERA	52	21.95%	!			;	,		1			!		1
(a) Domestic metered (b) Domestic unsetered	ERR ! 51	EPHR	ERR	51	err				į			1					
(c) Industrial/commel(d) Others metered	ERR Err	err Err		- Err Err	err err				i \			; ;			;		
(a) Others unmetered	ERR 59	ERR 48		ERR 43	ERR : 125.9-				1 }			1			:		
(f) Public standposts	. J7	***	10.00	***	,,,,,,				1			1					

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- UP JAL NIGAM INDO DUTCH PROJECT REVIEW OF OWN COSTS

PIPED SCHEME: TIKRI

	:	TOTA	LS			: COST I	PER KLOF I	MATER PRODUCED	: COST F	PERKLOF I	MATER DISTRIBUTED	(COST PER	KL OF WATE	R SOLD	: COMPI	OSITION OF	TOTAL
PARTICULARS	19 <del>89-9</del> 0 x INC	1990-91	x INC	1991-92	X INC	1989-90	1990-91	1991-92	1989-90	1990-91	1991-92	:1989-90	1990-91	1991-92	11989-90	1 <del>99</del> 0-91	1991-92
FINANCIAL PARAMETERS	<u> </u>					:			1			1			1		
REVENUES	!								į			3			}		
(1) Water charges demanded	<b>!</b>					1			ì						1		
(a) Domestic metered		103000			90.291							i					
(b) Dosestic unsetered	163000	55000	-66.261 ERR	10000	-81.92% ERR				•						1		
(c) Industrial/commel	i		ERR		ERR				į			;			•		
(d) Others metered	i •		ERR		ERR				;			•			:		
(e) Others unsetered	i !		EUV		EN	:			i			i			:		
TOTAL	163000	158000	-3.07	206000	30.38%				į								
ı									!			i !			1		
(2) Channes collected	i !					;			i			i			i		
(2) Charges collected (a) Domestic metered	!	70000	erir	116000	65.71%	i			1			1			Į.		
(b) Domestic unmetered	94000	20000	-78.723		-60.00%				1			}			1		
(c) industrial/commel	1		err		ERR	;			1			1			1		
(d) Others metered	}		ERA		ERR				1			i.			1		
(e) Others unmetered	1		err		err	1											
;					77 704				i			i			i !		
TOTAL	94000	90000	-4.261	124000	37.791	i •			:			;			:		
i	i I					:			i			;			1		
3) Demand of all provate									1			1			1		
connections were metered				_		:			1			;			1		
(a) Domestic matered	163000	15800	0	21000	0				1			1					
(b) Domestic unmatered	:		ERR	22000	ERR				1			i			i •		
(c) Industrial/commel	ł		ERR		ERR				i			i					
(d) Others matered			err err		err err				;			!			:		
(e) Others unsetered	i	ı	ERIK		CU/A	1			- 1			ì			ì		
TOTAL	163000	158000		21000	0				1			1			1		
	1	150000		21000	•	:			ł			ł			1		
1	ļ.					:			i.			1			<u> </u>		
4) Arrears of demand	l					1			i			i			i		
(a) Domestic metered		22000	ERR	80000	142.42%				;			i !			•		
(b) Dosestic unmetered	23000	35000	52.177 ERR	2000	-94.29% ERR							1			;		
(c) industrial/commel	i 1		ERR		ERR				i			ì			ì		
(d) Others metered (e) Others unmetered	i		ERR		ERA				ì			1	•		ŧ.		
OP.BAL OF ARREARS	46000	49000		137000		ì			į.			ł			i		
TOTAL	69000	137000	98.552		59.85%	;			1			i			ł.		
	1					1			1			1			:		
0	1					1			1			į			i		
5) Callection efficiency	ì	_		== 4==	48	1			1			i			,		
(a) Domestic metered	ERR	67.961		59.18%					i			1			!		
(b) Donestic unsetered	37.67%	36.361							ì						!		
(c) Industrial/commel	ERR	ERR	ERR	era era	ERR Err				<u>'</u>			1			;		
(d) Others metered	ERR COO	ERR	err err	ERR	ERR	-			1			!			:		
(e) Others unsetered	ERR .	ERR	ERR!	·	£M/	•			i			ì					
TOTAL EFFICIENCY	: 57.6 <b>7</b> %	56.96%	-1.23	60.19%	5.67%	•			-			-					

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UP INL NIGHM INDO DUTCH PROJECT REVIEW OF OWN COSTS

PIPED SCHENE: TIKRI

	:	TOTA	LS			: COST I	PER KL OF	MATER PRODUCED	: COST (	PER KL OF I	ATER DISTRIBUTED	:COST PER	KL OF WATE	R SOLB	t COMP	OSITION OF	TOTAL
PARTICULARS	:19 <del>89-9</del> 0 % INC	1990-91	x INC	1991-92	X INC	: 1989-90	1990-91	1991-92	11989-90	1990-91	1991-92	11 <del>997-9</del> 0	1990-91	1991-92	:19 <del>99-9</del> 0	1990-91	1991-92
(6) No. days arrears	:					1			1			- <u>1</u>	,		!		
(a) Domestic matered	l ERR	117		149	27.401				ł			1			}		
(b) Domestic unmetered	1 52	232	350.99	73	-68.571	il .			ł			1			ł		
(c) Industrial/commel	t err	err	RAS	era	ERR				1			}			1		
(d) Others matered	: ERR	ERR		err	err				ł			1			;		
(e) Othern womstered	ERA ;	ERA	ERR	EROR	ERR	} ! !			;			1			! !		
(7) Other income	1		ERR		ERR	}  -  -			; ; ;			1 1			: : :		
(O) Takel much seeme	; ; 94000	90000	-4.261	124000	37.78x	:			1			1			:		
(8) Total cash income (9) Total real income	; 143000	158000			30.38%				:			;			:		
	;					:			ŧ			1			1		
	1					1			}			ì			1		
	i !					( !			•			;			•		
	•					, !						;			;		
	i								í			·			į		
	ì					}			ì			1			1		
	1					:			ł			1			l .		
	1					ì			:			1			1		
	1					:			i			1			1		
COSTS	1					ł			1			:			1		
(1) HANPOMER COSTS	1					ŧ .			:			1			ł		
A. Direct labour	1					1						:			1		
(a) Pumping station	101000	103000	1.98%		2.91%		0.07	0.08	: 0.10	0.10	0.11	1 0.62	0.65	0.50			
(b) Distribution system		56000			5.36X			0.04	1 0.05	0.06	0.06	1 0.32	0.35	0.28			
(c) Others	22000	26000	10.107	26000		0.02	0.02	0.02	1 0.02	0.03	0.03	0.13	0.16	0.12			
TOTAL	i i 175000	185000	5 714	191000	3.24%	0.13	0.13	0.14	1 0.17	0.19	0.20	1 1.07	1.17	0.91	i !	,	
IUIAL	!	10000	01712	111000	31215	;	4115	<b>3111</b>	1	y	*.20	1.07	4137	0.71	;	•	
	:					į			i			į			ì		
	ì					;			ì			ì					
	1								<b>'</b>			ì			;		
	1					:			:			1			ł		
9. Indirect labour(Total)	1								1	,		ł			ŀ		
(a) EE	66000	75000	13.641	78000	4.00%	0.05	0.05	0.06	1 0.06	0.08	0.08	1 0.40	0.47	0.37	<b>!</b>		
(b) AE	1 43000	B7000	102.33%	60000	-31.03%	0.03	0.06	0.04	0.04	0.09	0.06	0.26	0.55	0.28			
(c) JE	30000	61000	103.33%	44000	-27.87%	0.02	0.04	0.03	: 0.03	0.06	0.05	; 0.18	0.39	0.21			
(d) Admn staff	: 518000	1699000	227.99%	717000	-57.B0%	0.37	1.22	0.51	1 0.49	1.72	0.74	3.18	10.75	3,40			
	:					ł			1			t			ţ		
TOTAL	657000	1922000	192.54x	899000	-53.23%	0.47	1.38	0.64	1 0.62	1.95	0.93	4.03	12.16	4.27	1		

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UP TAL NIGAM INDO DUTCH PRO4.....

	ı	TOTAL	S			: COST P	er klof (	MATER PRODUCED	1 COST F	Per Klof 1	ATER DISTRIBUTED	:COST PER	KL OF WATE	R SOLO	c COMP(	OSITION OF	TOTAL
PARTICULARS	11989-90 % INC	1990-91	X INC	1991-92	INC	1989-90	1990-91	1991-92	1989-90	1990-91	1991-92	11 <del>989-9</del> 0	1990-91	1991-92	11989-90	1990-91	1991-92
C. Time spent by ind. K	<del></del>					;			1			!			!	. ——	
(a) EE	1 5.00%	5.00%		5.00X		0.00	0.00	0.00	0.00	0.00	0.00	: 0.00	0.00	0.00	1		
(b) AE	20.00%	20.00%		20.00%		0.00	0.00	0.00	1 0.00	0.00	0.00	1 0.00	0.00	0.00	1		
(c) JE	50.00%	50.00%		50.00%		0.00	0.00	0.00	1 0.00	0.00	0.00	1 0.00	0.00	0.00	1		
(d) Adam staff	; 5.00%	5.00%	<b>;</b>	5.00%		: 0.00 ! !	0.00	0.00	; 0.00 ! !	0.00	0.00	; 0.00 ;	0.00	0.00	; 1 1 1		
). Cost of indirect labour	1					; ; ; ;			! ! !			: : :			! ! !		
(a) EE	3300	3750	13.64%	3900	4.00%	0.00	0.00	0.00	; 0.00	0.00	0.00	0.02	0.02	0.02	1		
(b) AE	1 8600	17400	102.33%	12000	-31.03%		0.01	0.01	0.01	0.02	0.01	0.05	0.11	0.06			
(c) 1E	15000	30500	103.33%	22000	-27.87X		0.02	0.02	; 0.01	0.03	0.02	0.09	0.19	0.10			
	25900	84950	227.99%	35850	-57.80X		0.06	20.0	0.02	0.09	0.04	0.16	0.54	0.17			
(d) Aden staff	!	04100	ZZILITA	WW-	J. 150A		4.00		1		*	1			1		
TOTAL	52800	136600	158.71%	73750	-46.01%	0.04	0.10	0.05	0.05	0.14	0.08	0.32	0.86	0.35	1 1		' 1
E. Casual labourers	1		ERR		ERR	; ;			1			{ } !			{ ! !		
	1					ł			ì			1			<del>\</del>		
F. Total manpower cost	1											i					
(a) Direct	175000	185000	5.71%	191000	3.24%		0.13	0.14	1 0.17	0.19	0.20	1.07	1.17	0.91			
(b) Indirect	52900	136600	158.71%	73750	-46.01%		0.10	0.05	: 0.05	0.14	0.08	0.32	0.86	0.35			
TOTAL	227900	321600	41.18%	264750	-17.68%	0.16	0.23	0.19	0.22	0.53	0.27	1.40	2.04	1.26	1		
6. Cost not paid	1					;			;			1					
(a) Direct	1		ERR		EAR				. !			1			i.		
(b) Indirect	ł		ERA		err	1						i			i .		
H. Real cost of manpower	Į.					!						1			;		
(a) Direct	175000	185000		191000	3.24%		0.13		0.17		0.20	1 1.07	1.17	0.91			
(b) Indirect	1 52800	134600	158.71%	73750	-46.01X	0.04	0.10	0.05	: 0.05	0.14	0.08	0.32	0.86	0.35	i		
	1							A 40		A 77	۸ 27		2 04	1 21	1		
TOTAL	227900	321600	41.18%	264750	-17.68%	0.16	0.23	0.19	0.22	0.33	0.27	1.40	2.04	1.26	;		
	!					;			į			;			•		
	1											- }			;		
	1					1			i			•			;		
	1								į			ì			ì		
(2) POWER COSTS HP RATINS - PUPP 1 45 HP RATINS - PUPP 2 45									;						1		
A. Bills received	1 1 106800	134400	25.84)	199480	47.689	: 6: 0.08 1	0.10	0.14	i i 0.10	0.14	0.21	; ; 0-66	0.85	0.9	1		
B. Bills paid	1		ERR		ERR	1			1 1			!			1		
C. Actual consumption	1				.= ==:						0.00	i			i		
PUMP 1 PUMP 2	170741 195220	170777 1 <b>95</b> 173		194600 175858	13,951 -9,901				0.16 0.19			1.05 1.20			, •		
	1,10	1.10	ı	1.60	45.45	x.			•		1	•		ı		1	

UP JAL NISAM INDO DUTCH PROJECT"
REVIEW OF OWN COSTS "

PIPED SCHENE: TIKRI

t		TOTA	LS			COST F	PER KLOFI	ATER PRODUCED	ı COST P	ER KL OF M	ATER DISTRIBUTED	COST PER	KL OF WATI	er sold	: COMP	OSITION OF	TOTAL
PARTICULARS :	1 <del>989-9</del> 0 % INC	1990-91	X INC	1991-92	X INC	11 <b>989</b> -90	1990-91	1991-92	:1 <del>989-9</del> 0	1990-91	1991-92	(989-90	1990-91	1991-92	11989-90	1990-91	1991-9
D. Actual power charges									1			;			1		
	187816	197855		311360	65.75%		0.13	0.22	1 0.18	0.19	0.32	1.15	1.19	1.48			
PUMP 2	214742	214690	-0.02X	281373	31.06X	0.15	0.15	0.20	1 0.20	0.22	0.29	1 1'25	1.36	1.34	1		
TOTAL :	402557	402543	0.001	592733	47.25%	0.29	0.29	0.42	1 0.38	0.41	0.61	1 2.47	2.55	2.81	   		
(3) CHEMICALS COST :						) 			1			1			† 1		
A. BLEACHING POWDER :						;			1			;			1		
a. Actual cost :	1000	6000	500.00%		16.67%	0.00	0.00	0.00	: 0.00	0.01	0.01	0.01	0.04	0.03	;		
b. Rora in graes per KL :	L	1		i		ł			1			ŧ			1		
c. Average price (KG)   1	3.75	3.90			31.54%				1			1			1		
d. Real cost of cheescals:		5437			33.16X		0.00	0.01	1 0.00	0.01	0.01	1 0.03	0.03	0.03	1		
e. Stock (qty in Kgs) :	7	290			-100.00%				i			1					
f. Number of days stock	2	73	3900.13X		-100.00%	; } ;			; ; ;			; ; ;			; ; ;		
; ; (4) repairs & Maintenance ;						: ! !			; ; ;			: !			} : :		
A. Material cost						1			ı			}			1		
(a) Pumping station   1	24300	76100			17.48%			0.06	0.02	0.08	0.09	: 0.15	0.48	0.42			
(b) Distribution mystem :		74700			64.26%		0.05	0.09	; 0.05	0.08	0.13	1 0.35	0.47	0.58			
(c) Gverhead tanks :	900	2200			-84.85X		0.00	0.00	0.00	0.00	0.00	0.01	0.02				
(d) Others :	16850	7400	-56.08%	13965	68.72%	: 0.01 :	0.01	0.01	1 0.02	0.01	0.01	1 0.10	0.05	0.07	;		
TOTAL	98550	161500	63.88%	224565	40.29%	0.07	0.12	0.16	1 0.09	0.16	0.23	0.60	1.02	1.08	: :		
B. Labour cost						, ! !			\ \ \ \			1			1		
(a) Pumping station { (b) Distribution system { (c) Overhead tanks { (d) Others	1		ERR Err Err Err		err err err err	) 			1 1 1			1 1 1			 		
1						1			1			1			Į.		
TOTAL :	ł		ERR		ERR	1			1								
! !						! !			1			1			1		
C. Total cost						i I			; ;			i			; ;		
(a) Pumping station	24300	76100	213.17%	89400	17.48%	. 0.02	0.05	0.04	. 0.02	BO.0	0.09	0.15	0.48	0.42	1		
(b) Distribution system :		74700			64.26%		0.05	0.09	1 0.05	0.08	0.13	0.33	0.47	0.58			
(c) Overhead tanks	900	3300			-84.65X				; 0.00	0.00	0.00	0.01	0.02				
(d) Others	16850	7400			88.721		0.01	0.01	0.02	0.01	0.01	0.10	0.05	0.07			
•						i									i		

UP JAL NISAM II REVIEW OF DAM COSTS

INDO DUTCH PROJECT

PIPED SCHENE: TIKRI

		TOTAL	5			: COST	PEA KL OF	MATER PRODUCE	<b>D</b>	COST F	ER KL OF I	ATER DISTRIBUTED	COST PER	KL OF WATE	er sold	: COMP	OSITION OF	TOTAL
PARTICULARS	11 <del>789-</del> 90 X INC	1990-91	X INC	1991-92	K INC	1999-90	1990-91	1991-92		119 <del>89-9</del> 0	1990-91	1991-92	1989-90	1990-91	1991-92	19 <del>09-9</del> 0	1990-91	1991-92
D. Maintenance budget	1			•		;				!			-; <del></del>			!		
(a) Pumping station	:		err		ERR					i.			Į.			1		
(b) Distribution system	1		erk		err					ł			:			1		
(c) Overhead tanks	1		ERR		ERR					;			1			;		
(d) Others			ERR		ERR	} •				<b>:</b>			1					
TOTAL	i 		ERR		ERA	1				) } !			1			1		
	!					; ;				: !			!			1		
	1					1				1			1			}		
(4) OTHER COSTS	1					i •							1			i		
A. Equipments	1		ERA		ERR	i				•			1	_		;		
(a) Total cost	i		EM		CNA	,			_	! !				_		1		
(b) % for OM	1		ERR		ERR	:			_	,			;			;		
(c) Old cost	;		ENK		240	;				:			;			ì		
	!					<b>:</b>				! !			!			1		
B. Vehicles	i . 7(000	10700	-71.00%	11000	2.80%	. 0.03	0.01	0.01		0.04	0.01	0.01	0.23	0.07	0.05	:		
(a) Total cost	1 36900	5.00%		5.00%	2.001	, 0.03	0.01	0.01		!	0101	0.01	!	V.V.	*****	ì		
(b) % for OMA	; 5.00% ; 1845	5.35	-71.00¥		2.80%	0.00	0.00	0.00		0,00	0.00	0.00	0.01	0.00	0.00	į		
(c) OM cost	1 1940	323	-/1.004	330	2.004	)	0.00	VV		;	****	4.44	}	••••		;	•	
	1					:				!			1			1		
C. Others	7700	6900	-10.391	8530	23.62%	. 0.01	0.00	0.01		0.01	0.01	0.01	0.05	0.04	0.04	;		
C, UMIETS	!	0,				1				}			1			:		
TOTAL	9545	7435	-22.117	9080	22.13%	10.01	0.01	0.01		0.01	0.01	0.01	1 0.06	0.05	0.04	ſ		
1	1					<b>!</b>				i			1			-		
	1					ł				l			ł			:		
	:					;				J			1					
	}					1						A 70	1			į		
(6) DEPRECIATION	310000	310000		210000		0.22	0.22	0.22		0.29	0.31	0.32	1 1.90	1.96	1.47			
	1		CO?		con .	i				i I						;		
(7) INTEREST	i		err		ERR	1				1			1					

UP JAL NIGAN INDO DUTCH PROJECT

REVIEW OF OWN COSTS

PIPED SCHEME: TIKRI

	1		TOTAL	LS			: COST 6	PERKLOF (	HATER PRODUCED	: COST I	PERKLOF I	WATER DISTRIBUTED	COST PER	KL OF WAT	ER SOLD	: COMPO	SITION OF	TOTAL
PARTICULARS	11989-90	x INC	1990-91	1 INC	1991-92	K INC	1999-90	1990-91	1991-92	:1989-90	1990-91	1991-92	:1 <del>797-</del> 90	1990-91	1991-92	119 <del>99-9</del> 0	1990-91	1991-92
REAL COST BASIS	!						1						1			1		
TOTAL REVENUE	163000		158000	-3.07)	206000	30.38%	0.12	0.11	0.15	0.15	0.16	0.21	1.00	1.00	0.98	\ { !		
VARIABLE COST	;						:						i			;		
(a) Power	402557		402545	0.00%	592733	47.25%	0.29	0.29	0.42	: 0.38	0.41	0.61	2.47	2.55	2.81	38.20%	33.31%	42.03
(b) Chemicals	5228		5437	4.001	7240	33.16X	0.00	0.00	10.0	0.00	0.01	10.0	0.03	0.03	20.0	0.50%	0.45%	0.51
. (c) Repair materials	98550		161500	43.88X	226565	40.29%	0.07	0.12	0.16	1 0.09	0.16	0.23	1 0.60	1.02	1.08	9.35%	13.36%	16.06
(d) Casuals	!			ERR		ERR	}			1			1			1		
Total	506335		569482	12.47%	824538	45.14%		0.41	0.59	0.48	0.58	0.86	3.11	3.60	3,92	48.05%	47.12%	58.60
CONTRIBUTION	-342225		-411482	19.85%	-620538	50.81%	-0 <b>.2</b> 5	-0.30	-0.44	-0.23	-0.42	-0.64	-2.11	-2.60	-2.95	1		
FLXED COST	;									t			1					
(4) Manager	227800		321600	41,18%	264750	-17.68X	0.16	0.23	0.19	: 0.22	0.53	0.27	1.40	2.04	1.26	21.62%	26.61%	18.77
(b) Others	9545		7435	-22.11%	9080	22.13%	0.01	0.01	0.01	0.01	0.01	0.01	1 0.06	0.05	0.04	0.91%	0.62%	0.64
(c) Depreciation	310000		310000		310000		0,22	0.22	0.22	0.29	0.31	0.32	1 1.90	1.96	1.47	29.42%	25.65%	21.98
(d) Interest	!			ERA		ERR :	-			1			:			;		
Total	547345		637035	16.75%	583830	-B.64X	_ 0.39	0.46	0.41	0.52	0.65	0.60	3.36	4.04	2.77	51.95%	52.88%	41.40
SURPLUS/DEFICIT	: : -890680		-1050517	17.95%	-1204368	14.65%	-0.64	-0.75	-0.85	-0.65	-1.07	-1.25	-5.46	-6.65	-5.72	i !		
TOTAL COST (FIXED+VC)	1 1053680		1208517	14.69X	1410368	16.70%				i !			i			: : 100.00%	100.00%	100.00

ALLAHABAD HAND PUMP SCHEDE

3 1 ;

		t :	!		0	IRECT C	<b>15</b> 1				:	I	NO TOBRECT C	061			t
SCHEDIE	NUMBER	:	SAL-MSC	SAL-JE	CHEMICALS	TOTAL	R Materials	& N Labour	TOTAL		EXE SAL	VEHICLE (	admin o/H	DEPA	INDIRECT COST	: TOTAL	:GRD.TOTAL : WITHOUT : DEP
Kalirihar		1989-90		102		243	19	105	124	367		31	53	900	1003		
		: 1 <b>99</b> 0-91		98		229	77	105	182	411		36	51	900	1007	: 1418	: 518
		1991-92		89	. <del></del>	213	138	240	378	591 	: 19	40	50	900	1008		: 699
		TOTAL	399	287		686	233	450	883	1369	59	107	153	2700	3018	4387	
KALIRIHAR		1989-90		102		243	19	105	124	367		31	53	900	1003		: 470
		: 1990-91		96		229	50	105	155	385		36	51	900			
		: 1991-92 :		89 		213	158	240	398	611	: 19	40	50	900	1008	1619	: 719
		TOTAL :	-	287		686	227	450	677	1362	58	107	153	2700	3018	4380	
KAURIHAR		1989-90		102		243	19	105	124	367		31	53	900	1003	1370	•
		: 1 <del>99</del> 0-91 :	: 133	96		229	50	210	260	490	: 19	36	51	900	1007	: 1496	: 596
		: 1991-92 :	124	89		213	201	120	321	· 535	: 19	40	50	900	1008	1543	: 643
		TOTAL	399	287		686	270	435	705	1391	58	107	153	2700	3019	4409	-
KAUR I HAR		1999-90		102		243	23	105	128	371		31	53	900			: 474
		: 1990-91 ·		96		229	59	105	164	394		36	51	900	1007	: 1400	
		: 1991-92 :	124	89		213	96	120	216	429	: 19	40	50	900	1008	1438	: 538
	· 	TOTAL	399	287		686	179	220	508	1194	: 58	107	153	2700	3018	4212	•
KALIRIHAR		1989-90		102		243	19	105	124	367		31	53	900			£ 470
		: 1 <del>990-9</del> 1	: 133	96		229	50	105	155	385	ŧ 19	36	51	900	1007	: 1391	
		1991-92	124	89		213	196	240	436	649	: 19	40	50	900	1008	1657	: 757
		TOTAL	399	287		686	265	450	715	1400	: 58	107	153	2700	3018	4418	•
Kalirihar	6	1989-90		102		243	19	105	124	367		31	53	900	1003		: 470
		: 1 <del>990-9</del> 1 :		96		229	80	105	185	415		36	51	900			
		1991-92	124	89		213	96	120	216	429		40	50	900	1008	1438	538
		TOTAL	399	287		686	195	3230	525	1211	: 59	107	153	2700	3018	4229	-
CAUR I HAR		1989-90		102		243	19	105	124	367	20	31	53	900	1003		: 470
		: 1990-91 :		96		229	103	210	313	543		36	51	900	1007		
		1991-92	124	<b>89</b>		213	129	120	248	461 :	19	40	50	900	1008 t	1470	570
		TOTAL	399	287		686	250	(72	685	1371	58	107	153	2700	3018 :	4389	-

#### ALLAHABAD HAND PURP SCHERE

		: :	:		D	IRECT C	120				: :	IN	DIRECT C	OST		:	:
SCHEME	NUMBER :		SAL-MSC	SAL-JE	CHENICALS	TOTAL	r Materials i	& M ABOUR	TOTAL	TOTAL DIRECT : COST	:	VEHICLE A	omn o/H	DEPR	INDIRECT		: GRO. TOTAL : WITHOUT : DEP
KALIRIHAR	8	1989-90	141	102		243	19	105	124	367	: 20	1 31	53	900	1003	1 1370	-
	:	1990-91 1	133	96		229	50	105	155	385	: 19	36	51	900	1007	1391	: 491
		1991-92		89		213	118	120	238	452		40	50	900	1008		: 560
		TOTAL	399	287		686	187	330	517	1203	•	107	153	2700	3018	•	-
KALIRIHAR		1989-90	•	102		243	19	105	124	367	: 20	31	53	900	1003	ı 1370	-
	;	1990-91	133	96		229	67	210	277	507 :	: 19	36	51	900	1007	: 1513	: 613
		: 1991-92	124	<u>69</u>		213	80	120	200	414	: 19	40	50	900	1008	1 1422	: 522
		TOTAL	399	287		484	166	435	601	1287	t 58	107	153	2700	3018	4305	-
KALIRIHAR	10	1989-90	141	102		243		105	132	375	: 20	31	53	900	1003	•	1 478
		1990-91		96		229		210	284	514		36	51	900	1007		
		: 1991-92		89		213		120	200	414	: 19	40	50	900	8001		: 522
		TOTAL	-	287		686	181	435	616	1302	: 58	107	153	2700	3018	•	: 1620
KALIR IHAR	11	t 19 <del>89</del> -90	: 141	102		243	19	105	124	367	: 20	31	53	900	1003	-	: 470
		: 1 <del>990-9</del> 1 :	133	96		229	440	105	545	775	: 19	36	51	900	1007	: 1781	: 861
		1991-92	124	89		213	78	120	198	411	: 19	40	50	900	1008	: 1419	: 519
		TOTAL	399	287		484	536	2220	966	1552	: 58	107	153	2700	3018	4570	: 1870
KALIRIHAR	12	: 1 <del>797-9</del> 0		102		243		105	123	365		31	53	900	1003		: 469
		1990-91 :		96		229	135	210	345	575 1		36	51	900	1007		
		: 1991-92 :	124	89		213	482	120	602	815		40		900	1008	1 1824	: 924
		TOTAL	399	287		486		425	1070	1755		107	153	2700	3018		: 2074
KALIRIHAR	13	: 1 <del>797</del> -90	141	102		243		105	124	367		31	53	900	1003		
		: 1990-91 :		96		229	92	210	302	531		36	51	900	1007		
		: 1991-92		89		213	96	120	216	429	; 19 ;	40	50	900	1008	: 1438	: 538
		TUTAL	•	287		484	206	435	641	1327	: 58	107	153	2700	3018	: 4345	: 1645
Kaurihar	-	: 1909-90		102		243		105	172			31	53	900			: 518
		: 1990-91		96		229		210	722	564		34	51	900	1007		
		: 1991-92	: 124	89		213	77	120	197	410		40	50	900	1008	: 1418 	: 518
		TOTAL	299	287		686	248	435	703	1307	: 58	107	153	2700	3018	4407	: 1707
KALIRIHAR	15	: 19 <del>99-</del> 90		102		243		210	261				53	900	_		: 606
		1990-91		96		229		210	290	509		36	51	900	_		
		: 1991-92	1 124	89 		213		120	147		: 19	40	50	900		-1	-1
		: TOTAL	379	287		686	147	540	<b>68</b> 7	1372		107	153	2700		: 4391	: 1691 -1
TOTAL		: 1999-90	£ 2119	1524		3643		1680	2052	5695	: 294		788	13500			
		: 1990-91		1440		3442		2415	3937				770	13500			
		1991-92		1229		3201	2049	2160	4209	7410	: 283	600	743	13500	15126	1 22536	1 9036
		IDIAL		4302		10285	3944	6253	10199	20484	t 867	1605	2300	40500	45272	s 65756	· 77771

ALLAHABAD HAND PUMP SCHEME

_		: !				IRECT C	<b>DST</b>				:	INDIRECT C	OST		: :	;
SOMME	NUMBER		•	SAL-JE	CHEMICALS	TOTAL	MATERIALS	R & M LABOUR	TOTAL	TOTAL DIRECT COST	:	VEHICLE ADMN 0/H	DEPR	INDIRECT	E GRAND : TOTAL :WITH DEP	-
HAYAL	_	: 1 <del>999-9</del> 0 :	-	36		135				133			961	1012	: 1147	186
		: 1990-91		36		137	9	105	114	251			961	1016	1 1267	: 306
		: 1991-92 ( :	101	36		137	73	240	313	450	19	40	961	1020	: 1470	509
		TOTAL	301	108		410	82	345	427	836	58	107	2883	3048	: 3884	1001
HAYAL	17	1999-9C i		36		135				135		31	961	1012		
		: 1990-91 :		36		137	34	210	244	281		36	961	1016		
		: 1991-92 : :	101			137	20	120	140	277 (	19	40	961	1020	1297	1 229
·		TOTAL :	301	108		410	54	330	384	793	58	107	2983	3048	-	958
HAYAL		1999-90 1		36		135				135 :		31	761	1012		
		: 1990-91 :		36		137	20	105	125	262 (		36	961	1016		_
		1991-92 :	101	79		137	249	360	609	746 :	19	40	961	1020	1766	: 805
		TOTAL 2	301	109		410	269	465	734	1143 1	58	107	2883	3048		1308
HAYAL	19 :	1989-90		36		135				135 1		31	961	1012	1147	
		1990-91 :		36		137	70	210	290	417 :		36	961	1016		
		1991-92 :	101	 		137		240	263	400 :	19	40	961	1020		459
	:	TOTAL :	301	108		410	93	450	543	952 :	58	107	2983	3048		1117
HAYAL	20 :	1989-90 :		36		135				135 (		31	961	1012	1147	
		1990-91 :		36		137	605	105	710	847 :		36	961	1016		
		1991-92 :				137		120	123	2 <u>60</u> :	19	<b>4</b> 0	961	1020	1290	319
		TOTAL 1	301	108		410	608	225	8223	1243 1	59	107	2983	3048	4291	1408
HAYAL		1 <del>997-9</del> 0 :		36		135				135 :	_	31	961	1012		
		1990-91 1		36 36		137	208 62	315	523	660 :		36	961	1016		
		1991-92 :	101			137		240	302	439 :		40	961	1020		
<u>-</u>	1	TOTAL :	301	108		410	270	555	825	1235 (	58	107	2883	3048	4283	1400
HAYAL		19 <del>89-9</del> 0 :	100	36		135				135 :		31	961	1012		
		1990-91 :		36		137	62	315	377	514 :		36	961	1014		
		1991-92 (	101	<u>3</u> &		137	56	240	296	434 :	19	40	761	1020	1453	492
		TOTAL :	301	108		410	118	555	673	1083 :	58	107	2983	3048		1247
HAYAL		1989-90 t		36		135				135 t		31	961	1012	1147	
		1990-91 :		36		137 137	20 35	105	125	262 :		36	961	1016		
		1991-92 :						120	155	292 :		40	961	1020	:	( <del></del>
	<sub> </sub>	TOTAL :	301	108		410	55	225	280	6 <del>89</del> :	58	107	2983	3048	3737	854
HAYAL	. 24 1	1999-90 t	100 101	36 36		1 <u>35</u> 137				135 : 137 :	20 19	31 36	961 961	1012 1016		
		1991-92 1		. 36		137	21	120	141	279 :	19	40	761	1020		

#### ALLAHABAD HAND PUMP SCHEME

	H P	:	DIRECT COST							: INDIRECT COST				:	:	
SCHEDE		: YEAR :	SAL-HSC	SAL-JE	CHEMICALS	TOTAL	MATERIALS	r & H Labour	TOTAL		EXE SAL	VEHICLE ADMN 0/H	DEPR	INDIRECT		: GRD. TOTAL: : WITHOUT: : DEP
CHAYAL		1989-90		36		135				135		31	961	1012		
		: 1990-91 :		36		137				137		36	961	1016		
		: 1991- <del>9</del> 2	: 101	36		137	20	120	140	277	: 19	40	961	1020	: 1297	: 336
		TOTAL	301	108	•	410	20	120	140	549	: 58	107	2983	3048	: 3597	: 714
CHAYAL	26	1989-90	100	36		135				135	20		961	1012	: 1147	: 186
	:	1990-91 :	101	36	•	137	173	315	488	625	19	36	961	1016		
		1 <del>99</del> 1–92	101	36		137	22	120	142	279	19	40	961	1020	: 1299	338
		TOTAL	301	108		410	195	435	630	1039	58	107	2883	3048	4087	1204
CHAYAL	27	1989-90	100	36		135		•		135	20	31	961	1012	: 1147	186
		1990-91 :	101	36		137	195	210	405	542 :	19	36	961	1016	1558 :	597
		1991-92 :	101	36		137	21	120	141	278	19	40	961	1020	: 1298	337
	:	TOTAL :	301	108		410	215	330	545	955	58	107	2883	3048	4002	1119
TOTAL	·	1989-90 :	1195	430		1625				1625	235	372	11532	12139	13764	2232
	:	1990-91 :	1209	435		1644	1395	1995	3390	5034 :		432	11532	12196	17230 :	5698 :
	:	1991-92 :	1211	435		1646	204	2160	2763	4409		480	11532	12238		
	·:	TOTAL :	3615	1300		4915	1998	4155	6153	11068	693	1284	34596	36573	47641	13045

### IP JAL NIGAM ALLAHABAD HANDPUMP SCHEME

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#### SUMMARY

AURIHAR			TOTAL		% of	TOTAL COST	•		PER PUMP	
	COST COMPONENTS	1989-90	1990-91	1991-92	1989-90	1990-91 1	.991-92	1989-90	1990-91	1991-92
	MANPOWER					,				
	- EMPLOYEES	3936	3732	3484	18.98%	16.60%	15.46%	262.43	248.78	232.26
	- LABOUR (R&M)	1680	2415	2160	8.10%	10.74%	9.58%	112.00	161.00	144.00
	R & M - MATERIALS	372	1522	2049	1.80%	6.77%	9.09%	24.82	101.47	136.62
	OTHERS	1253	1310	1343	6.04%	5.83%	5.96%	83.50	87.32	89.51
	DEPRECIATION	13500	13500	13500	<b>65.</b> 09%	60.06%	59.90%	900.00	900.00	900.00
	TOTAL	20741	22479	22536	100.00%	100.00%	100.00%	1382.76	1498.58	1502.40
	TOT WITHOUT DEP	7241	8 <b>9</b> 7 <i>9</i>	9036				482.76	598.58	602.40
	PHYSICAL PARAMETERS									
		W	WITH DEPRECIATION			WITHOUT DEPRECIATION				
	NO OF HP's	15			15	15	15			
	-COST PER HP	1383				599	602			
	POPULATION	3750	3844	3940	<b>37</b> 50	3844	3940			
	-COST PER PERSON	6			2	2	2			
	HOUSEHOLDS	750	750	750	<b>75</b> 0	750	750			
	-COST PER HOUSEHOLD	28	30	30	10	12	12			
	PRODUCTION(KL)	53950	53950	53840	53950	53950	53840			
	-COST PER KL	0.38	0.42	0.42	0.13	0.17	0.17			
	NO.NOT WORKING	I 80	80	91	во	80	91			

### UP JAL NIGAM ALLAHABAD HANDPUMP SCHEME

NO.NOT WORKING II

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CHAYAL			TOTAL		% OF	TOTAL COS	<b>э</b> т		PER PUMP	
	COST COMPONENTS	1989-90	1990-91	1991-92	<b>1989-</b> 90	1990-91	1991-92	1989-90	1990-91	1991-92
	MANPOWER - EMPLOYEES - LABOUR (R&M)	1860	1876 1995	1872 2160		( 10.89% 11.58%			156.35 166.25	156.00 180.00
	R & M - MATERIALS		1395	603		8.10%	4 3.62%	•	116.27	50.27
	OTHERS	372	432	480	2.70	2.51	4 2.88%	31.00	36.00	40.00
	DEPRECIATION TOTAL TOT WITHOUT DEP	11532 13764 2232	11532 17230 5698	11532 16647 5115				961.00 1146.98 185.98	961.00 1435.87 474.87	961.00 1387.27 426.27
	PHYSICAL PARAMETERS									
		WITH DEPRECIATION			WIT	THOUT DEPF	RECIATION			
	NO OF HP's	12	12	12	. 12	12	12			
	-COST PER HP	1147	1436	1387	186	475	426			
	POPULATION	3000	3075	3152	3000	3075	3152			
	-COST PER PERSON	5	6	5	1	2	2			
	HOUSEHOLDS -COST PER HOUSEHOLD	600 23	600 29	600 28		600 9	600 9	•		
	PRODUCTION(KL) -COST PER KL	43240 0.32				43240 0.13	43320 0.12			

COMBINED			TOTAL		% OF TOTAL COST			
	COST COMPONENTS	1989-90	1990-91	1991-92	1989-90	1990-91	1991-92	
	MANPOWER ,- EMPLOYEES - LABOUR (R&M)	5796 1680	560B 4410	5356 4320	16.807 4.877			
	R & M - MATERIALS	372	2917	2653	1.08%	. 7.35%	6.77%	
	OTHERS	1625	1742	1823	4.71	4.399	4.65%	
	DEPRECIATION TOTAL TOT WITHOUT DEP	25032 34505 9473	25032 39709 14677	25032 39183 14151	72.55% 100.00%	4 63.04% 4 100.00%		
	PHYSICAL PARAMETERS							
		_	TH DEPRECI		WITHOUT DEPRECIATION			
	NO OF HP's	27	27	27	27	27	27	
	-COST PER HP	1278	1471	1451	351	544	524	
	POPULATION	6750	6919	7092	6750	6919	7092	
	-COST PER PERSON	5	6	6	1	2	2	
	HOUSEHOLDS	1350	1350	1350	1350	1350	1350	
	-COST PER HOUSEHOLD	26	29	29	7	11	10	
	PRODUCTION (KL)	97190	97190	97160	97190	97190	97160	
	-COST PER KL	0.36	0.41	0.40	0.10	0.15	0.15	
	NO.OF DAYS NOT WORKING	136	136	139	136	136	139	
BEP			TOTAL		COST	PER PUMP	(RS)	
	COST COMPONENTS	1989-90	1990~91	1991-92	1989-90	1990-91	1991-92	
	VARIABLE COST							
	R & M - Materials '	372 1680	2917 4410	2653 4320	13.79 62.22	108.05 163.33	98.24 160.00	
	A & M - Labour							
	Total VC	2052	7327	6973	76.01	271.38	258.24	
	FIXED COST Man power - Employees Others	5796 1625	5608 1 <b>74</b> 2	5356 1823	214.67 60.17	207.70 64.51	198.37 67.51	
	Total FC	7421	7350	7179	274.84	272.21	265,88	
	Total VC+FC	9473	14677	14151	350.86	543.60	524.12	
	Depreciation	25032	25032	25032	927.11	<del>9</del> 27.11	927.11	
	GRAND TOTAL	34505	39709	39183	1277.97	1470.71	1451.23	

#### AMBASSADE VAN HET KONINKRIJK DER NEDERLANDEN

ROYAL NETHERLANDS EMBASSY

6/50F Shantipath, Chanakyapuri New Delhi - 110.021 tel 688.49.51 - fax. 91.11.688.49.56 tlx. 31-82054

No. 450/PF/as

New Delhi, 5 January 1993

Subject:

Ferguson Study, U.P.

WITHER 01713

de metal

Dear Rob,

As discussed with you, please find enclosed the draft final report on the study of O&M costs concerning UP Jal Nigam, prepared by A.F. Ferguson & Co. under your supervision.

I find the report makes very interesting and quite disturbing reading.

Please scrutinize it. You can send your comments either directly to Ferguson with a copy to me or, if that is easier, send your comments to me and I will forward them.

Sincerely yours,

DALIZE (JM) + 16, per

W

P.M. Flik
First Secretary
Sector Specialist Drinking Water and
Sanitation

1 2 JAN 1993
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Inoual donnhuate / cop

DHV Consultants B.V. Attn. Mr R. Trietsch P.O. Box 1399 3800 BJ AMERSFOORT

Cc.: DAL/ZZ (one copy enclosed for information)

# UTTAR PRADESH JAL NIGAM INDO-DUTCH RURAL WATER SUPPLY AND SANITATION PROGRAMME-INDIA/UTTAR PRADESH

# DRAFT FINAL REPORT ON STUDY OF OPERATION AND MAINTENANCE COSTS

DECEMBER 1992

A. F. FERGUSON & CO. INDIA

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#### REVIEW OF OPERATION AND MAINTENANCE COSTS

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#### 1. INTRODUCTION

#### BACKGROUND

- 1.1 The Public Health Engineering Department (PHED) has been responsible for provision of water supply in the state of Uttar Pradesh from the year 1927 onwards. The PHED was renamed as the Local Self Government Engineering Department (LSGED). In June 1975, an autonomous corporation in the name of Uttar Pradesh Jal Nigam (UPJN) was formed to take over the functions of LSGED. At the same time, Jal Sansthans were formed for provision of water supply to the major cities/towns in the state.
- t . 2 The Kingdom of the Netherlands has financing water supply projects in Uttar Pradesh from 1978 onwards with the basic objective of 'improvement health situation and the general living conditions areas of Uttar Pradesh (UP) through better drinking rural included 22 supply'. The first sub project (SPI) piped water supply schemes in 724 villages in 3 districts using ground water as the source. The project was completed in 1986.

#### OPERATION AND MAINTENANCE

schemes completed under SPI 1.3 have been The maintained bу UPJN. The evaluation mission of May (O&M) costs looked at the operation and maintenance mentions substantial lack of funds for O&M. The maission more detailed knowledge of costs also felt the need for and of the various components of operation, maintenance repair costs of both piped and hand pump schemes under Dutch assisted projects.

#### NEED FOR THE STUDY

1.4 Considering the criticality of operation and maintenance of water supply schemes in providing better drinking water supply, the evaluation mission felt the need for a better understanding of the actual costs of O&M. The results of the study was proposed to be useful for

- (a) better financial justification of projects under preparation
- (b) taking steps to improve cost recovery and
- (c) better control over the cost elements.

Against this background the Review and Support Mission (RSM) approached A. F. Ferguson & Co. (AFF) to conduct the study to arrive at the actual cost of operation and maintenance of a few select schemes.

#### SCOPE OF WORK AND OBJECTIVES

- 1.5 The objective of the study is to arrive at the actual cost of O&M of two piped water supply schemes and of a group of hand pumps. The review and support mission to UP of Novermber 1992 had decided on
  - one piped scheme each in Varanasi and Allahabad
  - group of hand pumps in Allahabad

for review of the O&M costs for three years.

- 1.6 The scope of work can be broadly defined as:
  - Determining the actual operating hours of the piped schemes for each of the three years
  - (2) Review of the actual revenues for each scheme
  - (3) Determining the direct costs of O&M towards manpower, chemicals, power, materials etc.
  - (4) Determining the indirect cost towards manpower, vehicle usage and allocating a portion of the same to the scheme
  - (5) Providing for depreciation based on the estimated technical life of the schemes / hand pumps
  - (6) Arriving at unit cost of water produced
  - (7) Advise on procedures for better information on O&M costs of dutch assisted projects.

#### **EXCLUSIONS**

- 1.7 The following are excluded from the scope of work:
  - (1) Socio-economic survey of the benefitted population to study water usage patterns, ability to pay, actual water distribution etc.
  - (2) Development of an O&M model to provide for sensitivity analysis on critical factors like power tariff, inflation etc.

#### PURPOSE OF THE REPORT

- AFF commenced the study on 12th November 1992 at Lucknow, after an initial meeting with Mr. Robert Trietsch, member RSM to UP. Field visits were made to Varanasi and Allahabad. The preliminary findings of the study was presented to RSM on 23 November 1992 and to UPJN on 25 November 1992. A brief meeting was also held with the Secretary, Ministry of Urban Development on 25 November 1992.
- 1.9 The report presents the results of the study carried out and does not intend to generalise the results of the study to evaluate applicability of the same to the whole of UP. The sample size of 2 piped schemes and a group of hand pumps is too small to do this generalisation.
- 1.10 This report presents AFF's findings and analysis of the O&M costs and is organised on the following lines:

Chapter	2	Executive Summary
Chapter	3	Background to UP Jal Nigam
Chapter	4	Approach to the study
Chapter	5	O & M Costs
Chapter	6	Analysis of O&M Costs
Chapter	7	Systems and procedures
Chapter	8	Conclusions.

#### 2. EXECUTIVE SUMMARY

#### BACKGROUND

2.1 The Government of Netherlands has been financing water supply projects in UP from 1978 onwards. The first sub project aimed at providing piped drinking water supply to 724 villages in 3 districts. This project was completed in 1986 and have been since maintained by UPJN. The Review and Support Mission [RSM] to UP felt the need for a better understanding of actual costs of Operation and Maintenance [O&M] of two piped water supply schemes and one group of hand pumps. A. F. Ferguson & Co. (AFF) were retained to conduct the study on review of O&M costs.

#### SCHEMES SELECTED AND CRITERIA

2.2 Based on the broad criteria defined by RSM, the schemes selected and reasons for the same are presented in the table below:

TABLE 2.1
SCHEMES SELECTED FOR REVIEW

SL.	SCHEME	TYPE	REASON FOR SELECTION
1.	Saidabad, Allahabad	Piped	Smaller population 25 kms from city [ rural ]
	Tikri, Varanasi	Piped	Larger population   5-6 kms from city
; ; ; ;	Group of hand pumps in Division VI, Allahabad	Hand pumps	Both Mark II/Mark III type of pumps maintained

#### BASIC PARAMETERS OF SCHEMES

2.3 The basic parameters of the schemes selected as originally envisaged and as of 1991-92 is presented in the table below:

TABLE 2.2

BASIC PARAMETERS OF SCHEMES SELECTED

, (	SAIDA	BAD	TIKR1		HAND PUMPS
PARAMETERS	AS ENVISAGED	1991-92	AS ENVISAGED	1991-92	[NORM PER PUMP]
1. Source of water	Ground	Ground	Ground	Ground	Ground
	2 Tube wells	2 Tube wells	2 Tube Wells	2 Tube wells	<b>-</b>
2. Villages covered	19	19	27	27	-
3. Population covered	3536Ø (2Ø11)	34Ø51	6156Ø (2Ø11)	59ØØØ	25Ø <del>0</del>
4. Number of connection		89Ø	131Ø (2Ø11)	1400	-
5. Public stand posts	212	238	219	219	-
6. Production (KLD)	3888	2592	35Ø <b>4</b>	3866	10
7. LPCD	7 <b>0 &amp;</b> 90*	45	; 70 & 90♥ !	45	40
8. Pumping Hours	16 hours	(10.70 x 2)	16 hours	(15.34 x	- - !
9. Service Hours	8	6	! 8 !	, , , ,	- !

NOTE: 0 50 families at 5 members per family

\* 70 lpcd for villages with less than 4000 inhabitants and 90 lpcd for villages with more than 4000 inhabitants

#### ACTUAL OAM COSTS

2.4 The actual cost of O&N for each scheme for each year for which data was made available is presented in Table 2.3.

#### REAL OAM COSTS

2.5 UPJN is presently not paying the power charges at the division level but the same is getting adjusted at the Government level. But power constitutes an important component of direct costs and hence to arrive at the real cost of O&M, power charges based on actual consumption and ruling tariff has been calculated and included. Table 2.4 shows the real cost of O&M for the piped schemes.

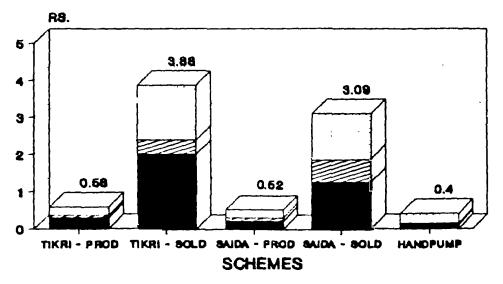
#### UNIT COST OF VATER

The total real O&M cost of water was analysed into the unit cost per kilo litre (KL) of production as well as per KL of water sold. The water sold is defined as the water billed to the private connections. The Exhibit 2.1 depicts the unit cost per KL of water produced/sold for the two piped schemes in 1991-92 and the unit cost per KL of water produced for the hand pumps in 1991-92.

#### EXHIBIT 2.1

#### UNIT COSTS OF VATER

## COMPARISON OF COST PER KL OF WATER 91-92



DIRECT COST INDIRECT COST DEPRECIATION

TABLE 2.3
ACTUAL OAN COSTS

(VALUE IN RS.)

PARTICULARS		; ;	SAIDABAD		TIKRI			27 HAND PUMPS	
		1989-90	1990-91	1991-92	1989-90	1990-91	1991-92	1990-91	1991-92
1.	Direct cost	220100	231100	199400	27455Ø	352500	424565	7327	6973
2.	Indirect cost	6945Ø	16325Ø	968øø	82345	144035	8283Ø	7350	7179
3.	Depreciation	196133	196133	196133	310000	310000	310000	25Ø32	25032
	Total	485683	59Ø483	492333	646895	8Ø8535	817395	39709	39183
4.	Income collected	108000	108000	1826ØØ	94000	90000	124000	-	
5.	Deficit	(379883)	(482483)	(329733)	(552895)	(716535)	(693395)	(39709)	(39183)
8,	Cost recovery	21.82%	18.29%	33.03%	14.53%	11.16%	15.17%	-	-
	;			i 					<b>!</b>

NOTE: In the year 1990-91, arrears of salary were paid to staff and officers and that explains the reason for the large increase in indirect costs.

TABLE 2.4

REAL OWN COSTS - PIPED SCHENES

(VALUE IN RS.)

; PARTICULARS	; ·	SAIDABAD			† TIKRI		
	1989-90	11990-91	11991-92	1989-90	11990-91	1991-92	
Direct cost	436318	488969	518786	681335	754482	1017538	
Indirect cost	69450	163250	96800	62345	144035	82830	
Depreciation	196133	196133	196133	1 310000	310000	; ; 310000	
TOTAL.	; ; ; ; ; ; ; ;	848352	   811719 	; ; ; 1053680 ;	; { {12Ø8517 {	; ; ; 141Ø368 ;	
Income Collected	106000	108000	162600	94000	90000	124000	
Deficit	(595901)	(740352)	(649119)	(95968Ø)	(1118517)	(1 <b>2</b> 86368)	
Cost recovery	15.10%	12.73%	2Ø.Ø3 <b>%</b>	8.92%	7.45%	8.79%	

2.7 As can be seen from the table below the unit cost of water sold increases 5 to 6 times as compared to the cost per KL of water produced. This is due to the fact that a very small percentage of the population has private connections and this is the only available avenue for revenue generation.

TABLE 2.5

REAL UNIT COST OF WATER - 1991-92

(RS. PER KL)

	WATER PRODUCED	WATER SOLD	DEFICIT ON WATER PRODUCED	DEFICIT :
1. Saidabad	Ø.86	5.1Ø	(Ø.69)	(4.Ø8)
2. Tikri	1.00	6.7Ø	; ; (Ø.91)	(6.11)
3. Handpumps	Ø.4Ø	Ø.4Ø	(Ø.4Ø)	(Ø.4Ø)

**NOTE**: Cost includes depreciation

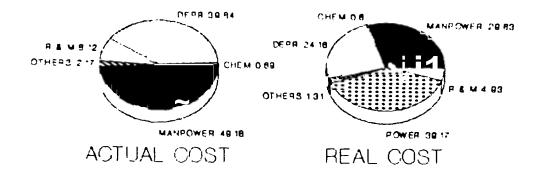
#### COMPOSITION OF COSTS

2.8 On a review of the real costs of water it can be seen that power charges account for 40-42% of the total cost in 1991-92 for the piped schemes. Manpower and depreciation costs together account for 41% in Tikri and 54% in Saidabad. The exhibits below present the composition of costs in 1991-92 for both actual and real costs.

#### EXHIBIT 2.2

COMPOSITION OF COST - SAIDABAD (1991-92)

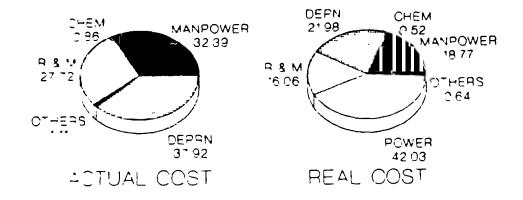
# COMPOSITION OF COST (%) SAIDABAD PIPED SCHEME 91-92



#### EXHIBIT 2.3

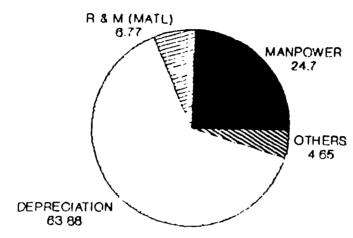
COMPOSITION OF COST - TIKRI (1991-92)

# COMPOSITION OF COST (%) TIKRI PIPED SCHEME 91-92



#### EXHIBIT 2.4

# COMPOSITION OF COST (%) KAURIHAR/CHAYAL HAND PUMP SCHEMES 91-92

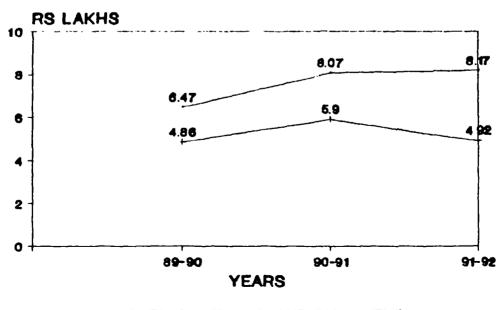


#### TREND IN REAL COSTS

2.9 The total real costs of O&M in the piped schemes are showing an increasing trend essentially due to inflation, higher power costs and the revised tariff for power from 1991-92 onwards. In the year 1990-91, arrears of salary were paid to officers and staff, resulting in steep increase in costs. Exhibit 2.5 below shows the trend of costs for the piped schemes.

#### EXRIBIT 2.5

# TREND IN COSTS- PIPED SCHEMES TREND IN O & M COST (ACTUAL)



- TIKRI SCHEME - SAIDABAD SCHEME

#### ANALYSIS OF COSTS/REVENUES

Real costs derived were further analysed into fixed and variable, in order to arrive at the contribution per KL of water produced/sold. It is interesting to note that operation of both the piped schemes results in a negative contribution meaning that for every KL of water produced UPJN is loosing money. The analysis further shows that the real O&M cost per KL of water produced is ranging from Rs.Ø.86/KL to Rs.1.ØØ/KL while the tariff fixed by the UP Government is Rs.1.ØØ/KL. But due to a very small percentage of water produced being actually sold, the cost recovery fall downs drastically. Table 2.6 below presents the analysis of costs.

TABLE 2.6

ANALYSIS OF COSTS - 1991-92

( VALUE IN RS. PER KL ) TIKRI : SAIDABAD ; |-----| HAND-! PRO- ! PRO- ! PUMPS ELEMENTS | DUCT- | SALES | DUCT- | SALES | ION : ION ; Ø.98 ¦ Ø.17 ¦ Ø.99 ¦ 1. Revenue ( Ø.15 ; demanded 2. Variable cost | Ø.59 | 3.92 | Ø.38 | 2.28 |  $\{(\emptyset,44)\}\ (2.95)\}\ (\emptyset,21)\}\{(1.29)\}\ (\emptyset.07)\}$ 3. Contribution 4. Fixed cost | Ø.41 | 2.77 | Ø.47 | 2.82 | Ø.33 !(Ø.85); (5.72); (Ø.68);(4.11); (Ø.4Ø); 5. Surplus/ (Deficit)

2.11 As can be seen from the above table the variable cost per KL of production in hand pumps is comparitively lower as compared to the piped schemes. This is based on the assumption of 250 people using the handpump at the rate of 40 lpcd. But according to available indications the average number of people using the handpump is around 150. In this case the variable cost per KL will go upto Rs.0.12, which is still much lower than piped schemes.

2.12 The costs were further analysed into cost per person covered and cost per household and the following results were obtained from the same.

TABLE 2.7

ANALYSIS OF COSTS (1991-92)

(VALUE IN RS.)

;	SAIDABAD	TIKRI	HANDPUMPS
REAL COSTS			
1. Total cost per person p.a.	23.84	23.9Ø	6.00
2. Total cost per connection p.m.	76.00	83.95	2.42 [Household]
3. Variable cost per connection p.m.	33.97	49.20	Ø.43 (Household)
4. Fixed cost per connection p.m.	42.03	34.75	[.99 (Household)
ACTUAL COSTS			
1. Total cost per person p.a.	14.46	13.85	-
2. Total cost per connection p.m.	46.10	48.65	-
3. Variable cost per connection p.m.	4.Ø6	13.90	- :
4. Fixed cost per connection p.m.	42.03	34.75	-

The UPJN is charging Rs.15/- per month as the flat rate for unmetered connections, which does not even cover the variable real cost of O&M. The costs indicated above are total costs spread over the private connections including depreciation for the total scheme/handpump.

#### PROCEDURAL CHANGES NEEDED

2.13 The procedural changes proposed are essentially in the nature of better information generation from available records. It is important that the persons to whom information is made available have adequate authority to take decisions to remedy the pointers from the information.

#### SUGGESTIONS

- It is clear from the analysis of costs and revenues that cost recovery is very low and for every KL of water produced the UPJN is incurring losses. It is pertinent to note that even in the scheme design [ as informed to us ] only about 20% of the population are to be covered by private connections, implying an assumed cross subsidy if the scheme is to breakeven. The possible methods to improve the situation are given below but these are not based on a field survey and hence would have to be studied in that light.
  - (1) Educating the population on the need for 'safe' water and the need to pay for it.
  - (2) Involving the population right the planning of scheme and eventually handing over the same for maintenance to the local bodies. The decision whether take up a scheme should be made by local bodies and there should be a underthat maintenance will be just execute responsibility. UPJN should the scheme.
  - (3) Recovering a portion of the costs through a 'Tax' on all households in the village both for handpump and piped schemes. Since there seems to be a basic lack of inclination in paying for water, this may be an indirect way of recovery. The modalities for this 'Tax' needs to be worked out.

- (4) Conducting a socio-economic survey before a scheme is approved. This is essential to get a feel for need for water, ability pay, intention to pay and other social factors which have a strong bearing on a sensitive issue like provision of water supply. The survey should be a prerequisite for approval of the scheme, say if the scheme value is above a certain limit.
- (5) Due to lower cost recovery, lesser will be spent on O&M of schemes, which will have a bearing on the quality of service and hence on the collection efficiency. The revenues and O&M costs of a scheme should be closely evaluated during the planning stage itself and the sensitivity of the same to critical parameters like inflation, tariffs, wastage factor etc. need to be studied. The results of the evaluation should justify taking up the scheme. Development of a O&M financial model may be taken up for the purpose.
- (6) Involving private contractors / voluntary agencies in maintenance of piped as well as hand pump schemes.
- (7) For existing schemes, there is a tariff fixed for public stand posts also. Efforts may be taken to recover these charges the households, which may have a good bearing the cost recovery. The on the PSP responsibility of recovering charges may be given to the local bodies / voluntary organisation.
- (8) It is to be remembered that all assets have a life span. They need to be replaced or extended. It is important to recover depreciation charges also in order to ensure availability of funds for replacements/extensions. This has a long term impact on the efficiency of the organisation.
- (9) There is need for a closer monitoring of O&M costs at various levels through improved Management Information Systems (MIS).

#### CONCLUSION

2.15 It is near impossible for a commercial organisation like UPJN to achieve the twin objectives of providing service and also breakeven on costs. The situation on O&M is quite alarming and immediate steps are needed to ensure better recovery of costs. The experience gained in the past should become inputs for future planning through better evaluation of schemes and critical importance given to review O&M costs and revenues.

#### BACKGROUND TO UP JAL NIGAM 3.

#### STATE OF UP

Uttar Pradesh (UP) had population of million in 1991 constituting 16.5% of India's population but with only 9% of India's total area. The population growth in UP during the period 1981-1991 is slightly higher as compared to the All India average (ie)

1981-1991

UP

2.29% p.a.

All India

2.14% p.a.

[Source: Report of the 1992 Evaluation Mission - June 1992]

of the population is said to be agriculture based as compared All India average, indicating a higher 6Ø% component of rural population.

3.2 The state is organised on the following lines:

DIVÍSIONS

13

DISTRICTS

63

TEHSILS

262

DEVELOPMENT BLOCKS

859

VILLAGES

112566

population in each village is said to relatively be small as shown below:

> (a) villages with less than 500 population

(b)

47% of total villages

14% of total population

Average population per village

villages with between 500-1999 population

44% of total villages

55% of total population

Average population per village 1545

37Ø

[Source: Report of the 1992 Evaluation Mission - June 1992]

- 3.3 The state can further be claissified as
  - Plains (55 out of 63 districts)
  - Hills Himalayas
  - Rocky Bundelkand

#### ECONOMIC PROGRESS OF UP

3.4 The state of UP had a per capita income of Rs.3072 in 1989-90 which is lower than the All India figure by Rs.1180. The growth in per capita income has been lower than the All India growth as shown below:

TABLE 3.1
PER CAPITA INCOME

1	YEAR	UP	ALL INDIA	DIFFERENCE	% OF DIFFERENCE
,	1980-81	1286	1630	344	27%
	1984-85	1812	NA	NA	NA.
;	1989-9Ø	3072	4252	118Ø	38%

[Source: Report of the 1992 Evaluation Mission - June 1992]

#### INTRODUCTION TO UPJN

Provision of water supply in the state of Uttar Pradesh (UP) was the responsibility of the Public Health Engineering Department (PHED) from the year 1927 onwards. The PHED was subsequently renamed as the Local Self Government Engineering Department (LSGED). Considering the importance of providing water supply, an autonomous corporation in the name of Uttar Pradesh Jal Nigam (UPJN) was formed in 1975 to take over the functions of LSGED. For the provision and maintenance of water supply in major towns, Jal Sansthans were also formed.

#### ROLE OF UPJN

- 3.6 UPJN is responsible for the following functions:
  - Provision and maintenance of water supply in the whole of UP except the major towns
  - Provision and maintenance of sewerage treatment facilities (except in major towns)
  - Provision of sanitation facilities (except in major towns)

The state of UP is said to possess a higher level of surface and ground water as compared to the All India figures.

- 3.7 Inspite of the higher levels of water availability and the Government's thrust towards provision of safe drinking water, specially in the rural areas, many problems have been encountered in terms of
  - large area of the state as well as higher population growth
  - wide disbursement of the population (small villages)
  - different types of terrains (hilly, rocky, plains)
  - lower economic status of the population

But still a lot of work in creation of water supply assets have been done and the focus is now on better utilisation of created assets and resources.

#### ORGANISATION OF UPJN

3.8 UPJN is managed by a Board and is headed by a Chairman. It also has a Managing Director and a Finance Director. UPJN employs around 15000 staff in addition to work charge and non-muster roll employees. It has its head quarters at Lucknow and is organised into 6 geographical areas headed by Chief Engineers (CE). The organisation structure is as depicted below:

### EXHIBIT 3.1

#### ORGANISATION STRUCTURE

		; CHAIRMAN	 (		
		, опитини			
				•	
		! MANAGING DIE	RECTOR ;		İ
		!			
<b>;</b>	;		!	;	;
6 ZONAL CE	; FINANCE ; ; DIRECTOR;	SECRETARY    MGMT.	SECRETARY     ADMN.	СРО	CE (5)
;					
40 CIRCLE; SE;	27 Civil   7 Elect-   h		ANAGER {		
;	6 Project				
DIVISION EE's	<u>;</u>				

135 construction, 25 electrical and mechanical, 19 project and addition special divisions.

- NOTE: (1) Organisation structure as given by UP Jal Nigam
  - (2) Do not necessarily indicate grades/levels.

#### INDO-DUCTH CO-OPERATION

3.9 As part of the bilateral co-operation between Government of India and Kingdom of the Netherlands, UP has been getting assistance for water supply projects from the year 1978 onwards. At the time of commencement the objectives for the Dutch assistance were

"The improvement of the health situation and the general living conditions in the rural areas of UP through better drinking water supply."

The assistance is for the creation of the scheme and the responsibility for operation and maintenance is with UPJN and the State Government.

3.10 The Dutch Government has so far financed 6 schemes [ SPI and SP III to SP VII ] covering various districts and types of schemes. The profile of the projects financed by the Dutch Government are given below:

TABLE 3.2
PROFILE OF DUTCH ASSISTANCE

SL.		TYPE OF SCHEME	COVERAGE	NUMBER OF SCHEMES	ALLOCATION IN DG ('ØØØ)
1.	Sub Project (SP) I	Piped	724 villages in 3 dists.	22	22140
2.	SP III	Hand pumps	960 villages ın 6 dists.	5830 pumps	11100
3.	SP IV	Piped	237 villages in 2 dists.	13	17000
4.	SP V	Sanitation	13000 house- holds 32 schools	-	5210
5.	SP VI	la. Hand pumps	1638 villages in 7 dists.	13599	25Ø0Ø
		b. Commun- l ity parti- cipation	-	-	968
6.	SP VII	Piped	  3605 villages 	ιø	81400

DG = Dutch Guilders

Source: Report of the 1992 Evaluation Mission - June 1992

#### PROFILE OF OPERATION AND MAINTENANCE ( RURAL )

3.11 The UPJN operates and maintains 817 piped water supply schemes and about 295000 hand pumps in rural areas as at the beginning of 1991-92. The overall profile of O&M in rural areas and some of the key ratios are presented below. These are essential to present so as to compare the same with results from the study.

TABLE 3.3

OAN OF PIPED SCHEMES - UPJN (PLAINS)

,		
(1)	Total schemes	817
(2)	Estimated cost at the time of construction [Rs.lacs]	19385
(3)	Total number of tube wells	1375
(4)	Total number of overhead tanks	1020
(5)	Length of pipeline in KMS	2582Ø
(6)	Number of private connections	205519
(7)	Number of villages benefitted	9942
(8)	Population benefitted	10595449
· 		· · · · · · · · · · · · · · · · · · ·

NOTE: Source: (1) Report on the recommendations of the committee constituted for working out norms

(2) Figures are approximate

TABLE 3.4

KEY INDICATORS = PIPED SCHENES = PLAINS = UPJN

	PARTICULARS	VAL	VE (RS.L	ACS)	; AS	AX OF PR COST	OJECT		R PRIVAT	_		PER PERS	
		1989-90	1990-91	1991-92			1991-92						1991-92
1.	Receipts	165	205	240	Ø.85%	1.06%	1.24%	6.69	8.31	9.73	Ø.11	Ø. 16	Ø.19
2.	Total expenditure on O&H without centage	866	1116	2252	4 58%	5.7 <b>6%</b>	11.62%	36.00	45.25	91.31	Ø.7Ø	Ø.88	1.77
3.	Cost recovery	19%	18%	11%							;		:

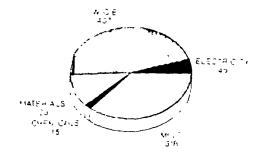
NOTE: SOURCE . (1) Report on the recommendations of the committee constituted for working out norms

(2) 1989-90 and 90-91 are actuals while 91-92 is anticipated, costs exclude depreciation.

#### EXHIBIT 3.2

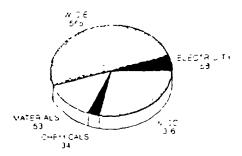
#### COMPONENTS OF OAM COST - PIPED - PLAINS - UPJN

COMPONEN'S OF O & M COST (RS.LAKHS)
PIPED SCHEME - PLAINS - UPJN - 89-90



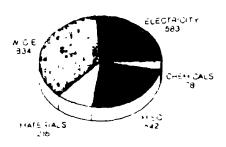
TOTAL Rs. 888 Likhs

COMPONENTS OF O & M COST (RS.LAKHS) PIPED SCHEME - PLAINS - UPJN - 90-91



TOTAL Rs.1116 Lakhs

COMPONENTS OF O & M COST (RS.LAKHS) PIPED SCHEME - PLAINS - UPJN - 91-92



TOTAL Rs.2252 Lakhs

24

3.12 The overall profile of O&M of hand pumps in rural areas by UPJN is given below:

TABLE 3.5

KEY INDICATORS - HAND PUMPS - PLAINS - UPJN

	1989-90	1990-91	1991-92
1. Number of hand pumps maintained [ approx. ]	; ; ; 21931Ø	; ; ; 252325 ;	29688Ø
2. Total cost of O&M (Rs. lakhs)	604.10	, 8Ø6.88	945.39
3. Norms			<u>{</u>
a. Families (50 per pump ];	10965500	12616250	14844000
b. Population { ( 250 per pump }	54827500	63Ø8125Ø	74220000
c. KL production { [ 40 lpcd ]	8ØØ4815ØØ ;	92Ø98625Ø ;	1083612000
4. Key Ratios ;	;	;	
a. Cost per house-; hold per month;	Ø.46	Ø.53	Ø.53
b. Cost per person per month	Ø.Ø9	Ø.11	Ø.11
c. Cost per KL of production	Ø.Ø8	Ø.Ø9	ø.ø9
d. Cost per pump p.a.	275.45	319.78	318.44
	275.45	319.78	318.44

NOTE: Source: (1) Report on the recommendations of the committee constituted for working out norms

<sup>(2)</sup> Cost excludes depreciation.

#### EXHIBIT 3.3

9

COMPOSITION OF O & M COST (RS.LAKHS) . HAND PUMP SCHEME - PLAINS - UPJN - 89-90

COMPOSITION OF O & M COST (RS LAKHS) HAND PUMP SCHEME - PLAINS - UPJN - 90-91

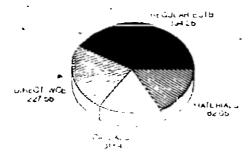
CACUALS 150 37

MALEY ALL

TOTAL Re.604.08 Lakha

TOTAL Rs. 806,88

#### COMPOSITION OF O & M COST (RS LAKHS) HAND PUMP SCHEME - PLAINS - UPJN - 91-92



TOTAL Rs. 946 39 Lakhs

#### UP JAL NIGAM FINANCES

3.13 A sum of Rs.7000 million was spent during the seventh plan for water supply and sanitation in UP. Against this a provision of Rs.14500 million has been made for the eighth plan. The details are as given below, which indicate the importance being given to rural water supply.

TABLE 3.6

UP JAL PLAN ALLOCATION

( RS. MILLION )

HEADS	VII PLAN	; % ;	VIII PLAN BUDGET	; % ;
(1) Rural water supply	5570	8Ø	10250	71
(2) Rural sanitation	230	3	15Ø	, 
Total	5800	83	10400	72
(3) Urban water supply	1090	16	3200	22
(4) Urban sanitation	110	1	900	6
Total	1200	17	4100	28
GRAND TOTAL	7000	100	14500	100

- Source: (1) Indo-Dutch rural water supply and sanitation projects UP India Report of 1992 Evaluation Mission June 1992
  - (2) Includes assistance under Netherlands Assisted Projects (NAP)

#### FINANCIAL POSITION OF UP JAL

- 3.44 The UP Jal Nigam essentially depends on the State Government through the Minimum Needs Programme (MNP) and the Central Government through the Accelarated Rural Water Supply Programme (ARWSP) for financing new projects. In addition funds are obtained under the NAP. For maintenance of schemes and hand pumps funds are received from
  - water charges recovery
  - percentage of plan foods allotted by government for O&M and
    - government subst.

3.15 UPJN has been continuously incurring deficits which essentially means that the cost of supervision of projects and maintenance is much more than the centage being charged. The following table presents the overall financial performance:

TABLE 3.7

UPJN OVERALL FINANCIAL PERFORMANCE

(RS. MILLION)

;	YEARS	INCOME	% INC.	EXPENDITURE	X INC.		% OF ; INCOME;
; -	1984-85	193	·	338	,	145	75
;	1985-86	3Ø5	58	395	17	9ø	29
;	1986-87	316	4	447	13	131	41
1	1987-88	352	111	525	17	173	49
1	1988-89	407	16	664	26	257	63
;	1989-90	391	(4)	724	, ; ; 9 ;	333	85
i ;	1990-91	326	(17)	948	31	622	191
;	Average	p.a.	;	<b>,</b>	30		; ; ;

NOTE: Source: (1) Report of the 1992 evaluation mission

June 1992

(2) Income excludes state government grants but includes centage.

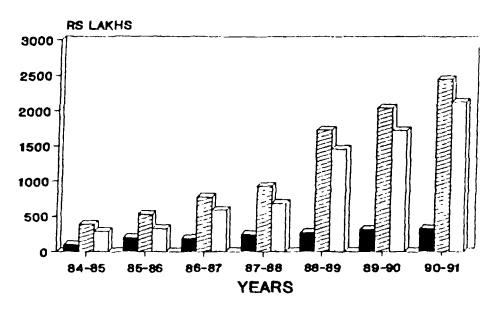
As can be seen the rate of increase in expenditure is almost thrice that of increase in income resulting in higher percentage of deficits.

#### OLH - FINANCIAL POSITION

3.16 The financial position on operation and maintenance is no different, with increasing deficits each year. The following exhibit presents the income, expenditure and deficit on O&M account.

EXRIBIT 3.4

JAL NIGAM - FINANCIAL POSITION



INCOME EXPENDITURE DEFICIT

3.17 On an analysis of the costs the following are indicated:

- deficit as a % of income has been growing consistently in the last 4-5 years to stand at 657% in 1990-91
- the average increase in income is 37% during 1984-85 to 1990-91 as compared to a 88% increase in expenditure thus contributing to the growing deficits
- the cost recovery has fallen from about 26% in 1984-85 to 13% in 1990-91.

#### STUDY ON OAM COSTS

3.18 Considering the alarming situation of UPJN finances on O&M, the RSM felt the need for a clearer understanding of the actual costs of O&M. This is essential to ensure that the resources created over a period of time are actually used effectively and the objectives set out for the assistance is met. As already indicated SPI provided 22 piped schemes in the districts of Rai Bareli, Varanasi and Allahabad. The RSM decided on a review of O&M costs of SPI schemes, since they have been in operation from 1986 onwards.

#### SCHEMES SELECTED AND CRITERIA

3.19 The RSM decided on one piped scheme each in Varanasi Allahabad and a group of hand pumps in Allahabad for review and of O&M costs. It was decided to take only dutch assisted piped though it would have been difficult to adopt that schemes, based hand pumps. The final selection of schemes was on population coverage and the distance of the scheme nearest city. Table 3.8 below shows the selection of schemes and the criteria adopted for the same.

TABLE 3.8
SCHEMES SELECTED

SI	SCHEME	TYPE	REASON FOR SELECTION
1.	Saidabad, Allahabad	Piped	Smaller population 25 kms from city [ rural ]
2.	Tikri, Varanasi	Piped	Larger population 5-6 kms from city { semi-urban }
3.	Group of hand pumps in Division VI	Hand pumps	Both Mark II/Mark III   type of pumps   maintained

3.20 The schemes selected were discussed with RSM and agreed upon. Subsequent to this a detailed plan for conduct of the study was drawn up. The approach to the study, data collected and analysis of the same aare presented in the subsequent chapters.

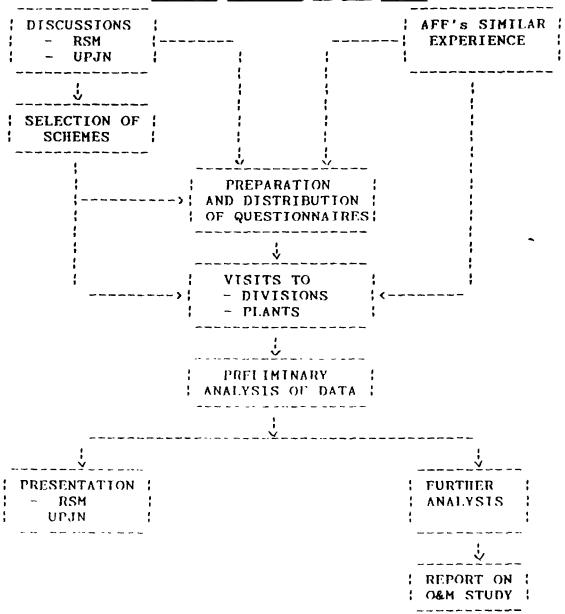
### 4. APPROACH TO THE STUDY

### BASIC APPROACH

with discussions on the objectives of the study and the schemes to be selected with Mr. Robert Trietsch of the RSM. The overall approach to the study was based on the combination of our experience in conducting similar studies and actual field visits to divisions/plants to get a first hand feel of the operation and maintenance aspects. Exhibit 4.1 depicts the overall approach to the study.

#### EXHIBIT 4.1

### OVERALL APPROACH TO THE STUDY



4.2 Some of the critical steps in the approach are discussed in detail in the subsequent paragraphs. The critical assumptions in analysing the costs and revenues are also indicated under 'Analysis'.

### QUESTIONNAIRE

4.3 After discussions with RSM and UPJN, detailed questionnaire, one each for piped schemes and hand pumps, was prepared and sent to the divisions concerned for updation. The questionnaire is broadly organised as follows:

# <u>Piped</u>

- (1) Schemes detail at project completion time
- (2) Scheme/yearwise details [1989-90 to 1991-92]
  - (a) physical parameters
  - (b) financial parameters
  - (c) operation and maintenance costs

#### - various heads

- (3) General [ problems faced, suggestions ]
- (4) List of records maintained
- (5) Enclosures, if any

#### Hand pumps

- (1) General [ location, Make, Cost of purchase etc. ]
- (2) Norms for maintenance [ manpower, materials ]
- (3) Physical parameters
- (4) O&M Costs [ headwise ] for the pump
- (5) Division O&M costs on hand pumps
- (6) General
- (7) Records maintained
- (8) Enclosures, if any

Copies of the questionnaire are enclosed as Annexure I.

### VISITS TO DIVISION/PLANTS

Visits were made to the divisions responsible for O&M of the piped schemes and the group of hand pumps and in addition the pumping plants at Tikri, Varanasi and Saidabad, Allahabad were also visited. The focus of the visit, apart from helping UPJN divisions to update the questionnaire, was to get a first hand feel of O&M by talking to the people at the plant and division office. The visits were aimed at

- (a) review of the log books / sheets maintained at the plant to derive / judge
  - service hours
  - number of hours of pumping for each tube well per day for each year
  - chemicals consumption per day
  - days on which plant/(s) not working
- (b) review of other records to look at
  - type of complaints recreved & quickness of action taken
  - availability of chemicals
- (c) getting a feel of the time spent by each category of labour / staff on various activities of O&M by talking to them
- (d) talking to the people in the nearest village, very briefly, on water availability, hours of supply, whether meters available, why not paying for water etc.
- 4.5 The Executive Engineer (EE) in charge of the division and the Assistant Executive Engineer (AEE) in charge of the scheme were also met to understand the problems in O&M and to estimate the time spent by each of them on O&M of the scheme concerned. Records maintained at the division for expenditure was also briefly reviewed.

- 4.6 For hand pumps, details were essentially obtained through the questionnaires but whereever made available the cards maintained to record the repairs carried out and the cost of materials and casual labourers reviewed. In addition details on number of hand pumps maintained by the JE/AE/EE concerned were obtained to help in allocation of indirect manpower cost.
- 4.7 To the extent available, the annual balance sheet of the division, at least for the year 1991-92 was obtained to get an overall view of the total cost of O&M for that division.
- 4.8 The list of people met during the study is enclosed as Annexure II.

### **ANALYSIS**

- 4.9 The data obtained from the field visit and from the questionnaires was critically reviewed and analysed with a view to derive:
  - (a) Total cost of operation and maintenance [split into direct and indirect] as well as the revenues demanded and collected
  - (b) Composition of total cost in to manpower, power, chemicals, other expenses and depreciation
  - (c) Cost per KI of water produced, distributed and sold for piped schemes and cost per KI of water and per pump for hand pumps
  - (d) Contribution in total and per KI after splitting costs into fixed and variable elements
  - (c) Cost per connection and person covered.

The power charges that would have been due based on actual pumping hours was added to the actual costs to derive the real costs. The detailed analysis mentioned above was also carried out on the real costs.

4.10 The analysis of the data was carried out by using a financial model developed for this purpose on Lotus 1-2-3.

#### **ASSUMPTIONS**

4.11 The assumptions made in working out the actual O&M costs are listed below:

#### Piped Schemes

- (1) To arrive at the population covered by private connections, the average household size was taken as 8 for Tikri and Saidabad schemes. The balance population was persumed to be covered by Public Stand Posts (PSP).
- (2) The actual pumping hours were compiled from the log books available at the plant. If particular year's log book were not made available the previous years average was considered. Wherever log books were not made available for a month, the average pumping hours per month in each season was assumed to derive year / monthwise pumping hours. For this purpose the year was split into two seasons [ie.] summer and winter [ April to September and October to March]. Most of the data for the year 1991-92 was available for both the schemes.
- (3) Water distribution was difficult to assess due to lack of records in this regard. This was essentially picked up from the questionnaire but suitably adjusted for
  - lpcd in each category
  - revenue demand from private connections

For eg. - in the Tikri scheme while distribution to metered connections was given as 370679 KL, the actual revenue demand was only Rs. 2.06 lakhs. In this case, the revenue demand was taken as the basis for arriving at water distribution. It has been assumed that water demand has been at Rs. 1/- per KI (ie.) without the rebate for early payment.

- (4) Water sold excludes distribution through public stand posts.
- (5) The indirect manpower cost was arrived at on the following basis:

LEVEL	TIKRI % ASSUMED	SAIDABAD % ASSUMED
EE AE JE	5 2Ø 5Ø	5 15 85
Admn.	5	5

These were based on discussions with respective level of people as well as indications in the questionnaire. The EE's % was also assumed for administration staff.

(6) The real power charges (which are not based on bills received or on the flat rate) were arrived at based on the following formula:

Number of hours of pumping x HP x Ø.735 x rate per unit

The power tariff assumed are

1989-90	Rs.1.10/unit
1990-91	Rs.1.10/unit
1991-92	Rs.1.60/unit

Since proper data on the efficiency factor of the pump was not made available, the same has been assumed as 1. But in most cases the efficiency factor may be less than i and hence the power charges may be lower. The power charges worked out are as if for metered power connections. But meters have not been installed for both the schemes visited. The electricity board is charging only a flat rate per month, which also are not being paid.

(7) The price for bleaching powder was assumed at:

1989-9Ø Rs.3.75/kg. 1990-91 Rs.3.90/kg. 1991-92 Rs.5.13/kg.

- (8) Cost of O&M of vehicles was as mentioned in the questionnaire
- (9) Other administration overheads was allocated at 5%
- (10) Depreciation was provided on straightline method based on 30 years life.

### Hand pumps (HP)

(1) 27 hand pumps were chosen for a detailed analysis

15 in Kaurihar 12 in Chayal

- (2) Data for 1989-90 was not available in full and hence results are presented only for 1990-91 and 1991-92.
- (3) The salary of the work charged establishment (WCE) directly involved in hand pumps maintenance was equally distributed over the handpumps maintained by the group of WCE.
- (4) 33% of the JE's time was presumed to be spent on hand pumps maintenance and the proportional salary thus derived was distributed equally over the number of hand pumps maintained. Similarly 11% of AE's salary and 16% of EE's salary were assumed.
- (5) The average number of hand pumps maintained in each year was arrived at based on the formula

HP at beginning of year + HP at closing - of year

- (8) Cost per KM of vehicle was indicated in the questionnaire along with estimated number of kms run for each hand pump; which was the basis for vehicle expenditure per pump.
- (7) The administrative overheads were distributed along the same basis as the EE's salary.
- (8) Depreciation was arrived at based on straightline method with 15 years life.

### **PRESENTATION**

4.12 The detailed analysis of the data based on assumptions mentioned above was carried out and the preliminary results presented to RSM and the UPJN.

### REPORT

4.13 Further analysis, essentially in the nature of different assumptions on distribution, revenues from PSP's, proportional depreciation on private connections were carried out and the results are presented in this report. The detailed findings from the study are presented in the subsequent chapters.

# 5. OAM COST OF SCHEMES

#### **BACKGROUND**

The data collected on the piped schemes and the group of hand pumps was analysed to arrive at the total cost and unit cost per KL. As explained in the previous chapter, further analysis on the components of costs and the nature of costs [ie.] fixed/variable was also carried out. This chapter presents the results of this analysis.

# SCHEME SPECIFIC INFORMATION

5.2 At the time of design of the piped schemes, various parameters were decided and the same are presented below:

TABLE 5.1

DESIGN PARAMETERS - PIPED SCHEMES

PARAMETERS	SAIDABAD	tikri ;
1. Scheme completed 1	n 1983	1983
2. Source of water	2 tube wells	2 tube wells
3. Villages to be covered	19	27
4. Population in design year(2011)	3536Ø	61560
5. Pumping station and capacity	30 HP and 40 HP 1950 lpm and 2100 plm resp.	45 HP and 40 HP 2100 lpm each
6. Capacity of over- head tank	650 KL	1200 KI.
7. Length of distri- bution lines	59 kms	80 kms
8. Number of metered (connections (2011)	1458	1312

TABLE 5.1 (CONTD.)

PARAMETERS	SAIDABAD	; TIKRI ;
9. Number of PSP's planned	212	219
10. LPCD assumed *	70/90	70/90
11. Anticipated O&M cost per KL of water production	Rs.Ø.24	Rs.Ø.19
12. Total actualscheme: cost [Rs. lakhs]	58.84	92.78

<sup>\* 70</sup> lpcd for villages with less than 4000 inhabitants and 90 for villages with more than 4000 inhabitants.

NOTE: Information as provided in the questionnaire. Actual design records not made available and hence not verified.

5.3 The hand pumps were planned with the following norms:

Number c	o C	persons	per	pump	250	
lpcd					40	
Number c	) f	families	per	qmvq	50 A 5 per	family.

5.4 The key physical parameters of the piped schemes as of 1991~92 as compared to the design parameters are presented below to enable evaluation of certain parameters like population and service hours, which seem to have undergone drastic changes.

TABLE 5.2
KEY PARAMETERS PIPED SCHEMES

	SAID	ABAD	TIKRI		
PARAMETERS	AS ENVISAGED	1991-92	AS ENVISAGED	1991-92	
1. Source of water	Ground	Ground	Ground	Ground	
Water	2 Tube wells	2 Tube wells	2 Tube wells	2 Tube wells	
2. Villages covered	19	19	27	27	
3. Population covered	3536Ø (2Ø11)	34051	6156Ø (2Ø11)	59ØØØ	
4. Number of connections		89Ø	131Ø (2Ø11)	1400	
5. Public stand posts	212	238	219	219	
6. Production (KLD)	3888	2592	35Ø4	3866	
7. LPCD	7Ø & 9Ø*	45	70 & 90*	45	
8. Pumping Hours	16 hours	(10.70 x 2)	16 hours	(15,34 x 2)	
9. Service Hours	8	6	8	6	

<sup>\* 70</sup> lpcd for villages with less than 4000 inhabitants and 90 lpcd for villages with more than 4000 inhabitants

# ORGANISATION OF THE SCHEMES

5.5 The organisation structure for operation and maintenance of the schemes as of 1991-92 is shown below. The salary cost of these people have been allocated to the scheme based on the assumptions given in chapter 4.

TABLE 5.3

# **ORGANISATION**

LEVEL OF PEOPLE	; SAIDABAD	† TIKRI	KAURIHAR   HPS	CHAYAL HPS
INDIRECT	!	.;	;	!
1. Executive Engineer	; ; ;	1	; ; ;	1
2. Assistant Engineer	; { ;	1 1	1	1
3. Junior Engineer	1	1	; ;	1
TOTAL	3	3	3	3
DIRECT		;	2*	4*
4. Pump operators	2	58		
5. Tax collector	1	1		
6. Fitter	1	2		;
7. Beldar	į	2		• • •
8. Sweeper ; { part time } ;	1	- ;	• • •	1
9. Pump attendants	5	- ; - ;	; ; ;	
TOTAL	11 ;	10	2	4
GRAND TOTAL	14	13 ;	5	7 ;

<sup>@</sup> May include attendants also

<sup>\*</sup> Levels not available.

5.6 It is pertinent to note that inspite of Tikri being a bigger scheme with more private connections and distribution lines it has lesser number of direct labour as of 1991-92.

١

# ACTUAL COST OF OAM

5.7 The actual cost of O&M of the piped schemes and of the group of hand pumps is presented in Table 5.4. As can be seen the cost recovery is very low in the piped schemes and nil for the hand pumps. While the Tikri scheme is showing consistent increase in costs, Saidabad scheme is showing lower direct cost in 91-92, compared to 89-90. This is due to lower repairs cost even in absolute terms which may not be healthy for maintenance of the system.

TABLE 5.4

<u>ACTUAL OAN COSTS</u>

(VALUE IN RS.)

PARTICULARS :		;	SAIDABAD		: :	TIKRI	27 HAND PUMPS		
, P	ARIICULARS	1989-90	199Ø-91	1991-92	1989-90	1990-91	1991-92	1990-91	1991-92
1.	Direct cost	220100	231100	199400	27455Ø	3525 <b>00</b>	424565	7327	6973
2.	Indirect cost	6945Ø	163250	96800	62345	144Ø35	8283Ø	7350	7179
3.	Depreciation	196133	196133	196133	310000	310000	310000	25032	25Ø32
	Total	485683	590483	492333	646895	8Ø8535	817395	39709	39183
4.	Income collected	108000	108000	162600	94000	90000	124000	-	-
; ; 5.	Deficit	(379663)	(482483)	(329733)	(552895)	(718535)	(693395)	(387Ø8)	(39183)
6.	Cost recovery	21.82% 	18.29%	33.03%	14.53%	11.18%	15.17%	-	-

NOTE: In the year 1990-91, arrears of salary were paid to staff and officers and that explains the reason for the large increase in indirect costs of piped schemes.

4

#### REAL COST OF OAM

The real cost of O&M includes the actual cost and imaddition the power charges calculated based on actual operating hours of the pumping station. In the real costs, power charges become a very important component as is evident from the increased direct costs. The real costs of O&M of the piped schemes are presented in Table 5.5-below:

# TABLE 5.5

## REAL OM COSTS

(VALUE IN RS.)

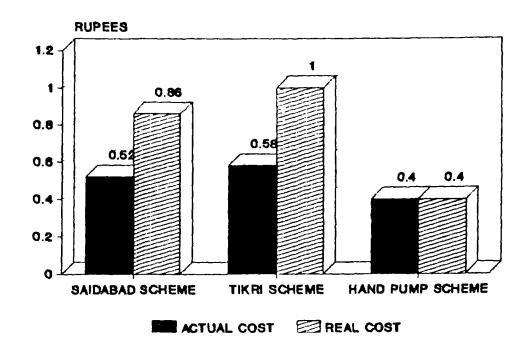
PARTICULARS	; !	SAIDABAI	0	TIKRI			
; PARTICULARS	1989-90	1990-91	1991-92	1989-90	1990-91	1991-92	
Direct cost	436318	488969	518786	681335	754482	1017538	
Indirect cost	6945Ø	18325Ø	96800	62345	144Ø35	8283Ø	
Depreciation	196133	196133	196133	310000	310000	310000	
TOTAL	701901	848352	811719	1053680	12Ø8517	141Ø368	
Income Collected	106000	108000	162600	94000	90000	124000	
Deficit	(595901)	(74Ø352)	(649119)	(95968Ø)	; ;(1118517)	(1286368)	
Cost recovery	15.10%	12.73%	2Ø.Ø3 <b>%</b>	8.92%	7.45%	8.79%	

## COST PER KL OF WATER

The actual and real cost of water was distributed over the extent of water produced, distributed and sold to arrive at the unit cost of water. Since 1991-92 is a representative year, because of revised pay scales from 1990-91, the cost per KL of water produced in 1991-92 will be a good indicator of the costs. The following exhibit presents the cost per KL of water produced in 1991-92.

# EXHIBIT 5.1

# COST PER KL OF WATER PRODUCED 91-92



5.10 Table 5.6 gives the actual and real cost per KL of water produced and sold. Two interesting inferences can be made from this table [ ie. ]

- (1) The cost per KL of water sold in piped schemes goes up 5 to 6 times as compared to the cost per KL of water produced
- (2) The deficit of Rs.Ø.4Ø in O&M of hand pumps is comparable with the actual cost deficit in piped schemes in terms of KL of water produced (Rs.Ø.35 and Rs.Ø.49). But the real cost of O&M in piped schemes per KL of water produced is much higher.

TABLE 5.6

OAM COST OF WATER PER UNIT (1991-92)

# O & D CRS. OF MIE

TEM		CORST PER LIPEE SCI			( <b>CO</b> S)	PER PUMP) BANDPUMPS	(0051)	PEF RL)
	118			MAN	27 BA	IDPUMPS	27 MAN	DPUMPS
	PRODUCED	<b>30</b> :0	PRODUCED	<b>\$0</b> .0	With	TUONTE	BITH	MITHOU:
ACTUAL COST					<b>D</b> £ P	DEP	<b>6</b> £7	<b>0</b> {P
BROAD COST ELEMENTS								
(1) DIRECT COST	0.30	2.02	●.21	1.25	258.00	258.00	0.12	0.12
(2) INDIRECT COST	9.06	0.39	0.10	0.61	266.00	266.90	0.03	0.03
(3) DEPRECIATION	0.22	1.47	●.21	1.23	927.00		●.26	
TOTAL	0.58	3.88	0.52	3.09	1451.00	524.00	0.40	0.15
(4) INCOME RECEIVED	0.09	0.59	₩.17	1.02			0	•
(5) SURPLUS/(DEFICIT)	-0.49	-3.29	-0.35	-2.07			-0.40	-0.15
(6) RECOVERY & ON TOTAL								
· <b>COS</b> 1	15.52%	15.21	32.691	\$10.22			0.001	0.901
REAL COST								
BROAD COST ELEMENTS								
(1) DIRECT COST	0.72	4.84	0.55	3.26				
(2) INDIRECT COST	0.06	0.39	0.10	0.61				
(3) DEPRECIATION	9.22	1.47	9.21	1.23				
TOTAL	1.00	6.70	0.86	5.10				
(4) INCOME RECEIVED	0.09	0.59	€.17	1.02				
(5) SURPLUS/(DEFICIT)	-0.91	-6.11	-0.49	-4.06			-	
(6) RECOVERY & ON TOTAL	•							
C051	9.001	8.81	19.77	20.00	1			

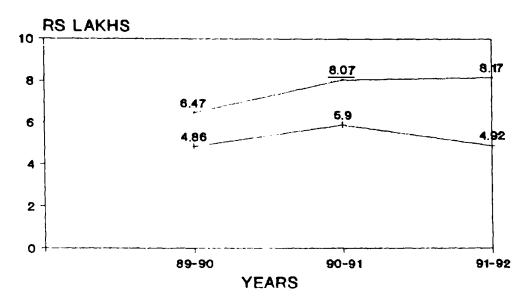
### TREND IN COSTS

The real costs have been showing an increasing trend essentially due to inflation, increase in manpower costs and the revised tariff for power from 1991-92 onwards. The salary scales were revised from 1990-91, arrears of salary were also paid and hence the steep increase in cost, during that year. Exhibit 5.2 below shows the trend in costs.

# EXHIBIT 5.2

# TREND IN COSTS

# TREND IN O & M COST (ACTUAL)



TIKRI SCHEME SAIDABAD SCHEME

# COMPOSITION OF COSTS

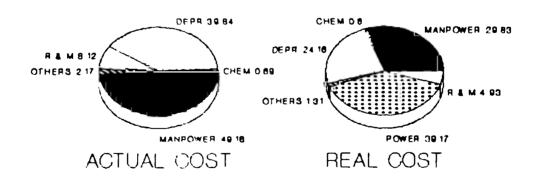
5.12 The major components of actual cost of O&M of piped schemes are

- manpower
- repairs and maintenance and
- depreciation.

These three account for more than 95% of the total costs. These three components also account for about 95% of O&M of hand pumps. In the components of real cost power charges make about 40% of the total cost. The components of actual and real costs for 1991-92 are presented diagramatically in Exhibit 5.3 to Exhibit 5.5.

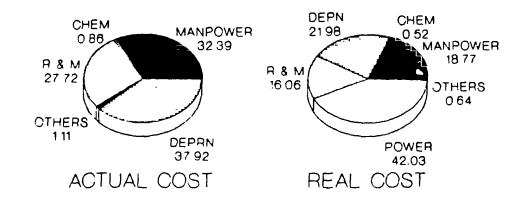
#### EXHIBIT 5.3

# COMPOSITION OF COST (%) SAIDABAD PIPED SCHEME 91-92



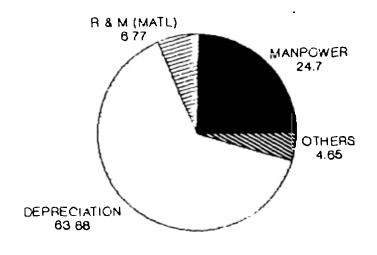
# EXHIBIT 5.4

# COMPOSITION OF COST (%) TIKRI PIPED SCHEME 91-92



# EXHIBIT 5.5

# COMPOSITION OF COST (%) KAURIHAR/CHAYAL HAND PUMP SCHEMES 91-92



# ANALYSIS OF COSTS

The costs derived were further analysed into cost per private connection and cost per person covered by the scheme in both piped as well as hand pumps. The real cost per connection for the year 1991-92 comes in the region of Rs.77/- to Rs.84/- per month, which is about 5.5 times the minimum charge of Rs.15/- being levied today. This difference explains the cost recovery being as low as 15-20%. Table 5.7 gives an idea of the cost per person/connection for both types of schemes. As can be seen the cost per household in hand pumps (assuming 50 families per pump) works out to less than Rs.3 per month.

TABLE 5.7

COST PER CONNECTION/HOUSEHOLD - 1991-92

(VALUE IN RS.)

!	SAIDABAD		TIKR	HAND :	
	ACTUAL COST	REAL COST		REAL COST	PUMPS :
1. Cost per person pa	14.46	23.84	13.85	23.90	6
2. Cost per connection pa	n 553.18	912.04	583.85	1007.41	29
3. Cost per connection pm	n 46.10	76.00	48.65	83.95	2.42

5.14 The above figures have been worked out after considering the entire cost of O&M, including depreciation, being paid for by the private connections in piped schemes and by all households to be covered by the hand pumps. Even if a recovery of Rs.3/- per household per month is made for hand pumps, an attempt can be made to recover the entire cost of O&M of hand pumps.

### CONTRIBUTION ANALYSIS

The costs were further analysed into fixed and variable, in order to arrive at the contribution per KL of water produced/sold. It is interesting to note that operation of both the piped schemes results in a negative contribution meaning that for every KL of water produced UPJN is loosing money. The analysis further shows that the real O&M cost per KL of water produced is ranging from Rs.0.86/KL to Rs.1.00/KL while the tariff fixed by the UP Government is Rs.1.00/KL. But due to a very small percentage of water produced being actually sold, the cost recovery fall downs drastically. Table 5.8 below presents the analysis of costs.

TABLE 5.8

CONTRIBUTION ANALYSIS

( VALUE IN RS. PER KL )

	TIK	RI	SAID	HAND- :	
ELEMENTS	PRO- DUCT- ION		PRO- DUCT- ION	•	PUMPS
1. Revenue demanded	Ø.15	Ø.98	Ø.17	Ø.99	- ;
2. Variable cost	Ø.59	3.92	Ø.38	2.28	Ø. <b>Ø</b> 7
3. Contribution	(0.44)	(2.95)	(Ø.21)	(1.29)	(0.07)
4. Fixed cost	้ Ø.41	2.77	Ø.47	2.82	Ø.33
5. Surplus/ (Deficit)	(Ø.85)	(5.72)	(Ø.68)	(4.11)	(Ø.4Ø)

5.16 As can be seen from the above table the variable cost per KL of production in hand pumps is comparitively lower as compared to the piped schemes. This is based on the assumption of 250 people using the handpump at the rate of 40 lpcd. But according to available indications the average number of people using the handpump is around 150. In this case the variable cost per KL will go upto Rs.0.12, which is still much lower than piped schemes.

5.17 The costs were further analysed into cost per person covered and cost per household and the following results were obtained from the same.

<u>TABLE 5.9</u>

<u>COST ANALYSIS (1991-92)</u>

(VALUE IN RS.)

<u>;</u>	1	SAIDABAD	TIKRI	BANDPUMPS
; ;	REAL COSTS			
11.	Total cost per person p.a.	23.84	23.90	6.00
2.	Total cost per connection p.m.	76.00	83.95	2.42 (Household)
3.	Variable cost per connection p.m.	33.97	49.20	Ø.43 (Household)
<b>4</b> .	Fixed cost per connection p.m.	42.03	34.75	l.99 (Household)
) ; )	ACTUAL COSTS	)   		
; ; 1 . ;	Total cost per person p.a.	14.46	13.85	-
2.	Total cost per connection p.m.	46.10	48.65	-
; ;3.	Variable cost per connection p.m.	4.06	13.90	; ; ;
4.	Fixed cost per connection p.m.	42.Ø3	34.75	i - i

# PHYSICAL RESULTS

5.18 The analysis of costs was done based on the appraoch and assumptions indicated in chapter 4. The analysis also indicated certain key physical parameters, which are shown below. These resultant parameters have to be studied in relation to the assumptions. Further these are derived from the records available and hence may not reflect the actual situation on the ground in terms of water distribution, wastage, actual lpcd etc.

#### **WORKINGS**

5.19 A set of outputs from the model showing the calculations and workings are enclosed as Annexure III.

<u>TABLE 5.10</u>

# SCHEME SAIDABAD - PHYSICAL PARAMETERS

	1989-90	1990-91	1991-92
1. Pumping hours			,
- Pump 1 - Pump 2	4354 3Ø96	4354 <b>6</b> 4776	36Ø8 42Ø1
2. No. of days not worked		<b>!</b>	
- Pump 1 - Pump 2	- (1) - (1)	- (1) - (1)	47/3 <b>0</b> 5 51/274
3. Production KL (Total)	91Ø836	11Ø7396	946125
4. lpcd calculated			
<ul><li>domestic metered</li><li>domestic unmetered</li><li>PSP</li></ul>	NA 62 4Ø	NA 62 4Ø	6Ø 62 4Ø
5. Average production per day in KL	2495	3Ø34	2592
6. Chemicals			i !
Number of days not treated			Full of March 92 no treat- ment was done
Average per day			2.75 kg/day
Per KL of production	 	i ! !	1.08 gm/KL
7. Composition of repairs		;   	
<ul><li>Pumping station</li><li>Distribution system</li><li>Others</li></ul>	34% 61% 5%	43% 57%	48% 52%
8. Revenues (Rs.lacs)	)   	1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
- Demand - Collection (incl) arrears	Ø.92   1.06	Ø.97   1.08	1.58

NOTE : 8 Since 1990-91 log books not made available, 1989-90 figures assumed

<sup>(1)</sup> Full details of daily pumping not made available.

TABLE 5.11

SCHEME - TIKRI - PHYSICAL PARAMETERS

1 1	1989-90	1990-91	1991-92
1. Pumping hours			
- Pump 1	5162	5163	5884
~ Pump 2	59Ø2	5901	5317
2. No.of days not worked			
- Pump 1	-	-	18/335
- Pump 2	-	-	43/335
3. Production Kl	;   1394138	1394Ø94	1411269
4. lpcd calculated	? ! !	 	
<ul><li>domestic metered</li><li>domestic unmetered</li><li>PSP</li></ul>	51 59	42 - 48	52 51 43
5. Average production per day in KL	¦ ¦ 382Ø !	; ; 3819 ;	;   3866   
8. Chemicals		1 1 1	, , , , , , , , , , , , , , , , , , ,
Number of days not treated	; ; ;	i 1 1 3 3 1 1 1	Full of April, October and November 91 Inol treated
Average per day	i i	8.19 kg	2.83 kg.
Per KL of production	1 1	2.14 gms	0.73 gms
7. Composition of repairs	1	1 1 1	1
- Pumping station - Distribution system - Overhead Lank - Others	25% 57% 1 1%	47% 46% 2% 5%	40% 54% - ( <1%) 8%
8. Revenues (Rs.lacs)	; !	· • •	
- Demand - Collection - Efficiency	1.63 Ø.94 58%	1.58 0.90 57%	2.08 1.24 80%

# 6. ANALYSIS OF OAM COSTS

- 6.1 The costs derived, as indicated in chapter 5, were further reviewed with a view to
  - compare the same across schemes and with UPJN as a whole
  - do sensitivity analysis on certain key parameters.

The results of this review are described in the subsequent paragraphs.

#### <u>COMPARISON ACROSS SCHEMES - PIPED</u>

- 6.2 On a comparison of the real cost per KL of water produced in 1991-92 the conclusions that may be drawn are:
  - (a) Saidabad scheme has been spending less each year on repairs resulting in lower repair cost per KL
  - (b) Tikri scheme has been operating at a higher capacity resulting in higher power charges and lower manpower cost per KL of water produced
  - (c) In other aspects of revenues/costs they present almost a similar picture.

Table 6.1 below presents the comparison.

TABLE 6.1

REAL COST PER KL OF WATER PRODUCED = 1991-92

; ;	SAIDABAD	; TIKRI
1. Income demanded	Ø.17	Ø.15
COSTS		i !
2. Manpower	Ø.26	Ø.19
3. Power	Ø.34	Ø.42
4. Chemicals	Ø.Ø1	0.01
5. Repairs	Ø.04	Ø.16
6. Others	0.01	0.01
7. Depreciation	Ø.21	Ø.22
TOTAL	Ø.86	1.01
SURPLUS/ (DEFICIT)	(Ø.69)	(Ø.85)

# COMPARISON WITH UPJN

6.3 The overall profile of O&M of piped and hand pumps schemes in UPJN has been presented in chapter 3. Some of the key parameters are compared here. Table 6.2 depicts the cost analysis of piped schemes in comparison to O&M of piped schemes in UPJN (plains).

TABLE 8.2

PIPED SCHEMES - COMPARISON WITH UPJN (PLAINS)

!	!	1989-93		1:	99Ø-91		! !	1991-	92
PARAMETERS	UPJN (ACT- UALS)	-	;	UPJN (ACT- UALS)	ABAD		UPJN (EST)		TIKRI
11. Revenue receipts	;	; ; ;			, ; ;	; ; ;	, ———— ; ;	, ; ; ;	, — — — ;
a. % of project cost	; ; ; Ø.85	1.8Ø	1.01	1.08	1.84	Ø.97	1.24	2.77	1.34
b. Per con- nection (Rs.pm)		1Ø.54	7.09	8.31	1Ø.53	5.86	9.73	15.22	7.38
c. Per person (Rs.pm)	Ø.13	Ø.28	Ø.16	Ø.16	Ø.28	Ø.13	Ø.19	Ø.4Ø	Ø.18
2. O&M Cost   [without centage and depreciation]									
a. % of project cost	4.58	8.60	8.02	5.76	11.Ø8	9.69	11.62	10.47	11.86
b. Per con- nection (Rs.pm)	-	50.30	56.Ø8	45.25	83.57	58.50	91.31	57.84	85.5Ø
c. Per person (Rs.pm)	Ø.70	1.36	1.23	Ø.88	1.67	1.30	1.77	1.51	1.55
3. Cost recovery %	19	21	13	18	17	10	11	26	11

The O&M cost as a % of project cost for Tikri and Saidabad (ie) 11.86 and 10.47% compares favourably with the UPJN average of 11.62%.

6.4 A similar review for hand pumps was also done and the results are as shown below:

TABLE 6.3

HAND PUMPS - COMPARISON - PLANS - UPJN

						-
;	PARAMETERS	199	90-91	1991-92		
1	FARAMETERS	UPJN	27 HPS	UPJN	27 HPS	
1	(1) Cost per household per month	Ø.53	1	Ø.53	1	
,	(2) Cost per person per per month	Ø.11	Ø.17	Ø.11	Ø.17	
	(3) Cost per KL of production	Ø.Ø9	Ø.15	Ø.Ø9	Ø.15	, , , ,
1	(4) Cost per pump p.a.	319.78	545	318.44	524	1

Unlike in piped schemes, the cost for the 27 handpumps looks to be higher then that for UPJN as a whole which can be explained by the fact that a greater percentage of pumps may not undergo any repair or limited number of repairs. Further UPJN costs do not seem to include vehicle expenditure and allocated administrative overheads.

### SENSITIVITY ANALYSIS

### Recovery of PSP charges

As per the tariff fixed by the State Government an amount of Rs.3/50 per month per household is to be collected for usage of public stand posts. This rate is effective from 1/7/91. Earlier the rate was Rs.2/50 per month per household. Due to various reasons this charge is not being 'demanded' from households.

- 6.6 Sensitivity analysis was done on the working based on the following assumptions:
  - demand will be net rate (ie) after discount

89-90 Rs.2 per household/month 90-91 Rs.2 per household/month 91-92 Rs.2.50 per household/month

- collecton efficiency of 50% of current demand.

The results obtained from the analysis are :

Tikri Cost recovery improves to 26% in 1991-92 on actual cost basis and to 15% on real cost basis

Saidabad Cost recovery improves to 43% in 1991-92 on actual cost basis and to 26% on real cost basis.

There is almost a doubling of the cost recovery if PSP charges are recovered at 50% collection efficiency. If depreciation is not considered the recovery would be much higher.

Tikri 42% on actual costs
19% on real costs

Saidabad

72% on actual costs 35% on real costs

#### Normal lpcd distribution

on the revenue demanded/ruling tariff for the private connections. A sensitivity of the workings assuming the tended as below was attempted:

- dometic metered - 70 - domestic unmetered - 100 - PSP - 40

Accordingly the water revenue demanded was also suitably adjusted at the ruling tariff.

6.9 The cost recovery in Tikri on income demanded/real costs goes up from 15% to 20% in such a situation in the year 1991-92. Similarly in Saidabad the cost recovery goes up to 19%. Further this brings down the wastage in Tikri and Saidabad to around 30%.

# Depreciation only on private connections

6.10 The depreciation charge relevant for the private connections only based on the population coverage was allocated and costs worked out. The results are as shown below:

<u>TABLE 6.4</u>

<u>COST - DEPRECIATION ONLY FOR PVT CONNECTIONS</u>

(1991-92) (VALUE IN RS.)

	PRODUCED		soi	.D	DISTRIBUTED		
SCHEME	ACT-	REAL.	ACT-	REAL	ACT- UAL	REAL	
Cost per KL	,			,			
Tikri	Ø.4Ø	Ø.82	2.69	5.5Ø	Ø.59	1.20	
Saidabad	Ø.36	Ø.69	2.12	4.13	Ø.61	1.19	
Cost per connection pm							
Tikri	33.7Ø	69.ØØ	, ( 1				
   Saidabad 	31.57	61.48	; ;				

6.11 Ever with proportional depreciation for private connections the real cost per KL of water distributed is Rs.1.20 in Tikri and Rs.1.19 in Saidabad against a tariff of Rs.1/- per KL. The real cost per connection is around Rs.69 in Tikri and Rs.61.48 in Saidabad.

#### CRITICAL PROBLEMS

5.14 From the review of costs and revenues an attempt has been made to derive the critical problems which need to be addressed by UPJN. This list is not to be taken as an exhaustive one but only indicative. Further, a detailed analysis of the problems can be done only after a socio-economic survey of the population is carried out.

#### Design related

- (1) The design provides only for 20-25% of households being provided private connections. The rest are to be supplied by PSP's. It is very difficult to justify the scheme based on revenues from only 25% of the population, unless a large cross subsidy had been assumed.
- (2) The decision on taking up the scheme to have been made by UPJN without detailed analysis of the socio-economic conditions in the rural area concerned (ie) for drinking water, water quality today, inclination and ability to pay water, other sources of water, need for water for other purposes etc. In effect the decision has been made without a request and hence the non-participation of the people concerned. This results in a feeling that the system is being owned by UPJN and not by the people/society.
- (3) The location of the plant itself is not sometimes central to the area to be covered, say for eg. in Tikri. This effects distribution to the tail end areas resulting in poor service. This observation is based on the drawing of the scheme and no further technical analysis has been carried out.
- (4) The population projections in both the schemes has been grossly underestimated, with the design population being reached halfway through the scheme itself.

# O&M related

(1) It is observed from the log books that one of the two pumping plants are not functioning sometimes for long periods of say a month. During the visit to Saidabad scheme, one of the plants was undergoing repair. For eg.: in Tikri, one of the pumps was not used from 5-12-91 to 1-1-92. Similarly in Saidabad the plant with 40 BHP was not used for the whole of October 1991. It is essential that preventive maintenance of these plants are done at regular intervals so as to avoid long breakdowns.

- (2) It is also clear from the log books that for days at a stretch treatment with bleaching powder is not being done due to non-availability of stock. This has a critical effect on the quality of the water and subsequently on quality of service to the consumers.
- (3) In Saidabad scheme, it was mentioned that no documents / records are kept of the chemical analysis or tests, if any, being conducted. This is also absolutely essential to ensure quality of water being distributed.
- (4) On the discussion with division officers and staff there is a feeling that due to non-availability of sufficient funds many repairs and maintenance jobs are getting postponed. In fact in Saidabad scheme we can see a fall in the absolute amounts being spent on repairs and maintenance. Even though it is difficult to estimate the extent of repairs to be carried out, the feeling is we are a year behind in repairs. The lesser importance to repairs will have long term consequences in terms of quality of service, collection efficiency etc.
- (5) The collection efficiency is in the region of 55-60% resulting in a reasonably huge accumulation of arrears. This might be related to the poor service levels and even delays in carrying out repair jobs.

- (6) providing for power By not charges depreciation, the expenditure on O&M being understated with resultant implications on incorrect figures being reported. It is to be remembered that all assets have a life span and hence need to be replaced at some future date. It is very important that depreciation charge is provided for in the accounts.
- (7) The most difficult part of the study was to 'estimate' the distribution of water total and to individual category of consumers. No records are available for the purpose. For private connections the demanded might be a good indication. study on water distribution was done at Tikri scheme by installing bulk meters яt certain villages. This can give important pointers on water distribution, wastage and the problem locations.
- (8) There is very little of analytical reporting on O&M costs on a regular basis to divisions and other administrative offices. The reporting today is restricted to copies of log books being sent to the divisions by the plants. Further, very little information was made available to us from the head quarters at Lucknow either due to non-availability of records or difficulty in consolidation / analysing the available records. Timely information reporting is very critical for control of O&M aspects and costs.

## **HANDPUMPS**

5.15 The critical problems on hand pumps, as analysed from the questionnaires and records made available to us are:

- (1) It is told to us that the hand pumps are actually used by around 125-150 people which is only 50% of the deisgn population. This implies that
  - (a) either the distance to be covered for reaching the hand pump is much longer than envisaged or

(b) the average household size is bigger than 5 { the average in Saidabad, Tikri seem to be in the region of 7-8 }.

It may not be right to assume the common norm for all pumps. This may have to be revised based on the location concerned, dispersement of population etc.

- (2) Similar to piped schemes, there is very little information on actual usage of hand-pumps, water wastage, quality of water etc. An analysis of these aspects is critical for a comparison with piped schemes and for future decision making.
- (3) It is observed that for all most any of repair a team of 4-5 people are engaged on a daily basis. It is informed to us that for most repairs the time required will be in the region of 4-5 hours. This means that 4-5 people are engaged for 5 hours but get paid for eight hours. The wages for the 5 people was Rs.120/- day of 8 hours and hence, on an average, Rs. 45/is wages for which labourers may not be working. It is told to us that from 92-93 onwards practice of engaging daily labour has been stopped.
- (4) Depreciation on hand pumps is not being provided, even for analysis sake. As indicated earlier this is essential to get the real picture on O&M costs.
- (5) It is observed that the 27 hand pumps put together were not working for 139 days, in 1991-92. This works out to 5 days on an average per pump per year.

- The problems highlighted above may be known by people at various levels in UPJN. But the problem is quite alarming. In a few years, if the same trend continues, it would be difficult to operate and maintain many schemes without a huge subsidy from the government. The thinking now should be to make UPJN, over a period of time, a self sustaining institution at least as far as O&M is concerned. It is difficult for a commercial organisation like UPJN to meet the twin objectives of providing service as well as breaking even on costs.
- suggestions to rectify some Some the problems listed above are discussed in chapter 8, These suggestions have been made based on discussions with UPJN staff. review of records made available to us and experience in conducting similar studies. As indicated these are not made after a socio-economic survey and hence have to be studied in that light.

#### 7. SYSTEMS AND PROCEDURES

### BACKGROUND

- One of the components of the study is to look at existing records maintained for O&M and to recommend changes, if any, for improved reporting on O&M costs and revenues. It is to be remembered that information availability is not an end in itself but a beginning for better decision making. Hence it is essential that people reviewing the information have adequate authority to take decisions.
- 7.2 A brief review of records maintained at divisions and at the plants was made and brief recommendations on information that needs to be captured is presented in this chapter. A much more detailed study needs to be done covering more schemes/divisions before recommendation on formats for the records/MIS can be made.

#### INFORMATION CAPTURE

7.3 The information that needs to be captured and source for the same are mentioned below:

	Information	Source
i ea	umber of days on which ach pumping plant not borking	Log book/sheet
p	ctual operating hours of lant and service hours. Cower availability	Log book/sheet
:	esults of chemical halysis	Needs to be recorded in the log book itself
i b	umber of days on which leaching powder not vailable	Stock register
	xtent of bleaching powder; sed on a daily basis	Log book/sheet

Information	Source
6. Complaints received classified into categories such as	Complaints register to be modified to include such a classification
<ul> <li>taps broken</li> <li>tap missing</li> <li>water not flowing</li> <li>chockages/leakage in pipelines</li> <li>water quality not good (blackish etc.)</li> </ul>	
7. Days within which each complaint was repaired and if delayed reasons therefor such as	Complaints register to be modified
- material not available - labour not available etc	
8. Other repairs carried out with details of	Repair register to be introduced, wherever not existing
- when problem detected - nature of problem - reason for the problem (old equipment, lack of maintenance etc.) - when repair completed - cost (material and labour	
- days on which service could not be provided	
9. Villagewise and assessee- wise demand raised, coll- ected and arrears	Demand register
10. Cost of labour directly involved in scheme main-tenance	Work register of scheme
11. Cost of casual labourers involved in repair and maintenance	To be separately recorded in works register

!	Information	Source
12.	Record of inspections carried out by	To be introduced wherever not available
	- JE - AEE - EE	
	with time spent for each scheme and purpose of inspection	
13.	Usage of vehicles to be identified to schemes	Log book to include this in a form such that com- pilation becomes easier
; ; ;		

# NOTE: (1) List may not be exhaustive

- (2) Where ever applicable similar records to be maintained for hand pumps also
- (3) Existing records should be continued.

#### RECOMMENDED MIS

7.4 The MIS that needs to be generated are essentially from the records to be maintained at the plant and at the divisions.

#### MIS

- 7.5 (1) Schemewise/plantwise number of days on which plant not working and % of total number of days in a period. The same compared with % in last 2 years for the same period.
  - (2) Actual average operating hours per day of the plant pumpwise for a particular period and average service hours per day. Same compared with data for last two years.
  - (3) Production in total KL per pump and in lotal for the scheme for a period as compared with production during the same period in the last 2 years.
  - (4) Periodic reporting of actual distribution in KL to various points arrived at by installation of bulk meters and calculation of wastage in total and as a %. Result to be compared with last two similar studies.
  - (5) Schemewise number of days on which chemical tests not carried out and corresponding chlorine content in those days.
  - (6) Analysis of complaints received and arriving at % for each category in relation to the total number of complaints.
  - (7) Arriving at cost per KL of water produced, distributed and sold split into direct costs, indirect costs and depreciation.
  - (8) Comparing revenue demanded/received per KL with cost per KL.
  - (9) Analysis of costs into variable and fixed and deriving contribution per KL.

A similar MIS can be prepared for a 'block' of hand pumps.

- An yearly analysis of these MIS can be done, which can be an important input to the budgeting exercise. These MIS can also point to major repairs that need to be carried out on schemes. Further inter-scheme comparison in the same division/circle can be attempted to decide on schemes where revenues have to improve or costs are to be controlled.
- 7.6 Circlewise, consolidated costs per KL of water produced, distributed and sold (for piped and hand pumps separately) should be sent to region and to Lucknow head quarters. These will be important pointers for tariff suggestions and for identifying problem locations for cost control.

#### 8. <u>CONCLUSION</u>

- 8.1 The report so far has presented the background to the study, actual and real cost of O&M and an analysis of the problems in O&M of rural piped and hand pump schemes. Even though this study does not intend to project the results of the study to UPJN as a whole, the problems may be similar.
- 8.2 In the following paragraphs a few suggestions to correct some of the problems facing UPJN have been recommended. As told earlier, these are not based on a socio-economic survey and hence have to be read in that light.

### OVERVIEW OF SUGGESTIONS

- 8.3 The suggestions are essentially aimed at
  - proper evaluation of schemes at design stage
  - critical importance to evaluation of O&M costs and revenues before scheme finalisation
  - better revenues through taxes
  - involving voluntary organisations / private contractors in O&M.

The objective should be to take up only those schemes which are financially viable and where O&M will be the responsibility of local bodies or voluntary organisations. These drastic steps are needed to make UPJN a self sustaining commercial organisation.

#### SUGGESTIONS

- 8.4 The suggestions for overcoming some of the identified problems are listed below. These have to studied more carefully and supported by field studies before a final decision can be taken.
  - (1) A comprehensive education effort to tell the population about the need for safe drinking water and the consequences if this is not available. The need to pay for water should also be emphasised.

- (2) The decision to have a rural water supply scheme (either piped or hand pumps) should be made by the population represented by the local bodies. The local bodies should then approach the UPJN for taking up the scheme. UPJN should take up the scheme only after an undertaking that maintenance will be the responsibility of the local body concerned. The responsibility of UPJN will be to execute the scheme and hand it over for O&M.
- (3) It may be essential to involve the people right from the planning and design stages of the project. This may be in identifying location of pumps, stand posts, hours of supply needed, area to be covered etc. A few persons identified at this stage from the population can later be involved in O&M.
- (4) Conducting a socio-economic survey before a scheme is approved. This is essential to get a feel for need for water, ability to pay, intention to pay and other social factors which have a strong bearing on a sensitive issue like provision of water supply. The survey should be a prerequisite for approval of the scheme, say if the scheme value is above a certain limit.
- (5) Due to lower cost recovery. lesser money will be spent on O&M of schemes, which will have a bearing on the quality of service and hence on the collection efficiency. The revenues and O&M costs of a scheme should be closely evaluated during the planning stage itself and the sensitivity of the same to critical parameters like inflation. tarisss, wastage factor etc. need to be The results of the evaluation studied. should justify taking up the scheme. Development of a O&M financial model may be taken up for the purpose.

- (6) Voluntary organisations may be asked to take up O&M of rural water supply schemes. These organisations may be asked to make each scheme self sustaining. Some of these organisations are available at village/district levels.
- (7) The O&M of rural water supply schemes may be given to private contractors who will also have responsibility for revenue collection. It may also be worthwhile to include the private contractors in design and construction of the schemes.
- (8) For existing schemes, there is a tariff fixed for public stand posts also. Efforts may be taken to recover these charges from the households, which may have a good bearing on the cost recovery. The responsibility of recovering the PSP charges may be given to the local bodies.
- (9) Recovering a portion of the costs through a 'Tax' on all households in the village both for handpump and piped schemes. Since there seems to be a basic lack of inclination in paying for water, this may be an indirect way of recovery. The modalities for this 'Tax' needs to be worked out.
- (10) It is to be remembered that all assets have a life span. They need to be replaced or extended. It is important to recover depreciation charges also in order to ensure availability of funds for replacements/extensions.
- (11) There is need for a closer monitoring of O&M costs at various levels through improved Management Information Systems (MIS).

(12) A periodic analysis of actual distribution at various points may be made for each piped scheme by installing bulk meters for a fixed number of days. This will also be useful in analysing wastage and the problems in the distribution lines.

### CONCLUSION

8.4 It is near impossible for a commercial organisation like UPJN to achieve the twin objectives of providing service and also breakeven on costs. The situation on O&M is quite alarming and immediate steps are needed to ensure better recovery of costs. The experience gained in the past should become inputs for future planning through better evaluation of schemes and critical importance given to review O&M costs and revenues.

QUESTIONNAIRES

U.P.JAL NIGAM

REVIEW OF OGM COSTS
OF SELECT SCHEMES
(PIPEP WATER SUPPLY)
QUESTIONNAIRE

# REVIEW OF OWN COST QUESTIONNAIRE

Name	OP THE	SCHEME :	
DIVIS	I CM	•	
SUB I	IVISION	t t	
SECTI	COM	t	
I.	GENERA	77.3	
1.	Scheme	completed in the year	ŧ
	Number	of years for completion	\$
2.	Source	of Water for the scheme	
	(a)	Tube well	
	(P)	River (Specify name)	
	(c)	Ponds	
	(d)	others (Specify)	
3.	If sur	rface water, storage ity.	1
4.	Final	project parameters	1
	(a)	Supply areas to be covered.	
	(b)	Villages to be covered	
	(c)	Total population in the area	
	(a)	Population Ferage	
	(e)	Pumping stations and their capacity:	
	(f)	Overhead tanks and their storage capacity	
	(g)	Length of distribution lines.	
	(h)	Number of connections planned	
		- metered - unmetered	
	(1)	Number of public stand posts planned.	
	(1)	Expected leveled water production (kld)	

5.

6.

7.

(k)	Expected leveled water distribution (kld)	
(1)	Wastage anticipated (kld)	
(m)	Lpcd assumed.	
Final	project cost particulars :	
	Cost component	B. (lacs)
1.		
2.		
3.		
4.	•	
5.		
6.		
7.		
8.		
9.		
10.		
	Total:	
Finds	ing pattern for the scheme :	
· ·		Smount to James
ran an	aced By	Amount (R. lacs)
	cipated O&M Cost the time of project finalisati	on)
Head	of account Year 1 Year 2	Year 3 Year4 Year
COST	per Kl. of production :	

Cost per Kl of distribution:

8. Cost of expansion of the scheme : Total B. ( if any) YEAR R. (Lacs) Targetted benefits (a) Population coverage (b) Villages coverage (c) Number of connection (d) Number of stand posts 9. Manpower required for O&M of Total the scheme BI. Level of person Desires Number of No. Qualification persons II. SCHEME/YEAR SPECIFIC (details for the years 1989-90, 1990-91, 1991-92) 1989-90 1990-91 1991-92 PHYSICAL PARAMETERS A. Villages covered 1. 2. Population covered 3. Population not covered Total number of connections 4. (a) domestic matered (b) domestic unmetered (c) industrial/commercial (metered) (d) others metered (e) others - unmetered 5. Number of public stand posts.

- 6. Number of working meters
  - (a) domestic
  - (b) industrial/commercial
  - (c) others.
- 7. Actual operating hours of the pumping station.
- 8. Rate of pumping per hour(ltrs) :
- 9. Calculated production (kl)

  (mention the number of days on which pumping station was working ---- ----)
- 10. Hours of supply maintained (or an average parday )
- 11. Water distribution (kl)
  - (a) domestic metered
  - (b) domestic unmetered
  - (c) industrial/commercial
  - (d) others metered
  - (e) others un-metered
  - (f) Public stand posts

NOTE: (Mention below the method of calculating the distribution)

12. Wastage of water (total Kl.)

Reasons (with %)

- (a) Normal
- (b) leakages
- (c) Illegal tapping
- (d) others specify.
- 13. Estimation of lpcd.

- B. FINANCIAL PARAMETERS (in %.) 1989-90 1990-91 1991-92
  REVENUES
- 1. Water charges demanded
  - (a) domestic metered
  - (b) domestic unmetered
  - (c) industrial/commercial
  - (d) others.

#### Total :

- 2. Tariff structure (Enclose for the three years)
- 3. Revenues collected
  - (4) domestic metered
  - (b) domestic unmetered
  - (c) industrial/commercial
  - (d) others.

### Total :

- 4. What would have been the demand if all domestic/ industrial connections were metered?
- 5. Arrears of demand
  - (a) domestic metered
  - (1b) domestic unmetered
  - (c) industrial/commercial
  - (d) others.

#### Total:

What % of total arrears will be greater than 3 years.

6. Other income collected (specify by name)

COSTS		1989-90	1990-91	1991-92
Manpower emp	oloyed on the			
- Direct				
- Indirect	:			
- Total				
Details				
LEVEL	Direct/ Indirect	Skilled/ Unskilled	% Time on 0 &	<u>M</u>
TO	PAL			
fo: 2. <i>S</i> k	r which used. illed & unskil	-		_
Actual manpelovels defin	ower cost at ned in (1)			
LEVEL				
mot a l e	_			
10021				
NOTE: 1.	included in a kindly indicate that the	some other he ite actual ec same is inc	ad of accest and all	count, lse the another
	Manpower empscheme - Direct - Indirect - Total Details LEVEL  TO Note: 1. Fo fo 2. Sk Actual manp lovels defi	Manpower employed on the scheme  - Direct - Indirect - Total  Details  LEVEL Direct/ Indirect  TOTAL  Note: 1. For casual labou for which used.  2. Skilled & unskill any for WCE  Actual manpower cost at levels defined in (1)  Total (in R.)  LEVEL  NOTE: 1. If for some included in skindly indicated fact that the	Manpower employed on the scheme  - Direct - Indirect - Total  Details  LEVEL Direct/ Skilled/ Indirect Unskilled  TOTAL  Note: 1. For casual labourers, indicate for which used.  2. Skilled & unskilled particul any for WCF  Actual manpower cost at levels defined in (1) Total (in %.)  LEVEL  NOTE: 1. If for some levels the confineluded in some other he kindly indicate actual expect fact that the same is included in same of the confinelused in the same is included.	Manpower employed on the scheme  - Direct - Indirect - Total  Details  LEVEL Direct/ Skilled/ % Time Indirect Unskilled on 0 &  TOTAL  Note: 1. For casual labourers, indicate no. ef for which used.  2. Skilled & unskilled particulars may be any for WCE.  Actual manpower cost at levels defined in (1) Total (in Re.)  LEVEL

-- -- 41177

Page 11

<u>1989-90</u> <u>1990-91</u> <u>1991-92</u>

(3) Actual direct meanewercest by sub head of account

SUB HEAD

Tetal-

(4) Extent of menpower cost as paid in each year.

(C)

### POWER

<u>1989-90</u> <u>1990-91</u> <u>1991-92</u>

- (1) House power of the pumping station.
- (2) Rate charged by EB (enclose tariff for last 3 years)
- (3) Minimum amount chargeable by EB(R)per menth
- (4) Value of Bike received from EB
- (5) Power charges paid
- (6) Calculated power consumption based on hours pumped & HP.
- (7) Calculated power charges.

# CHEMICALS

(1) Quantity of chemicals consumed:

Item

Unit of Measure

Pa	ge	13

1 <u>-92</u>
1

(3) Nerms for usage per KL of production

ITEM

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<u> </u>	1989-90	1990-91	1991-9
----------	---------	---------	--------

(4) Average prices of chemicals-east year

ITEM

(5) Stock of major chemicals in quantity as at 30/9 every year.

ITEM

Unit of Measure

ì

### REPAIRS AND MAINTENANCE COST

- (1) Specify various kinds of maintenance and repair carriedout and for each.
  - The material and quantity of the same required
  - The bine required to be spat by U.P.Jal Nigam.

<u>1989-90</u> <u>1990-91</u> <u>1991-92</u>

(2) Actual cost of repairs and maintenance (Total (%)

SUB HEAD

METERIAL/ LABOUR

TOTAL:

Number of direct labour actually involved in R & M.

1989-90

1990-91

1991-92

(3) Number of repair job carried out.

SUB HEAD

TYPE OF JOB

(4) Number of days en which water not supplied and reasons therefore (in percentage terms).

(5) Estimate of repairs and maintenance cost as budgeted (what should have been the cost)

(b) Estimate of repair works to be carried out a value terms as a date.

# EQUIPMEN TS/VEHICLES

1989-90 1990-91 1991-92

(1) Equipments/Vehicles used in eperation & maintenance and numbers used.

(2) Year of procurement and cost of purchase of the above

(3) % utilisation of Real above for 0 & M.

1989-90 1990-91 1991-92

(4) Cost of maintenance of these equipments/cars.

- Tetal(法)

Cost per unit usage (say hours for equipments and Kms.for cars).

## GEN ERAL

- (1) Difficulties faced by the scheme in 0 & M.

  (List down the problems)
- (2) Main resources for the low cost recovery.
- (3) Suggestiens on methods to improve recovery.

(4) Other remarks.

# RECORDS MAINTAINES

Give a list of records maintained at various offices alongwith purpose for the same.

Kindly enclose the following (for 1989-90, 1990-91, 1991-92)

- (1) Budget decument
- (2) Annual maintenance budget
- (3) Capital budget
- (4) Annual accounting statements
  - P & L
  - B/S
- (5) Report on pilet studies on 0 & M.
- (6) Find project cost document

# - U. P. JAL NIGAM

REVIEW OF O & M COST

OF HAND PUMP SCHEME

NOVERMBER 1992

# REVIEW OF O & M COST OF HAND PUMPS

	GEN ERAL			
(1)	Lecation of the Hand Pump			
(2)	Type of Hand Pump			
(3)	MARK II/ MARK III			
(4)	Year of installation and mon	th		
(5)	Original cest	Basic price !	<b>5</b> •	
		Installation	cest b.	
			Tetal:R.	
(6)	Prepesed life of the pump :			
(7)	Cost funded by :			
	AT THE TIME OF INSTALLATION			
(1)	Area to be covered			
(2)	Pepulation to be covered			
(3)	Lpcd assumed			
(4)	Production assumed(KLD)			
	MAJOR REPLACEMENTS CARRIED O	UT AFTER INST	ALLATION	
(1)	Year of replacement			

# MAN POWER ANTICIPATED AS REQUIRED FOR MAINTENANCE

Level of person Indirect/direct Time PER PAY

per-day in hours.

(2) Cost of replacement ( )

## SPARE PARTS REQUIRED FOR MAINTENANCE-NORMS

METERIAL/SPARE

HOW OFTEN REQUIRED TO BE RE-PLACED TYPE OF REPAIR

TIME REQUIRED TO BE SPENT FOR REPAIRS

(HOURS TOBE SPENT)

TYPE OF REPAIR

LEVEL OF PEOPLE

HOURS TO BE STEN

(Prevetive maintenance should be included as a type of repair)

# Page 3

#### PHYSICAL PARAMETERS 1991-92 1989-90 1990-91 (1) Pepulation covered (2) Lpcd assumed/expected (3) Water production (KLD) (4) Expected wastage-of water as a % of production. (5) Number of days on which handpump was not working. (6) Reasons for non-work-(5) ing of the pump: (percentage of total, above)

REASONS

(7) Total number of handpump

- within the division
- within the jurisdiction of the JE concerned.

<u>1989-90</u> <u>1990-91</u> <u>1991-92</u>

### 0 & M COST

### MAN POWER

(1) Manpower employed on the pump:

LEVEL DIRECT/ SKILLS:
IN DRECT UN SKILLS:

(2) Actual hours spat by the direct manpower for this handpump (from log book and job card)
I includes both repair and maintenance)
LEVEL \*

(3) Total membeurs available to the direct labour tobe spent on a group of hand pumps.

\* For casual labour indicate mandays for which used in each year.

Manpower ( ... ( )

<u> 1989-90</u>

1990-91

1991-92

Cost of Manpower -Total Rs.

LEVEL

INDIRECT

## DIRECT

# MATERIALS

Number/type of repair job carried out on the pump: TYPE OF REPAIRS (Number of repairs)

(2) Spareparts used in repair 1989-90 1990-91 1991-92 of the Hand pump: (Numbers used)

SPARE PART

(3) Cost of Spare parts used SPARE PART

(Costs) 🥽

(4) Average Prices of Spare 1989-90 1990-91 1991-92
Parts
SPARE PART

### VEHICLES USED

- (1) Extent of Kms run for maintenance of the pump
- (2) Average cost per km of running the vehicle
- (3) Cost of vehicle for hand pump maintenance

INSPECTION

(2)

1989-90

1990-91

(hours spent)

1991-92

(1) Extent of time spent on inspection by various levels of people to LEVEL

Total time spent by various levels of people

in all hand pump

maintenance

LEVEL

# TOTAL MAINTENANCE COST FOR HAND PUMPS IN THE DIVISION

(1) Direct Cost of maintance 1989-90 1990-91 1991-92

DIRECT COST

a )

B)

c)

d)

(2) Total value of spare parts

v

parchased for hand pumps

maintenance

CENERAL

1989-90 1990-91 1991-92

(1) Number and type of complaints received on the handpum<sup>†</sup> TYPE OF COMPLAINT

(2) Problems faced in maintenance of hand pumbe.

(3) Suggestions for improvement

(4) Records maintained for hand pump maintenance at various offices (indicate name of record and purpose) Kindly enclose Reports prepared by the division on specific studies on cost on Hand Pumps Yearly statement on cost of hand pumps (last 3 years)

LIST OF PEOPLE MET

## UP JAL NIGAM - OAM STUDY

## LIST OF PEOPLE MET

- 1. Mr. Robert Treitsch
- 2. Mr. R. S. Singh
- 3. Mr. Y.N. Chaturvedi
- 4. Mr. V.P. Gupta
- 5. Mr. S. K. Singh
- 6. Mr. R. K. Sharma
- 7. Mr. Mahendra Singh
- 8. Mr. N.C. Gupta
- 9. Mr. J.B. Bats
- 10. Mr. S. K. Srivatsava
- 11. Mr. P. N. Shukla
- 12. Mr. R.P. Sharma
- 13. Mr. S.K. Verma
- 14. Mr. D.M.P. Singh
- 15. Mr. Panna Lal

Member, RSM

Managing Director, UPJN

Chief Engineer, South + Dutch Co-ordinator

Chief Engineer at Lucknow

SE, II, Circle, Allahabad

SE, VII Circle, Varanasi

EE, Construction Division, Allahabad

EE, Additional Construction Division, Allahabad

EE, VI Construction Division, Allahabad

EE, Maiantenance Division, Varanasi

AEE, Saidabad Scheme, Allahabad

JE, Saidabad plant Allahabad

AE, Hand pumps, Allabahad

JE, Tikri, Varanasi

Divisional Accountant, Tikri, Varanasi

SET OF OUTPUTS

UP JAL NISAN 1000 BUTCH PROJECT

PIPED SOURE: SAIDABAD

	ı	TOTALS	: 			( 0051	PER KL OF	WATER PRODUCED	, COST F	ER KL OF I	ATER DISTRIBUTED	ı COST I	PER KLOF I	eater sold	: COPPO	SITION OF	TOTAL
PARTICULARS	(1989-40 % THE	1990-91	r DC	1991-92	s nc	:1999-90	1990-91	1991-92	:1 <del>989-9</del> 0	1990-91	1991-92	11989-90	1990-91	1991-92	1999-90	1990-91	1991-92
SUMMARY OF ACTUALS	:					: :			!						 :		
(1) Direct cost	1 220100	231100			-13.725		0.21	0.21	0.44	0.44	0.36	1.46	1.50	1.25		39.14%	
(2) Indirect cost	69450	167220			-40.70%		0.15	01.0	: 0.14	0.31	0.18	0.46	1.06	0.61	14.30£	27.651	
(3) Depreciation	1 196133	146122		146133		0.22	0.18	0.21	1 0.39	0.37	0.36	1 1.30	1.27	1.23	40.JBX	33.22	39.8
4) Interest	1		ERR		細	! !			:			i I		,	:		
Total	485483	<b>39048</b> 3	21,589	492333	-16.673	0.53	0.53	0.52	1 0.96	1.12	0.99	3.22	3.84	3.10	100.001	100,00%	100.00
4) Income desanded	92000	97000	5.430	158000	62.89%	0.10	0.09	0.17	0.18	0.18	0.29	0.61	0.63	0.99			
5) Income collected	: 106000	108000	1.891	162600	50.56%	0.12	0.10	0.17	: 0.21	0.20	0.29	9.70	0.70	1.02	1		
6) Other Income	:		ERR3		ENA	,			;			1			,		
Total demended	; 92000	97000	5.433	158000	62.89%	0.10	0.09	0.17	0.18	0.18	0.29	0.61	ته.0	0.99	,		
Total received	106000	108000	1.891		50.56X	0.12	0.10	0.17	; 0.21	0.20	0.29	0.70	0.70	1.02	!		
/) Surples/(Deficit) on	;				,				;			i		;			
desand	: -343982	-493483	23.33	-234223	- <b>12.25</b> 1	-0.43	-0.45	-0.25	: -0.78	-0.93	-0.61	-2.61	-3.21	-2.10			
3) Sumplus/(Deficit) on	1												7 44	247			
received	: -379663	-482483	27.08X	-327755	-31.66X:	-0.42	-0.44	~0.25	; −0.75 ;	-0.91	-0.60	: -2.52	-3.14	-2.07 (			
st recentry on received	21.82%	18.29%	-16.20%	TO.U	80.57%: ;				; ;			; ;		;			
PENARY OF REAL COSTS	1 1 1				1				1			1 } !		;			
() Direct cost	: 436317	488769	12.07%	516765	6.[QXI	0.48	0.44	0.55	. G.66	29.0	0.94	2.89	2.18	2.24 (	62.16X	37.64%	63.91
Indirect cost	69450	163250	133.061	96800	-40.70%;	0.08	0.15	<b>0.</b> 10	7 0.14	0.31	0.18	0.46	1.06	0.61	9.09%	19.24%	11.93
) Depreciation	196122	196123		1%133	1	0.22	0.18	0.21	: 0.39	0.37	0.36	: 1.30	1.27	1.23	27.941	23.125	24.16
) Interest	:		ERA		ENR I				<b>!</b>			! !		:			
Total	701901	848332	20.87%	811719	-4.525	0.77	0.77	0.86	1.39	1.61	1.47	4.65	5.51	5.10	100.001	100.001	100.00
Income desanded	: 92000	97000	5.433	158000	62.0751	0.10	0.09	0.17	: 0.18	0.18	0.29	0.61	24.0	0.99			
Income received	106000	109000	1.07%	162600	50.5651	0.12	0.10	0.17	0.21	0.20	0.29	0.70	0.70	1.02			
Other income	:		ERR		ENR (				!		•	!		1			
Total desended	72000	97000	5.43	158000	42.09%	0.10	0.09	0.17	0.18	0.18	0.29	0.61	24.0	0.99			
Total received	106000	109000	1.07%	162600	50.56%	0.12	0.10	0.17	1 0.21	0.20	0.29	0.70	0.70	1.02 }			
Surplus/(Deficit) on	1				i				1				4.00	-4 40 3			
desand	1 -607901	-12/225	23.19%	<del>-422</del> 119	-12.99%1	-0.67	-0.₩	-0.69	-1.21	-1.42	-1.18	-4.64	-4.08	-4.11 ;			
Sumplus/(Deficit) on   received	; } - <del>5759</del> 01	-740352	24.20	<b>-697</b> 119	-12-321:	-0.45	-0.67	-0.69	1 -1.19	-1.40	-1.10	-3.75	<b>-4.8</b> 1	-4.00			
-	•								1		1			1			

UP JAL NIGAM INDO DUTCH PROJECT REVIEW OF DUM COSTS

PIPED SCHEME: SAIDABAD

Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression   Compression		ŧ		TOTALS				: 0001	PER AL DF	WATER PRODUCED	: 00811	PER KLOF I	ATER DISTRIBUTED	: 0061	PER YL OF	WATER SOLE	: 00#00	SITION OF	TOTAL
11   Register 10814   202150   375:600   61.073   242150   -25.6331   0.72   0.72   0.72   0.72   0.72   0.44   0.42   0.44   1.54   2.12   1.52   41.674   55.144   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674   1.674	PARTICILARS	:{ <b>989-9</b> 0	% INC	1990-91	z INC	1991-92	x INC	:1989-90	1990-91	1991-92	:1989-90	1990-91	1991-92	11989-90	1990-91	1991-92	1989-91)	1990-91	1991-92
130   Perior   139   139   139   139   139   139   139   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   130   1	COMPONENTS OF COST-ACTUAL	}						;	,		!			:			;		
11   S. P. Amaterials   7,000   5,000   -25 De 4000   -36,571   0,08   0,05   0,04   0,15   0,11   0,07   0,50   0,36   0,22   13,455   9,485     15   Obriers   194132   194133   194133   194133   194133   194133   194133   194133   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   194134   19		202150		325690		242150			0.29	0.26	0.40	0.62	0.44	1.34	2.12	1.52	41.624	55.14%	49.187
Compared   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   1985   198	(3) Cheescals	3100		3100		3400	9.68%	0.00	0.00	0.00	0.01	0.01	0.01	: 0.02	0.02	0.02	0.642	0.521	0.69
16   Depreciation   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133   196133	(4) A & M materials	76000		56000	-26 321	40000	-28.57%	0.08	0.05	0 04	: 0.15	0.11	0.07	1 0.50	0.36	0.25			8.12
Total   485483   590483   21.581 492333   -16.62%   0.53   0.53   0.52   0.96   1.12   0.89   3.22   3.84   3.10   101.00%   100.00%	(5) Others	1 8300		9650	16.27	10650	10.36%	10.01	0.01	0.01	0.02	0.02	0.02	: 0.06	0.04				7.16
Total	(6) Depreciation	: 196133		196133		196133		0.22	0.18	0.21	. 0.39	0.37	0.36	1.30	1.27	1.23	40.38X	33.22%	39.84
EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR   EDR	(7) Interest	:			ERR		ERR	} !			;			:			! !		
Total 465683 590485 21.58% 492333 -16.67% 0.53 0.53 0.52 0.96 1.12 0.89 3.22 3.84 3.10    Improver Cont	Total	485483		590483	21.581	492333	-16.62%	0.53	0.53	0.52	0.96	1.12	0.99	3.22	3.84	3.10	: 100.00%	100.001	100.00
COMPONENTS OF COST-REAL	(B) Centage	1			ETRR		ERR	!			į			}			!		
(1) Rangemer costs	Total	465683		<b>59048</b> 3	21.58%	492353	-16.62%	0.53	0.53	0.52	0.96	1,12	0.89	3.22	3.84	3.10	:		
Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Cont	COMPONENTS OF COST-REAL	:					,	<b>!</b>			;			<i>!</i>			; ;		
13   Chestcal's   3416   4319   26.44% 4854   12.38%   0.00   0.00   0.01   0.01   0.02   0.03   0.03   0.49%   0.51%	(1) Mangawer costs	-; ; 202150		325600	61.07%	242150	-25.63%	0.22	0.29	0.26	0.40	0.62	0.44						29.831
(4) R & H astriculs 76000 56000 -26.325 40000 -28.578; 0.08 0.05 0.04 0.15 0.11 0.07 0.50 0.36 0.23 (0.83% 6.60% 5) Others 8500 9650 16.273 10650 10.28% 0.01 0.01 0.01 0.02 0.02 0.02 0.02 0.06 0.06 0.07 1.18% 1.14% (3) Depreciation 196133 196133 196133 196133 0.22 0.18 0.21 0.39 0.37 0.36 1.30 1.27 1.23 27.94% 23.12% (7) Interest ERR ERR ERR ERR ERR ERR ERR ERR ERR ER	(2) Power	215902		256650	16.87%	317932	23.88%	0.24	0.23		-								39.173
33 Others   8500   9650   16.27%   10650   10.34%   0.01   0.01   0.01   0.02   0.02   0.02   0.06   0.06   0.07   1.18%   1.14%   1.46%   1.30   1.27   1.28%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   27.94%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23.12%   23	(3) Cheescals	; 3416		4219	26.44%	4854	12.38%	0.00	0.00		: 0.01	0.01	0.01						0.601
Contage   First   Fi	(4) R & M materials	1 76000		56000	-26.321	40000	-28.57%	0.08											4.933
FRR	(5) Others	; 6300			16.271		10.36%			,								-	1.312
STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STATE   STAT	•	1 196133		196122	ERR	196133	ETAR	0.22	0.18	0.21	: 0.39	0.37	0.36	1.30	1,27	1.23	. 27.94%	23.121	24.16%
Total 701901 B48352 20 87% 811719 -4.32% 0.77 0.77 0.86 1.39 1.61 1.47 4.65 5.51 5.10  HYSICAL PROPERERS  1) Population covered (a) Dimersic antered (b) Bonestic unsetered (c) Industrial/connel (ERR ERR ERR (A) (B) (B) (B) (B) (B) (B) (B) (B) (B) (B	Total	701901		848352	20.871	811719	-4.32%	0.77	0.77	0.86	1.39	1.61	1,47	4.65	5.51	5.10	100.007	100.00%	100 001
1) Population covered     ERR   1920   ERR	(8) Centage				EPAR		ERR				į			į		!			
1) Population covered	Total	701901 :		<b>8483</b> 52	20 87%	811719	-4.32%	0.77	0.77	0.86	1.39	1.61	1.47	4.65	5.51	5.10			
(a) Domestic metered   ERR 1920 ERR   (b) Domestic unmetered   6704 6840 2.03x 5200 -23.99%; (c) Industrial/commel   ERR ERR   (d) Others metered   ERR ERR   (e) Others unmetered   ERR ERR   (f) Others unmetered   ERR ERR   (f) Public stand posts   24296 25660 5.61% 26931 4.95%;	HYSICAL PARAMETERS	<u> </u>			- <del></del>		: : :				- <del></del>			! !					
(b) Dosestic unsetered					EBB	1920	FRG !				;			;		;			
		4704		ARAO							:			:					
(d) Others setered   ERR ERR				(MUTT)		3200					i			:		1			
(e) Others unsetered : ERR : ERR : (1) Public stand posts : 24296		!									1			:		,			
(f) Public stand posts : 24296	· · ·	· !									1			;		;			
		24296		25660		26931					1			:		;			
107A) : 31000	TOTAL	: 31000		32500		34051	\ !				₹ <b>:</b>			•		;			

INDO DUTCH PROJECT UP JAL NIGAN REVIEW OF OWN COSTS

PIPED SCHENE: SAIDABAD

	1	τ	TALS				7067	PER KL OF	MATER PRODUCED	1 COST	PER KLOF	MATER DISTRIBUTED	: 0057 6	PER KL DF 1	MATER SOLD	: COMP	ELTION OF	TOTAL
PARTICULARS	:19 <del>89-9</del> 0 x	INC 1990	)-91 X	INC	1991-92	x INC	1989-90	1990-91	1991-92	11989-90	1990-91	1991-92	:1 <del>989</del> -90	1990-91	1991-92	(1 <del>989-9</del> 0	1990-91	1991-97
(2) Total connections	;						;			1			;			;		
(a) Donestic metered	:			ERR	240	ERKR 1				;			1			i .		
(b) Domestic immetered	638		655	2.00%	650	-23.90%	;			;			:			:		
(c) industrial/commel	ŧ			ERR		ERR :				:			;			;		
(d) Others metered	1			596		ERR !	1			:			:			!		
(e) Others unmetered	1			500		ERA ?				1			;			:		
	;									;			;			i .		
	;					2				:			;			1		
	;					:				;			;			1		
	1					;				ŧ			1			1		
(3) Public standposts	195		210	7.691	238	13.33%				1			:			ł		
'UPP (	;					;				ı			;			:		
4) Purping hours p.a	4354		4354		3608	-17.13X				}			1			:		
(5) Rate of pumping (lpm)	2100		2100		2100	:				:			ŧ			;		
(6) No. of days worked	}			5269		ERR :				:			:			:		
(7) Production (KL)	548604	54	8604		454608	-17.131				1			:			1		
UMP 2																		
4) Pumping hours p.a	309£		4776	54.2cx	4201	-12.04%												
5) Rate of pumping (Ipa)	1950		1950		1950													
6) No. of days worked				₽f		err												
(7) Production (KL)	3A7232	55	9792	54.204	491517	-12.04%												
7a) TOTAL PUMPENG HRS	7450		9130	22.55%		-14,47%												
(76) TOTAL PRODUCTION IN KL	. 910836	110	7396	21.58%	946125	-14.56%												
						:				,			:			;		
(8) Average consumption(Ipd	i.					į				i			1			1		
(a) Domestic metered	1			ERR		ERR :				1			1					
(b) Dosestic unsetered	1			<b>⊡</b> RR		ERA :				ì			;			•		
(c) Industrial/commel	;			ERR		ERR ;				1			:					
(d) Others metered	;			ERR		ERR :				}			1					
(e) Others unsetered	1			Ð RR		ERR :				:			:					
(f) Public standposts	:			err.		: AFG				i			i					
	1					;				;			:					
	:					i				;			;					
	t					;				;			:			:		
	1					;				;			!					
9) Water distribution(KL)	;					:				;			;			Į.		
(4) Donestic metered	Į.			ERA	42048	ERR :				;			;			}		
(b) Domestic unsetered	150840	153	2000	2.031	117000	-73.981				1			:			:		
(c) Industrial/commel	t			<del>57</del> 6		ERR :				}			;			1		
(d) Others metered	;			EROR		ERR :				:			1					
(e) Others unmetered	1			EPER		ERR :				1			1			;		
(f) Public standposts	334722	374	1636	5.61%	395193	4,95%				<b>;</b>			:			1		
						:				1			1			1		
TOTAL	505562	526	336	4.545	552241	4.48%				4			;			ł		

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and the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second o

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UP TAL NIGAM INDO DUTCH PROJECT
REVIEW OF DUM COSTS

PIPED SCHEME: SAIDABAD

	:	יוסז	iLS			: COST PER KLO	OF WATER PRODUCED	: COST PE	ER KLOF I	WATER DISTRIBUTED	: COST	PER KLOF I	MATER SOLD	: COMPO	OSTITION OF	TOTAL
PARTICULARS	11989-90	K INC 1990-	I K INC	1991-92	1 INC	: L989-90 1990-91	1991-92	:1989-90	1990-91	1991-92	:1989-90	1990-91	1991-92	:1989-90	1990-91	1991-92
(10) Water wastage(KL)	405274	5796	60 42.	.83x 393664	-31.961	;		!			;			1		
•	;					1		;			1		•	ļ		
11) Skietage on production	1: 44,49X	52.	27% 17.	48% 41 63	x -20.36x	<b>!</b>		1			1			!		
• •	:					!		;			;			:		
12) Water sold (FL)	;					<b>:</b>		}			t		1	:		
(a) Comestic metered	:		Ε	RR 42048	EAR	!		;			ŧ.		;	1		
(b) Domestic unmetered	150840	1539	00 2.	02X 113000	-23. <b>98</b> %			1			;		;			
(c) Industrial/commel	1		Ε	PHR .	ERR			:			}		;			
(d) Others metered	;		ε	rr	ERR			1			:		(	1		
(e) Others unmetered	ł		E	RR	ERR			;			1		:			
(f) Public standposts	;		ξ	RA	EXA	l		1			;		1	i		
TOTAL	150840	1539	00 2.0	03% 159048	3.351											
	;							;			;		;			
3) X sold on production	16.56%	13.	90%	16.81	ĭ.			;			}		;			
	1				1			1			!		;			
4) lpcd calculated	:							:			;		}			
(a) Domestic metered	ERA	ឲ	UR E	5R PU	ERR :			;			;		;			
(b) Domestic unmetered	62		52	62				:			;		1			
(c) Industrial/commel	ER#	EF	EF EF	R EAR	ERR :			:			:		;			
(d) Others setered	: ERR	Ð	er e	RR ETAR	ERR			;			1		+			
(e) Others unmetered	ERAR	EF		NA ERA	ERR :			;			1		;			
(f) Public Standposts	40	4	ю	40				:			;		;			
					1			•			:					

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UP JAL WIGHT INDO BUTCH PROJECT REVIEW OF OWN COSTS

	t	TOTALS				: 0067	PER KL OF	WATER PRODUCED	ı 0067	PER KL DF	WATER DISTRIBUTE	0 : 0051	PER KL DE	MIEK SULU	1 (1)719	OSITION OF	TOTAL
PART LOUL/ARS	11989-90 X INC	1990-91	X INC	1991-92	I INC	1989-90	1990-91	1991-92	1989-90	1990-91	1991-92	:1989-90	1990-91	1991-92	:1989-90	1990-91	1991-92
INANCIAL PARAMETERS	!		**			!		• ·	<u> </u>			!		- <del></del>	!		
REVENUES	; 1					;			' <b>:</b>			ì			; {		
1) Nater charges demanded	ıi		,			;			1			į			i		
(a) Domestic matered	<b>.</b>		£1843		ERA	:			;			:			1		
(b) Scorestic unwetered	92000	97000	3.43%	158000	62.89%	;			;			1			1		
(c) Industrial/commel	. 1		ERR		err	:			:			ł			;		
(d) Others metered	1		ERR		ERR				;			1			:		
(e) Others westered	1		ERA		ERR	}			}			:			:		
TOTAL	; ; 92000	97000	5 474	158000	62.89X	i J			) !			i !			i !		
TOTAL	1 72000	77440	3.744	130000	02.074	;			i			ì			:		
	;								1			1			•		
2) Ourges collected	•					1			1			;			:		
(a) Bonestic metered	;		ERR	57600	err	ŀ			ł .			;			;		
(b) Domestic unmetered	106000	108000	1.89%	105000	-2.781	ŀ			;			;			l		
(c) Industrial/commel	;		ERA		err				i			1			•		
(d) Others setered	;		ERR		ERR									1			
(e) Others unmatered	1		err		ERR	<b>,</b>			j !			•			•		
TOTAL	1 106000	108000	1.99%	162600	50.56X	:			i			ì					
	1	-	•		;	I			;			1		;			
	}					1			1			:			ŀ		
3) Demand if all private	<u>;</u>											į		•			
connections were metered		154000	1.991	200000	29.87%	i						:					
(a) Domestic metered	: 151000	134000	ERR	200000	ERR				•			•					
(b) Bomestic unmetered (c) Industrial/commel	;		EBBR		ERA S				:			i					
(d) Others extered	;		ERR		ERR				Ì			1		;			
(e) Others unmetered	i		ERR		ERR 1				1			:		;			
	1								1			1					
TOTAL	: 151000	154000	1.99%	200000	29.871				•			1					
	;								i			;					
Arrears of demand	ì				j				;			1		:			
(a) Domestic metered	1		ERR		ERR S				1			1		;			
	132000	149000	12.80%	260000	74.50%				i			1					
(c) Industrial/commel	l		ERR		ERR :				1			:		;			
(d) Others metered	•		ERA		ERR 1												
(e) Others unmetered			ERR		ERR :				•			1		· ·			
TOTAL	1 132000	149000	12,98%	240000	74.501				i			i		:			
/4/m²	}	• , , , , ,			1				1			;		;			
					;				:			1		:			
Collection efficiency	1				1				:					:			
(a) Domestic metered	t		ERR		ERR :							i		;			
(b) Dosestic unsetered	1		ERRI		ERR :				i			1		,			
(c) industrial/come!	1		ERA		ERR :				;			;		;			
(d) Others setered			err err		ERR :				1			,		į			
(e) Others unactored	•		EW		, EN. (				ì			i					
TOTAL EFFICIENCY		111.34%	-3.37%		-7.57%				:					,			

UP JAL NIGAM ENDO DUTCH PROJECT REVIEW OF DAM COSTS

PIPED SCHOTE: SATDARAD

	:	TOTALS				: 0051	PER KL DF	MATER PRODUCED	: COST P	PER KLOF (	NATER DISTRIBUTED	: COST !	PER KL OF I	MATER SOLD	: COMF	%.1,0x 0f	TOTAL
PARTICULARS	(1 <del>989-9</del> 0 % (NC	1990-91	x INC	1991-92	X INC	1989-90	1990-91	1991-92	11999-90	1990-91	1991-92	1989-90	1990-91	1991-92	198c-90	100 -01	1001-9
(6) No. days arrears	!					!		<del></del>	:			1			1		
(a) Domestic metered	! ERR	ERR.	EM8	ERR		1			:			;			}		
(b) Domestic unmetered	1 524	561	7,06	K 601	7.13X	:			1			:			<b>;</b>		
(c) Industrial/commel	) ERR	ETRIR	ERR	ERR		;			:			;			1		
(d) Others metered	: ERR	err	ERF	ERR		ł			1			+			1		
(e) Others unsetered	ERR 1	ERIR	ERR	ERR	ERR	; ;			! !			:			; ! !		
71 Other income	1		ERR		ERR	} 			1			; ; ;			; ; ;		
B) Total cash income	; 106000	108000	1.871	162600	50.56X	<u> </u>			i :			;			; ;		
Total real income	92000	97000	5.43X		62.89%				1			1			1		
	•				,	ŀ						:			;		
	i !					!			1			•			;		
	•								i			;			<u>.</u>		
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COSTS	;				:				:			:		1	<b> </b>		
NAMPOMER COSTS :	·				;				1					ï			
Direct Labour	•				:				1			;		1			
(a) Pumping station	96000	126000	31.25%	106000	-15.87%	0.11	0.11	0.11	: 0.19	0.24	0.19	0.64	0.82	0.67			
(b) Distribution system		40000	17.65X	44000	10.00%	0.04	0.04	0.05	0.07	0.08	0.08	0.23	0.26	0.28			
(c) Others	11000	6000	-45,451	6000	;	0.01	0.01	0.01	: 0.02	0.01	0.01	0.07	0.04	0.04			
N/ Ount	1	•			:				1			<b>!</b>		:			
TOTAL	141000	172000	21.99%	156000	-9.30%	0.15	0.16	0.16	0.28	0.33	0.29	0.93	1.12	0.98			
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;					+				;					1			
Indirect labour(Total) :					+				:								
(a) EE :	66000	75000	13.641	79000	4.00%	0.07	0.07	0.08	0.13	0.14	0.14	0.44	0.49	0.49			
(b) AE 1	43000		102.331	60000	-31.03%;	0.05	0.08	0. <b>0</b> 6	: 0.09	0.16	0.11	0.29	0.57	0.38			
(c) JE :	30000		103.33	44000	-27.87X:	0.03	0.06	6.05	: 0.06	0.12	0.08	0.20	0.40	0.28			
(d) Admin staff	519000	1699000	227.991	717000	-57.B0%	0.57	1.53	0.76	1.07	3.21	1.30	3.43	11.04	4.51			
TUTAL :	<b>657000</b>	1922000	192.54%	009000	-53,23%	0.72	2.11	0.99	1.30	3.64	1.63	4.36	12.49	5.65			
(UIRL )	DJ/UUU	1722000	414.074	017VVV		V - 14	4-11	V . I I		3.07		7.00					

UP JAL NIGHT 1800 BUTCH PROJECT REVIEW OF OWN COSTS

PIPED SCHEPE: SALDABAD

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;	l	TOTALS				: 0057	PER KL OF	MATER PRODUCED	; COST F	ER KLOF I	ATER DISTRIBUTED	: COST F	YERKLOFI —	MTER SOLD	t COMP	OSITION OF	TOTAL
PARTICULARS :	1989-90 % INC	1990-91	x INC t	991-92	x INC	:1989-90	1990-91	1991-92	: ( <del>989-9</del> 0	1990-91	1991-92	:1989-90	1990-91	1991-92	:1989-90	1990-91	1991-97
Time spent by ind. %				**		,			:			:			:		
(a) EE	5.00%	5.00%		5.002	l	0.00	0.00	0.00	; 0.00	0.00	0.00	: 0.00	0.00	0.00	}		
(b) AE	15.00%	15,00%		15.00	(	: 0.00	0.00	0.00	; 0.00	0.00	0.00	: 0.00	0.00	0.00	1		
(c) JE	85.00%	85.00%		85.00%		0.00	0,00	0.00	; 0.00	0.00	0.00	; 0.00	0.00	0.00	1		
(d) Aden staff	5.001	5.00%		5.001		: 0.00 :	0.00	0.00	t 0.00	0.00	0.00	( 0.00 ( )	0.00	0.00	( ; ;		
:						; ;			:			1			1 }		
Cost of indirect labour !				7500						0.01	0.01	0.02	0.02	0.02	;		
(a) EE	2200	3750	13.64%	3400	4.001		0.00	0.00	; 0.01	0.01	0,01						
(b) AE :	6450	13050	102.33%	9000	-31.03%		10.0	0.01	0.01	0.02	0.02	0.04	0.08	0.06			
(c) IE	25500	51850	103.33X	37400	-27.87¥		0.05	0.04	0.05	0.10	0.07	: 0.17	0.34	0.24			
(d) Admn staff	25900	84950	227.99%	<b>7585</b> 0	-57.80%	: 0.03	0.08	0.04	; 0.05	0.16	30.0	1 0.17	0.55	0.23	; ;		
TOTAL :	61150	153600	151.19%	86150	-43.912	; <b>0.</b> 07 ;	C.14	0.09	; 0.12 ;	0.29	0.16	1 0.41	1.00	0.54	; ; ;		
: Casual labourers	3600	5000	38 89%		-100.00%	: : 0.00	ERR		; 0.01	ERR		0.02	ERR		: : :		
1						;			ì			:			:		
. Total manpower cost		477444		15 (00)	0.70		0.16	0.16	0.28	0.33	0,28	0.93	1.12	0.98	· !		
(a) Direct !	141000	172000	21.99%		-9.301							0.41	1.00	0.54			
(b) Indirect	61150	122900	151.19%	86150	-43.911		0.14	0.07	1 0.12	0.29	0.16						
TOTAL :	202150	375600	61.07%	242150	-25.63%	0.22	0.29	0.26	1 0.40	0.62	0,44	1.34	2.12	1.52	•		
Cost not paid						;			:			i .					
(a) Direct			ERR		ETAR				- 1						•		
(b) Indirect			erar		err	;			1			i			i		
Real cost of manpower :						:						1		. ~			
(a) Direct	141000	172090	21.99%	156000	-9.30%	0.15	0.16	0.16	: 0.28	0.33	0.28	1 0.93	1.12	0.98			
(b) Indirect	61150	153600	151.19X	86150	-43.91%	0.07	0.14	0.09	; 0.12	0.29	0.16	: 0.41	1.00	0.54	; ;		
TOTAL	202150	325600	61.07%	242150	-25.63%	0.22	0.29	0.26	0.40	0.62	0.44	1.34	2.12	1.52	:		
i						!			;						:		
						;			;			ì			1		
•						;			;			1			! !		
POMER COSTS RATING - PUMP 1 40 RATING - PUMP 2 30									:			1			<b>;</b>		
Bills received	<b>850</b> 00	91000	7.06%	97700	7.361	0.09	0.08	0.10	0.17	0,17	0.18	0.56	0.59	0.41	<b>:</b> :		
Bills paid			ERR		ERR	<b>:</b>			1	•		;			; !		
Actual consumption						١			1			1		A 43	:		
PUMP 1	129008	129008		106075	-17.13%		0.12	0.11	0.25	0.24	0.19	0.85	0.83	0.67			
FUHP 2	68267	105311	54,26%	92632	-12.04X	0,07	0.10	0.10	0.14	0, 20	0.17	0.45	0.68	0.38			

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UP JAL NIBAM INDO DUTCH PROJECT REVIEW OF DRM COSTS

PIPED SCHEDE: SAIDABAD

	1	TOTALS	;			: COST	PER KL OF	MATER PRODUCED	: 0067 (	PER KL OF	MATER DISTRIBUTED	: 00ST I	PERKLOF (	MATER SOLD	: COMP(	EITION OF	TOTAL
PARTICULARS	:1987-90 X IN	1990-91	X INC	1991-92	X INC	:1999-90	1990-91	1991-92	:1989-90	1990-91	1991-92	(1989-90	1990-91	1991-92	:1 <b>989</b> -90	1990-91	1991-9
D. Actual power charges	!					;			!			;			;		
PUMP 1	140908	140808		169720	20.53%	0.15	0.13	0.18	0.28	0,27	0.31	0.93	0.91	1.07			
PUMP 2	75093	115842	54.26	148211	27.94%	80.0	0.10	0.16	0.15	0.22	0.27	0.50	0.75	0.93	;		
TOTAL	: 215902 :	256650	18.87	317932	23.98%	0.24	0.23	0.34	0.43	0.49	0.58	1.43	1.67	2.00	: :		
3) CHEHICALS COST	: !								;			:			; ;		
I, BLEACHING PONCER								4.40				i			:		
a. Actual cost	: 3100	3100		3400	9.68%	0.00	0.00	0.00	: 0.01	0.01	0.01	0.02	0.02	0.02	i		
b. More in graes per KL		_ 1		1		'			- 1								
c. Average price (KB)	3.75	3.90	4.00%	5.13	31.54%:				1			i			j		
d. Real cost of chemicals	3416	4319	26.44%	4654	12,384		0.00	0.01	1 0,01	0.01	0.01	: 0.02	0.03	0.03	i		
e. Stock (gty in Kgs) f. Number of days stock	<b>!</b>		err Err		ERR : ERR :				:			: :			: : :		
4) REPAIRS & MAINTENANCE . Material cost (al Pumping station (b) Distribution system (c) Overhead tanks (d) Others TOTAL	26000 46000 4000	24000 32000	-7.69% -30.433 ENR -100.00%	19000 21000	-20.63%; -34.38%; ERR ; ERR ;	0.03 0.05 0.00	0.02 0.03 0.05	0.02 0.02 0.04	0.05	0.05 0.06 0.11	0.03 0.04 0.07		0.16 0.21 0.36	0.12 0.13 0.25			
! !	\ <del></del>	•			:				1		:	: :		; ;	1		
Labour cost :					:				;			t		;			
(a) Pumping station :			ERR		ERR :				:			}		:			
(b) Distribution system :			ERR		584 :				1			;					
(c) Overhead tanks			ERR		ERR :				i .		;			;			
(d) Others			ERR		ERR ;				;			:					
TOTAL :			ERR		ERR :				1 1		;	! !		;			
1					1				1		;			;			
					1				:			:		3			
į					:				į								
<u>.</u>					:				!			•					
Total cost									i					0.17			
(a) Pumping station	25000	24000	-7.69%	19000	-50'827:	20.0	0.02	0.02	0.05	0.05	0.03	0.17	0.16	0.12			
(b) Distribution system :	46000	32000	-30.43	21000	-34.38X	0.05	50.0	0.02	0.09	0.06	0.04	0.30	0.21	0.13			
(c) Overhead tanks 1 (d) Others 1	4000		-100.00%		ERAR I ERAR I	0.00			1 0.01		:	.0.03		;			
1	_				1				:		1	1					
TOTAL :	76000	56000	~24.XX	40000	-28.571	0.08	0.05	0.04	0.15	0.11	0.07	0.50	0.36	0.25			

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UP JAL NIGAM DIGO BUTCH PROJECT REVIEW OF GLAY COSTS

PIPED SCHENE: SALDABAD

	:		TUTALS				: COST	PER KL DE	MATER PRODUCED	COST F	ER KLOF	MATER DISTRIBUTED	: 0057	PER KL OF I	MATER SOLD	: COMP	OSITION OF	TOTAL
	<u> </u>					~												1991-92
PARTICULARS	11989-90 1	I INC	1990-91	X INC	1991-92	I INC.	1989-90	1990-91	1971-72	1989-90	1990-91	1991-92	11989-90 	[440-4[	1991-92	11989-90	1990-91	1771-7_
D. Maantenance budget	1						:			!			<i>:</i>			:		
(a) Pumping station	;			ERR		ERR				•			1			1		
(b) Distribution system	1			ERK		ER#										1		
(c) Overhead tanks				ERR.		ERR				į			i			í		
(d) Others				EPAR		err	:			,			1			;		
	ì			ERR		ERR	:			:			;			:		
TOTAL	;			ERR		ENK	!			:			;			i		
	1						:			ì			į			;		
	:						ì			•			•			<b>:</b>		
	;									1			;			:		
(4) OTHER COSTS							:			+			:			;		
A. Equipments	1						;			1			1			:		
(a) Total cost	l			ERR		ERM	;			ŧ			1			l .		
(b) X for OSM	;		,				i .			ł			1			; ,		
(c) OM cost	:			ERR		ERR	;						į.			i		
	1						:			:			i			•		
	:									i i			1			:		
B. Vehicles			****	40.40	4400	12 028	0.00	0.00	0.00	. 0.01	0.01	0.01	0.02	20.0	20.0	i		
(a) Total cost	2200		100,00% 2900	18.195	[00.00%	12.02%	, 0.00	0.00	0.00	; 0.01 ;	0.01	0.01	1	0.00	*****	:		
(b) % for OM	: 7200 : 100.001		3900	19.18%		12.82%	0.00	0.00	0.00	0.01	0,01	0.01	0.02	0.03	0.03	;		
(c) OM cost	, 3300		3100	19.105	*****	11.04	1	V.100	V. V.	}	• • • •		1	-		1		
						:				1			;			{		
C. Others	5000		3750	15.00%	6250	9.701	0.01	0.01	0.01	1 0.01	0.01	0.01	0.03	0.04	0.04	:		
Unite	{					;				í			:					
TOTAL	: B300		9650	16.27%	10650	10.36%	0.01	0.01	0.01	: 0.02	0.02	0.02	0.06	0.06	0.07	1		
	}					1							:			i		
	;						ł			:						•		
	;									1			i ,					
			.0		104.77		0.22	0,18	0.21	: 0.39	0.37	0.36	1.30	1.27	1.23			
6) DEPRECIATION	: 196133		126122		196133	•	y. 22	V. 18	0.21	. 0.34	0.37	V.30	1.30	4.47	1.64			
The second core	:			ERR		ERR :				•			!			-		
7) INTEREST	i			ERK		CIAN .				1								

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UP JAL NIGAM INDO DUTCH PROJECT REVIEW OF OWN COSTS

PIPED SCHEME: SAIDABAD

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	:		TOTALS				r 00st	PER KL DF	MATER PRODUCED	£ COST (	PER KL OF	MATER DISTRIBUTED	: COST 1	PER KLOF I	MATER SOLD	: COMPO	OSTATION OF	TOTAL
PARTICULARS	1 <b>989-9</b> 0	1 INC	1990-91	X INC	1991-92	X INC	: 1989-90	1990-91	1991-92	:1989-90	1990-91	1991-92	:1 <del>989-9</del> 0	1990-91	1991-92	:1 <del>989-9</del> 0	1990-91	1091-92
REAL COST BASIS	}						:			:			!			:		
TOTAL REVENUE	; ; 92000		97000	5.431	158000	62.89%	; ; 0.10	0.09	0.17	: 0.18	0.18	0.29	; 0.61	0.63	0.99	1		
VARIABLE COST	!						! !			i i			1			1		
(a) Power	215902		256650	18.87%	317932	23.88%	0.24	0.23	0.34	; 0.43	0.49	0.58	1.43	1.67	2.00	1 30.76%	30.251	39.17
(b) Chemicals	3416		4319	26.44%		12,38%		0.00	0.01	: 0.01	0.01	10.0	0.02	0.03	0.03	: 0.49%	0.51%	0.60
(c) Repair materials	76000		56000	-24, 32%		-28.57%		0.05	0.04	. 0.15	0.11	0.07	: 0.50	0.36	0.25	1 10.83X	6.60%	4.93
(d) Casuals	1		••••	ERR		ERR				1			:			1		
Total	295317		316969	7.33%	362785	14.45%		0.29	0.38	0.58	0.60	0.66	1.96	2.06	2.28	42.07%	37.36%	44.69
CONTRIBUTION	-203317		-219969	8.191	-204785	-6.90%	- <b>0.2</b> 2	-0.20	-0.22	; ;			-1.35	-1.43	-1.29	:		
FIXED COST	1						I						;			i		
(a) Manpower	202150		325600	61.07%	242150	-25.63X	0.22	0.29	0.26	1 0.40	0.62	0.44	1 1.34	2.12	1.52	28.80%	18.381	29.83
(b) Others	8300		9650	16,271		10.36%	0.01	0.01	0.01	: 0.02	0.02	0.02	0.06	30.0	0.07	1.18%	1.14%	1.317
(c) Depreciation	196133		196133		196133		0,22	0.18	0.21	: 0.39	0.37	0.36	1.30	1.27	1.23	77.94%	23 12%	24.16
(d) Interest	1			ERUR	•	ERR :				:			:			:		
Total	406583		531383	30.69%	448933	-15.52X	0.45	0.48	0.47	0.80	1.01	0.81	2.70	3 45	2.82	57.93x	62.64%	55.311
BURPLUS/DEFICTT	: : -60990!		-751352	23.19%	-653719	-12.99%	-0.67	-0.68	-0.69	-1,21	-1.42	-1.18	-4.04	-4.88	-4.11	; <b>;</b>		
TOTAL COST (FIXED COST+VC)	: : 701901		848352	20.87%	811719	-4.32X;	0.77	0.77	0.86	: 1.39	1.61	1.47	: : 4.65	5.51	5.10	100.001	100.00%	100.001

UP JAL NIGAM INDO DUTCH PROJECT REVIEW OF DAN COSTS

PIPED SCHENE: TINNI

	:	TOTAL	.5			COST P	ER KL OF N	ATER PRODUCES	1 730D :	PERKLOFI	ATER DISTRIBUTED	COST PEF	KE OF WATE	r solo	, 00≪3	SELLION OF	*S14.
PARTICULARS	:1989-90 X INC	1590-91	z IMC	1991-92	X INC :	1989-90	1990-91	-	:1 <del>787</del> -9c	1990-91	1991-92	:1929-90	1990-91	1991-92	1 <b>989</b> -5	1990-9	199,-92
SUMPARY OF ACTUALS	;				;										;		
(1) Direct cost	274550	352500	28.371	424565	20.44X	0.20	0.25	0.30	0.26	0.36	0.44	1.68	2.23	2.02	,   42,44%	45,719	51.94
(2) Indirect cost	62345	144035	131.03%	82830	-42.49%	0.04	0.10	0.06	; 0.06	0.15	0.09	0.38	0.91	0.39	9-04%		
(3) Degreciation	: 310000	210000		310000	:	0.22	0.22	0.22	0.29	0.31	0.32	1.90	1.96	1.47	: 47.93%	38.447	J 93
(4) Interest	1		ETRR		ERA :				:			;			{ !		
Total	646895	806535	24.68X	817395	1.35%	0.46	0 58	0 58	0.61	0.82	0.85	3.97	5.10	3.88	100.00%	100,00%	100,000
(4) Income demanded	163000	158000	-3.07%	206000	30.38%	0.12	0.11	0.15	0.15	0.16	0.21	1.00	1.00	0.98	i		
(5) Income collected	94000	90000	-4.26X	124000	37.78X	0.07	0.06	0.09	1 0.00	6.09	0.13	0.58	0.57	0.59	1		
(6) Other income	1		ERR		ERR :				:			1			;		
Yotal demanded	163000	158000	-3.07¥	206000	30.38%	0.12	0.11	0.15	. 0.15	0.16	0.21	1.00	1.00	0.99	:		
Total received	94000	90000	-4.26%	124000	37.78X;	0.07	0.06	0.09	: 0.09	0.09	0.13	: 0.58	0 <b>.5</b> 7	0.59	<b>:</b>		
(7) Surplus/(Deficit) on	•				;												
denand	-483995	-648535	34.02%	-411355	-5.73X:	-0.35	-0.47	-0.43	1 -0.4c	-0.66	-0.63	: -2.97	-4.10	-2.90			
(8) Surplus/(Deficit) on received	-552895	-714535	29.60%	£92295-	-3.23x	-0 <b>4</b> 0	-0.51	-0.49	-0.53	-0.73	-0.72	-3.39	-4.54	-3.29	;		
Cost recovery on received	14.53X	11.16%	-23.21%	15.17%	35.95x; ;				; ; ;			:			: :		
SUMMARY OF REAL COSTS	:				:				:			:			<b>!</b>		
(1) Direct cost	: : : : : : : : : : : : : : : : : : : :	754482	10.74%	1017538	34.87X	0.49	0.54	0.72	0.65	0,77	1.05	4.18	4.78	4 83			
(2) Indirect cost	67345	144035	131.031	82830	-42.49X;	0.04	0.10	0.06	: 00c	0.15	0.09	: 0.38	0.91	0.39	5.92%		
(3) Depreciation	: 310000	310000		210000	;	0.22	0.22	0.22	: 0.29	6.21	0.22	1.90	1.96	1.47	29,42%	25.65	21,981
(3) Interest	1		ERR		ERR :				1			1			•		
Total	1053480	1208517	14.69%	1410368	16.70%	0.76	0.97	1.00	1.00	1.23	1.46	: 646	7-65	6.70	: 100 00k	100,115	נטט ורן
(4) Income demanded	163000	158000	-3.071	206000	30,38%	0.12	0.11	0.15	0.15	0.16	0.21	1.00	1.00	0.98			
(5) Income received	44000	90000	-4.26¥	124000	37. <b>78%</b> :	0.07	0.06	0.09	1 0.09	0.09	0.13	0.58	0.57	0.59	:		
(6) Other income	1		ERR		ERR ;				:			;			;		
Total demended	163000	158000	-3.07		30.38%	0.12	0.11	0.15	0.15	0.16	0.21	1.00	1.00	0.98			
fotal received	94000	90000	-4.26x	124000	37.78%:	0.07	0.06	0.09	9.00	0.09	0.13	0.56	0.57	0.59	; ;		
(7) Sumplus/(Deficit) on	• •				;				:			:					
demand	: -890680	-1050517	17.95%	1204368	14.65%	-0.64	-0.75	-0.85	-0.6°	-1,07	-1.25	5.46	-6.65	-5.72			
(8) Surplus/(Deficit) on	;												7 00	_,	•		
Sec a 1 And	-959680	-1118517	16.33%	1286368	15.01%	-0.69	-0.80	-0.91	} -0.91 ;	-1.13	-1 72	: -5.89	-7.08	-6.11	;		
lost recovery on received	: : 8.92%	7,451	-16.57%	8.791	18.06%				i			;					

UP JAL NIGAM INDO BUTCH PROJECT REVIEW OF OWN COSTS

PIPED SCHENE: TIKRI

		TOTA	N.S			: 0057 (	PERKLOFI	MATTER PRODUCED	: COST F	PER KLOF I	ATER DISTRIBUTED	100ST PER	KL OF WATE	R SOLD	: 0000	ISITION OF	TOTAL
PARTICULARS	11 <del>787 7</del> 0 % INC	1990-91	I INC	1991-92	X INC	:1 <b>987-9</b> 0	1990-91	1991-92	11 <del>989-9</del> 0	1990-91	1991-92	11989-90	1990-91	1991-92	:1989-90	1990-91	1991-92
COMPONENTS OF COST-ACTUAL						!					·	-: <del></del>			:		
(1) Manpower costs (2) Power	227900	<b>3</b> 21600	41.181 ERR	264750	-17.68% ERR		0.23	0.19	0.22	2.0	0.27	1.40	2.04	1.26	: : 35.21% :	39.671	37.39
(3) Cheercals	: 1000	6000	500.001	7000	16-67X	0.00	0.00	0.00	0.00	10.0	0.01	10.01	0.04	20.0	: 0.15K	0.74%	0.861
(4) R & H materials	<b>995</b> 50	161500	43.88¥	226565	40.271	0.07	0.12	0.16	: 0.09	0.16	0.23	: 0.60	1.02	1.08		20.02%	27.72
(5) Others	9545	7435	-22.11%	9080	ZZ. 13¥	0.01	0.01	. 0.01	10.0	10.0	0.01	1 0.06	0.03	0.04			1.111
(6) Depreciation	: 310000	310000		310000	;	0.22	0.22	0.22	: 0.29	0.31	0.32	1.90	1.96	1.47	47.92%	38.441	37.933
(7) Interest	1		ERR		ERR	!			!			:			:		
Total	646895	806533	24.68%	817395	1.22x	0.46	0.58	0.58	13.0	0.82	0.65	3.97	5.10	2.86	100.00%	100.00%	100.009
(B) Centage	:		ERR		ERR							1			i 		
Total	646895	806272	24.68%	817395	1.351	0.46	0.58	0.58	0.61	0.82	0.85	3.97	5.10	3.88	; ; ;		
COMPONENTS OF COST-REAL	:				; !				:			<u> </u>		,	<del>!</del>		
(1) Hanpoier costs	-; ; 227900	321600	41.18X	264750	-17,6 <b>8</b> %	0.16	0.23	0.19	; ; 0.22	0.33	0.27	; ; 1.40	2.04	1.26	21.62%	26.61%	18.77%
(2) Power	402557	402545	0.00%	592733	47.25Y:	0.29	0.29	0.42	0.38	0.41	0.61	2.47	2.55	2.81	38.20%	33.31%	42.03X
(3) Chesicals	5229	54.77	4.00%	7240	33.16%;	0.00	0.00	0.01	0.00	0.01	0.01	0.03	0.03	0.03	0.50%	0.45%	0.51%
(4) R & H materials	98550	161500	63.88%	226565	40.291	0.07	0.12	0.16	: 0.09	0.16	0.23	0.60	1.02	1.08	9.35%	13.36x	16.06%
5) Others	9545	7435	-22.11%	9080	22,131	0.01	0.01	0.01	0.01	0.01	0.01	0.06	0.05	0.04	0.91%	0.62%	0.64%
(6) Depreciation	310000	310000		310000	:	0.22	0.22	0.22	1 0.29	0.31	0.32	1.90	1.96	1.47	29.421	25.651	21.96%
7) Interest	!		ETAR		ERR :							:		1			
Total	1053680	1208517	14.69%	1410368	16,70%	0.76	0.87	1.00	1.00	1.23	1.46	6.46	7.65	6.70	x00.001	100.00%	100.00X
8) Centage	, !		ERR		ERR :				i			:		1	ı		
Total	1053680	1208517	14.69k	1410368	16.70%:	0.76	Q.87	1.00	1.00	1.23	1.46	6.46	7.63	6.70 :			
HYSICAL PARAMETERS	! 			<u> </u>		<del></del> .			<u> </u>	<del></del> -		! 		;	<b></b>		
() Population covered	i !				;				;			;		:			
(a) Domestic metered (		10240	ERR	10416	1.721				i			! !		:			
(b) Domestic unmetered :	8940		-100,00%	794	ERR :				;			!					
(c) Industrial/commel. :			ERR		EMR :						,	!					
(d) Others metered			ERR		ERR :				i		'	!		:			
(a) Others unactored			ERR		ERR :				1					•			
(f) Public stand posts	41500	47430	14.29%	47800	0.78%				1					i			
;					:				1		:	!		:			
TDTAL :	50340	57670	14.56X	59000	2.31X:				1			:		:			

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UP IAL NIGAN INDO DUTCH PROJECT REVIEW OF OWN COSTS

PEPED SOMERE: THAT

	:		TOTAL	LS			0051	PER KL OF	MATER PRODUCED	: COST	PER KLOF	MATER DISTRIBUTED	:005T POR	KL OF MATE	OR SOLD	: COMP	ISITION OF	TOTAL
PARTICULARS	:19 <del>89-9</del> 0	Y INC	1990-91	X INC	1991-92	x INC	1 <b>989-9</b> 0	1990-91	1991-92	! <b>! 98</b> 9-ዋህ	1990-91	1991-92	(1989-90	1990-91	1991-92	1 <b>989-9</b> 9	1990-91	100;-02
(2) Total connections	: :						1			:	-		;	-		;		
(a) Domestic metered	Ι,		1280	err	1302	1.72%				ŧ.			:			:		
(b) Domestic unmetered	1105			-100.001	78	ERR				}			ł			1		
(c) Industrial/commel	:			ERR		ERR 3				1			:			;		
(d) Others setered	;			ERR		ERP	!			1			;			;		
(e) Others unmetered	1			ERR		ERR :				;			ł			1		
	;						;			;			1			1		
	¦									í.			{			1		
	1									1			;			;		
!	1					:				ł			;			!		
3) Public standposts	219		219		219	;				;			i			1		
unf i						ï				:			1			!		
4) Pumping hours p.a.	5162		5163	0.02%	5884	13.95%				;			;			i		
5) Rate of pumping (lpm)	2100		2100		2100	:				;			1			:		
6) No. of days worked	327		<b>32</b> 7		346	5.811:				•			1			į		
	650444		650580	0.02%	741334	13.95%				;			}			i		
<b>PP</b> 2																		
I) Pumping hours p.a	5902		5901	-0.02%	5317	-9.90%												
Rate of pumping (lpm)	2100		2100		2100													
i) No. of days worked	349		349		319	~B.601												
) Production (KL)	743695		743515	-0.02%	PF6442P	-9.901												
a) TOTAL PUMPING HRS	11065		11064	0.001		1.231												
TOTAL PRODUCTION IN KL	1394138		1394094	0.00%	1411269	1.231												
:						:				;			;			:		
B) Average consumption(1pd;						;				ŀ			:			•		
(a) Domestic metered				ETHR		ERR :				:			1			:		
(b) Domestic unmetered :				£786		ERR :				;			1			i		
(c) Industrial/comel				ERR		ERR :				;			I			i		
(d) Others setered				ERR		ERR ;				;			:			1		
(e) Others unsetered :				ERA.		ERA :				:			;			:		
(f) Public standposts				ERR		ERR :				:			;			1		
1						;				t			1			<u>.</u>		
:						}				:		,	1					
į						1				;			}					
:						:				;			;			i		
) Water distribution(KL)						3				;			1					
(a) Domestic metered			158000	ERR	196000	24.05%;				;			1			i		
(b) Donestic unmetered 1	163000			-100.00¥	[4594	ERR :				:			;			i		
(c) industrial/commel				ERR		ERR :				;			;					
(d) Others setered				ERR		ERR :				t			;					
(e) Others unsetered :				ERR		ERR :				;			:			i		
(f) Public standposts	889164		<b>B2762</b> 3	-6.92X	7545 <del>9</del> 7	-8.82X				1			1			: 1		
TUTAL	1052164		985623		965191	-2.071							,			:		

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-( UP TAL MIGAN INDO BUTCH PROJECT REVIEW OF OWN COSTS

PEPED SCHOOL TEKRE

	:	A707	LS			COST PE	ER KIL OF 1	MATER PRODUCED	: 0057	PER KL OF	MATER DISTRIBUTED	:COST PER	KL OF WAT	OLD FOLD	: 00199	OSITION OF	TOTAL
PARTICULARS	11989-90 1 INC	1990-91	X INC	1991-92	x INC	1999-90	1990-91	1991-92	1989-90	1990-91	1991-92	1989-90	1990-91	1991-92	11999-90	1990-91	1991-92
(10) Water wastage(KL)	341974	408471	19.44)	446078	9.21%				<u></u>						!		
(11) XMastage on production	24.53%	29.30	19.451	31.612	7.88x							}			: :		
(12) Water sold (KL)	; }				•				;			;			i (		
(a) Domestic metered	<b>;</b>	158000	EMR.	196000	24.05%				1			:			ŧ		
(b) Domestic unnetered	163000		-100.00%	14594	ERR :				:			1			:		
(c) Industrial/commel	}		ERR		ENR :				í			1			;		
(d) Others metered	<b>;</b>		ERR		ERR				:			:					
(g) Others unsetered	:		ERR		ERR :				:			;			!		
(f) Public standposts	;		err		err :				1			:			†		
TOTAL	163000	159000	-3.07%	210594	33.29%												
1	1				;				;			;			Į.		
(13) % sold on production	11.691	11.33%		14.92%	;				1			:			:		
					1				ŧ			1			į.		
(14) lpcd calculated	ł				:				į.			;			;		
(a) Domestic metered :	ERR	42	ERR	52	21,95%;				;	1		1			}		
(b) Donestic unmetered (	51	ERR.	ERR	51	ERR :				;			:			{		
(c) Industrial/comme) :	SBR3	ERA	ERA	ETHA	ERR :				;			;		,			
(d) Others metered	ERR	ERR	ERR	err	ERR :				;			<b>!</b>			<b>:</b>		
(e) Others unsetered	ERR	ERA	ERR	ERR	ERR ;				1			1		1			
(f) Public standposts	59	48	-18.56X	43	-9.521				;			;					

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UP JAL NIGAN INDO BUTCH PROJECT REVIEW OF OWN COSTS

PIPED SCHEME: TOOR!

	:		TOTA	T2			: COST	PER KL OF	WATER PRODUCED	: COST	PER KL OF	WATER DISTRIBUTED	ICOST PER	KL OF WAT	ER SOLD	: 0019	OSITION OF	TOTAL
PARTICULARS	:1 <b>989-9</b> 0	X INC	1990-PI	x inc	1991-92	X INC	:1969-90	1990-91	1991-92	11989-90	1990-91	1991-92	1989-90	1990-91	1991-92	1 <b>1989</b> -90	1990-91	1991-92
FINANCIAL PARAMETERS	;						:			!			-;					
REVENUES	\ :						;			ì			j			:		
(1) Nater Charges demanded	1				,		}			;			:			1		
(a) Domestic metered	1		103000	ERR	196000	90.29	I;			t			:			<b>{</b>		
(b) Donestic unnetered	: 163000	,	55000	-66,26	10000	-81.82	11			1			;			1		
(c) industrial/commel	:			ERA		ERR	:			1			;			1		
(d) Others metered	}			ERA		ERFR	;			;			1			:		
(e) Others unmetered	!			ERR		ETRR	:			:			:					
TOTAL	; ; 163000	•	158000	-3.07	x 206000	30.38	; L;			;			;			;		
	:						;			1			1			!		
(2) Charges collected	; ;						:						ì			i		
(a) Domestic metered	:		70000	ERR	116000	65.71	<b>(</b>			1			+			ł		
(b) Dowestic unsetered	94000		20000	-70,72	8000	-60.001	::			:								
(c) Industrial/commel	;			ERKR		ERR										i		
(d) Others matered	:			ERR		ERR				÷.			i			1		
(e) Others wastered	:			ERR		ERR	<b>:</b>			;			;			;		
TOTAL	94000		90000	-4.26	124000	37.78	•						:			:		
	:						•			;			}			;		
The Second of all manyaba	<i>i</i> 1						:			•			1			1		
<ol> <li>Demand of all private connections were setered</li> </ol>	•						;			;			;			1		
(a) Dosestic metered	163000		187000	14.72	206000	10.161	:			1			;			;		
(b) Domestic unastered	1		•=	EFIR		ERR				}			:			:		
(c) Industrial/comel	i			ERR		ETHR	!			1			;			1		
(d) Others setered	•			ERR		<b>ERI</b> R	:			i			1			:		
(e) Others unmetered	;			ERR		ERR	:						;			!		
TOTAL	163000		197000	14.771	206000	10,161	{ {			i			;			i		
101112	!		•••••				;			;			;			1		
	i						:			:			ţ			:		
4) Arrears of demand	:						1			1			:			1		
(a) Donestic metered			22000	ERR	80000	142,427	:			:						1		
(b) Bonestic unmetered	23000		22000	52.177	2000	-94.291	J.			;			:			;		
(c) Industrial/comel				ERR		ERR	}			i			1			!		
(d) Others setered	I			<b>ER</b> 8		<b>ETR</b> R	:			í			1					
(e) Others unnetered	1			ERR		ERR	:			1			1			!		
P.BAL OF ARREARS	46000		69000		137000		:			;			1			1		
TOTAL	69000		137000	98.551	219000	59.851	;			1			<u> </u>			:		
;	1						:									•		
:							:			1			•			:		
Callection efficiency	1						:						i			:		
(a) Donestic metered	ENR		67.96%		59.161					•			•			i 1		
(b) Donestic unsetered	\$7.671	i	36.361	-36.941						;			<u>;</u>			:		
(c) Industrial/come)., (	ENR		ERR	ERR	ENA	ERR				1						i ·		
(d) Others setered	ERR		ENR	ERR	ENR	ERA				1								
(e) Others westered   1	84		ENR	ERR	ERR	ENR				:			ŧ.		,	•		
- 1	l				14.45		l			!					,	<u>'</u>		
TOTAL EFFICIENCY 1	97.471	1	56.961	-1.23	60.19%	5.67%				1	_		1			•		

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UP JAL NISAN INDO DUTCH PROJECT REVIEW OF DAM COSTS

PIPED SCHEME: TIKRI

		:	1014	NES .			: 0051	PER +L OF .	MATER PRODUCED	0097	PER KL OF I	NATER DISTRIBUTED	:00ST PER	KL OF WAT	ER SOLD	: COMP	OSITION OF	TOTAL
	PARTICULARS	:1989-90 X INC	1990-91	X INC	1991-92	X [NC	(1989-90	1990-91	1991-92	(1989-9)	1990-91	1991-92	:1989-90	1990-91	1991-02	11989-9	1990-91	1991-92
(6) No.	days arrears	¦					\			;			-; :			·:		
(z)	Domestic metered	: ETAR	117		149	27.402				1			1			t .		
(0)	Domestic unmetered	1 52	232			-68.57				•			;			1		
(c)	Industrial/comel	ERR	ERR	ERA	ERR	ERR	:			1			ì			;		
(4)	Others setered	: ERR	ERA	ERR	EFR	ETRR	1			;			;			1		
(e)	Others westered	EPAR :	EMA	ERA	ERR	ETRIR	}						1			1		
		<u>.</u>					<i>i</i>			;						:		
							;			:			i			•		
							· !			;			;					
173 Ath	er income			ERA		ERA	:			;			j					
		· }					:			i			1					
(8) Tot	al cash income	94000	90000	-4.26X	124000	37.78x	11			;						1		
	al real income	163000	158000	-3.07¥	206000	30.38%	:			:			;			1		
		:					i			:			:			:		
		1					;			ì			1			ł .		
							:			;			1			:		
							:						1			:		
		i					<i>i</i>			:								
	•						, ,						i			i		
		•				,	• !			;			;					
		•				•	:			•			;			· •		
	į	•				:	}						i			:		
	COSTS	<b>:</b>					;			1			ì			•		
11 1606	OMER COSTS :					:	1			1			1			:		
. Durec	t labour !						:			;			:			:		
(a) P	umping station :	101000	103000	1.98%	106000	2.911	0.07	0.07	0.08	0.10	0.10	0.11	0.62	0.45	0.50	:		
	listribution system :	52000	56000	7.69%	59000	5.36%	0.04	0.04	0.04	0.05	0.06	0.06	0.52	0.35	0.28	:		
(c) 0	thers :	22000	26000	18.18%	26000	;	0.02	0.02	0.02	0.02	0.03	20.0	0.13	0.16	0.12	:		
	:						<b>:</b>			;			1					
	TOTAL '	175000	185000	5.71%	191000	3.241	0.12	0.13	0.14	0. 1	0.19	0 20	1.07	1.17	υ <b>9</b> :	:		
	}					:	l						i			•		
	:					;				1			1			:		
							,						;					
	•					ì	,			i ,						•		
Indo	; ; ect labour(Total)									:								
(a) E		66000	75000	13.64X	78000	4.00X	0.05	0.05	0.06	1 0.05	90.0	30.9	0.40	0.47	0.37			
(b) A		43000	87000	102.33%	60000	-31.03%	-	0.05	0.04	: 0.4	0.05	0.06	0.26	0.55	0.28	, !		
(c) J		30000	61000	103.33%	44000	-27.87%		0.04	0.63	0.02	0.06	0.05	0.18	0.39	0.20	:		
	dmo staff '	519000	1699000	727.99%	717000	-57 BOX	0.37	1.22	0.51	0.45	1 77	0.74	3.18	10.75	3.40			
	::::			3=	•	1				1			1			;		
	TOTAL	657000	1922000	192.54%	899000	-53.23%	0.47	1.39	0.64	( c.e.	1.95	29.0	4,03	12.16	4,27			

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UP JAK NIGAM INDO DUTCH PROJECT REVIEW OF DAM COSTS

PIPED SOLDE: TIKRI

Time start by Ind. X   Fig. 2   S.001   S.0001   S.0.001	0.00 0.00 0.00 0.00 0.00 0.00 0.11 0.11	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0		1990-91	[99]-9
12   EZ   5.00%   5.00%   5.00%   5.00%   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 1 1 1 1 1 1 1 1 1 1	f ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;		
(c) IE 50.00% 50.00% 50.00% 50.00% 0.00 0.00 0	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 1 1 1 1 1 1 1 1 1 1	f ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;		
Coxt of indirect labour (a) EE 30.00% 50.00% 50.00% 50.00% 0.00 0.00 0.0	0.00 0.00 0.02 0.11 0.19 0.34	0.00 : 0.00 : 0.00 : 0.00 : 0.00 : 0.00 : 0.00 : 0.10 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.17 : 0.			
Cost of Indirect labour   Casual labourers   ERR   ERR   ERR   ERR   ERR   Casual labourers   Casual labourers   Casual labourers   Casual labourers   Casual labourers   ERR   ERR   ERR   ERR   ERR   Casual labourers   Casual labourers   Casual labourers   Casual labourers   Casual labourers   ERR   ERR   ERR   ERR   ERR   Casual labourers   Casual labourers   Casual labourers   ERR   ERR   ERR   ERR   Casual labourers   ERR   ERR   ERR   ERR   Casual labourers   ERR   ERR   ERR   Casual labourers	0.00 0.02 0.11 0.19 0.54	0.00 : : : : : : : : : : : : : : : : : :			
Cost of indirect labour  (a) EE	0.02 0.11 0.19 0.54	0.02 : 0.06 : 0.10 : 0.17 :	: : : : : : : : :		
(a) EE	0.11 0.19 0.54	0.06 : 0.10 : 0.17 :			
(a) EE	0.11 0.19 0.54	0.06 : 0.10 : 0.17 :			
(b) RE 8600 17400 102.33% 12000 -31.03% 0.01 0.01 0.01 0.01 0.02 0.01 0.02 0.01 0.05 (c) IE 15000 30500 103.33% 22000 -27.87% 0.01 0.02 0.02 0.02 0.01 0.03 0.02 0.09 (d) Admin staff 25900 84950 227.99% 33850 -57.80% 0.02 0.06 0.03 0.02 0.09 0.04 0.16   TOTAL 52800 13600 158.71% 73750 -46.01% 0.04 0.10 0.05 0.05 0.14 0.08 0.32 (a) Birect 175000 185000 5.71% 191000 3.24% 0.15 0.04 0.10 0.05 0.05 0.14 0.08 0.32 (b) Indirect 52800 136600 158.71% 73750 -46.01% 0.04 0.10 0.05 0.05 0.14 0.08 0.32 (c) ITAL 227800 321600 41.18% 264750 -17.68% 0.16 0.23 0.19 0.22 0.33 0.27 1.40 (c) Indirect 175000 185000 5.71% 191000 3.24% 0.16 0.23 0.19 0.22 0.33 0.27 1.40 (c) Indirect 175000 185000 5.71% 191000 3.24% 0.16 0.23 0.19 0.22 0.33 0.27 1.40 (c) Indirect 175000 185000 5.71% 191000 3.24% 0.16 0.23 0.19 0.22 0.33 0.27 1.40 (c) Indirect 175000 185000 5.71% 191000 3.24% 0.13 0.13 0.14 0.17 0.19 0.20 1.07 (a) Indirect 175000 185000 5.71% 191000 3.24% 0.13 0.13 0.14 0.17 0.19 0.20 1.07 (a) Indirect 175000 185000 5.71% 191000 3.24% 0.13 0.13 0.14 0.17 0.19 0.20 1.07 (a) Indirect 175000 185000 5.71% 191000 3.24% 0.13 0.13 0.14 0.17 0.19 0.20 1.07 (b) Indirect 175000 185000 158.71% 73750 -46.01% 0.04 0.10 0.05 0.05 0.05 0.14 0.08 0.32 (c) Indirect 175000 185000 158.71% 73750 -46.01% 0.04 0.10 0.05 0.05 0.05 0.14 0.08 0.32 (c) Indirect 175000 185000 158.71% 73750 -46.01% 0.04 0.10 0.05 0.05 0.05 0.14 0.08 0.32 (c) Indirect 175000 185000 158.71% 73750 -46.01% 0.04 0.10 0.05 0.05 0.05 0.14 0.08 0.32 (c) Indirect 175000 185000 158.71% 73750 -46.01% 0.04 0.10 0.05 0.05 0.05 0.14 0.08 0.32 (c) Indirect 175000 185000 158.71% 73750 -46.01% 0.04 0.10 0.05 0.05 0.05 0.14 0.08 0.32 (c) Indirect 175000 185000 158.71% 73750 -46.01% 0.04 0.10 0.05 0.05 0.05 0.14 0.08 0.32 (c) Indirect 175000 185000 158.71% 73750 -46.01% 0.04 0.10 0.05 0.05 0.05 0.14 0.08 0.32 (c) Indirect 175000 185000 158.71% 73750 -46.01% 0.04 0.10 0.05 0.05 0.05 0.14 0.08 0.32 (c) Indirect 175000 185000 158.71% 73750 0.14 0.04 0.10 0.05 0.05 0.05 0.14 0.08 (c) Indirect 175000 18	0.11 0.19 0.54	0.06 : 0.10 : 0.17 :			
(c) E	0.19 0. <b>54</b>	0.10 ; 0.17 ; ;	; ;		
(d) Admin staff	0.54	0.17 :	<b>:</b>		
TOTAL 52800 136600 158.71% 73750 -46.01% 0.04 0.10 0.05 0.05 0.14 0.08 0.32  Casual labourers		;	:		
Casual labourers ERR ERR:  Total sampower cost (a) Birect 175000 185000 5.71x 191000 3.24x; 0.13 0.14 0.17 0.19 0.20 1.07 (b) Indirect 5.28900 156600 158.71x 73750 -46.01x; 0.04 0.10 0.05 0.05 0.14 0.08 0.32  TOTAL 227800 321600 41.18x 264750 -17.68x; 0.16 0.23 0.19 0.22 0.33 0.27 1.40  Cost not paid (a) Birect ERR ERR: (b) Indirect ERR ERR: (c) Indirect 175000 185000 5.71x 191000 3.24x; 0.13 0.13 0.14 0.17 0.19 0.20 1.07 (a) Birect 175000 185000 5.71x 191000 3.24x; 0.13 0.13 0.14 0.17 0.19 0.20 1.07 (b) Indirect 52800 136600 158.71x 73750 -46.01x; 0.04 0.10 0.05 0.05 0.14 0.08 0.32	0.86	22.0			
Total sampower cost (a) Birect 175000 185000 5.71% 191000 3.24% 0.13 0.13 0.14 0.17 0.19 0.20 1.07 (b) Indirect 52800 136600 158.71% 73750 -46.01% 0.04 0.10 0.05 0.05 0.14 0.08 0.32 TOTAL 227800 321600 41.18% 264750 -17.68% 0.16 0.23 0.19 0.22 0.33 0.27 1.40 Cost not paid (a) Birect ERR ERR: (b) Indirect ERR ERR: (c) Indirect 175000 185000 5.71% 191000 3.24% 0.13 0.13 0.14 0.17 0.19 0.20 1.07 (a) Birect 175000 185000 5.71% 191000 3.24% 0.13 0.13 0.14 0.17 0.19 0.20 1.07 (b) Indirect 52800 136600 158.71% 73750 -46.01% 0.04 0.10 0.05 0.05 0.05 0.14 0.08 0.32		:			
Total supposer cost (a) Birect 175000 185000 5.71% 191000 3.24% 0.13 0.13 0.14 0.17 0.19 0.20 1.07 (b) Indirect 52800 136600 158.71% 73750 -46.01% 0.04 0.10 0.05 0.05 0.14 0.08 0.32 TUTAL 227800 321600 41.18% 264750 -17.68% 0.16 0.23 0.19 0.22 0.33 0.27 1.40  Cost not paid (a) Birect ERR ERR: (b) Indirect ERR ERR: (c) Indirect 175000 185000 5.71% 191000 3.24% 0.13 0.14 0.17 0.19 0.20 1.07 (a) Birect 175000 185000 5.71% 191000 3.24% 0.13 0.14 0.17 0.19 0.20 1.07 (b) Indirect 52800 136600 158.71% 73750 -46.01% 0.04 0.10 0.05 0.05 0.05 0.14 0.08 0.32		;	<b>:</b> :		
(a) Birect   175000   185000   5.71x   191000   3.24x    0.13   0.14   0.17   0.19   0.20   1.07   (b) Indirect   5.28900   15600   158.71x   73750   -46.01x    0.04   0.10   0.05   0.05   0.05   0.14   0.08   0.32    TUTAL   227800   321600   41.183   264750   -17.68x    0.16   0.23   0.19   0.22   0.33   0.27   1.40    Cost not paid   ERR   ERR		:			
(a) Direct   175000   185000   158.71%   73750   -46.01%   0.04   0.10   0.05   0.05   0.05   0.14   0.08   0.32      TOTAL   227800   321600   41.18%   264750   -17.68%   0.16   0.23   0.19   0.22   0.33   0.27   1.40      Cost not paid	1.17	0.91	•		
TOTAL 227800 321600 41.188 264750 -17.68%; 0.16 0.23 0.19 0.22 0.33 0.27 1.40  Cost not paid (a) Direct	0.86	0.35			
Cost not paid	2.04	1.26			
(a) Direct   ERR   ERR	2.04	1,20 ,	•		
(b) Indirect ERR ERR:  (a) Direct 175000 185000 5.71% 191000 3.24%; 0.13 0.14 0.17 0.19 0.20 1.07  (b) Indirect 52800 136600 158.71% 73750 -46.01%; 0.04 0.10 0.05 0.05 0.14 0.08 0.32		;	•		
Real cost of sanpower (a) Direct (175000 185000 5.71% 191000 3.24%; 0.13 0.13 0.14 0.17 0.19 0.20 1.07 (b) Indirect (52800 136600 158.71% 73750 -46.01%; 0.04 0.10 0.05 0.05 0.14 0.08 0.32		- ;			
(a) Direct   175000 185000 5.71% 191000 3.24%; 0.13 0.13 0.14   0.17 0.19 0.20   1.07 (b) Indirect   52800 136600 158.71% 73750 -46.01%; 0.04 0.10 0.05   0.05 0.14 0.08   0.32					
(b) Indirect : 52890 136600 158.71% 73750 -46.01% 0.04 0.10 0.05 0.05 0.14 0.08 : 0.32	1.17	0.91			
	0.86	0.35 :			
77700 77400 44 IOW 244750 -17 40W 0.44 0.27 0.39 1.07 0.37 0.22 1.40	V.00	1,33	!		
TOTAL : 227800 321600 41.18% 264750 -17.68%; 0.16 0.23 0.19 : 0.22 0.33 0.27 : 1.40	2,04	1.26 :			
		:	1		
		1			
		:			
PRATING - PUPP 1 45 RATING - PUPP 2 45		:			
Bills received : 106800 134400 25.84% 178480 47.68%; 0.08 0.10 0.14 0.10 0.14 0.21 0.66	0.85	0.94	1		
Bills patd : ERR ERR :		1			
Actual consumption		0. <b>9</b> 2	1		
PUMP 1 170741 170777 9.02% 194600 13.95% 0.12 0.12 0.14 0.16 0.17 0.20 1.05	1.08				
PURF 2 195220 195173 -0.02% 179838 -9.90% 0.14 0.14 0.12 0.19 0.20 0.18 1.20	1.24	0.84			
Rate per unit 1.10 1.10 1.60 45.45%		i			
Rate per unit 1,10 1.10 1.60 45.45%					

UP JAL NIGAN INDO DUTCH PROJECT REVIEW OF OWN COSTS "

PIPED SCHENE: TIKRI

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	•		TOTA	rs			: COST /	PER KLOF	MATER PRODUCED	: 0031	YER KLOF I	MATER DISTRIBUTED	:COST PER	KT OE MUL	ER SOLD	: COMP	OSITION OF	TOTAL
PARTICULARS	:0	K INC	1990-91	X INC	1991-92	I (NC	11989-90	1990-91	1991-92	:1989-90	1990-91	1901-92	11989-90	(990-91	1991-92	11 <b>989</b> -90	1990-91	1991-9
D. Actual power charges	!						!						- ! 			1		
PUMP 1	187816		197955		311260	65.75X		0.13	0.22	31.0	0.19	0.32	1.15	1.19	1.48			
FURF 2	214742	:	214690	-0.02	281373	21.062	0.15	0.15	0.20	0.20	0.22	0.29	: 1.32	1,36	1.34	:		
TUTAL	, 402557 ,	•	402545	0.00	592733	47.253	0.29	0.29	0,42	0.39	0.41	0.61	2.47	2.55	2.81	: :		
(3) CHENICALS COST	<i>!</i> !					;	; !						!			<b>;</b>		
A. BLEACHING POMDER													;			:		
a. Actual cost	1000		6000	500.00%	7000	16.67%	0.00	0.00	0.00	: 0.00	0.01	0.01	0.01	0.04	0.03	;		
b. Norm in grams per KL	1		1		1		i			:			1					
c. Average prace (KB)	3.75		3.90	4.00%		31.54%										<b>`</b>		
d. Real cost of chemicals			5437	4.001	7240	33.16%		0.00	0.01	: 0.00	10.0	0.01	20.0	0.03	0.03	:		
e. Stock (gty in Kgs)	7		280	3900.00x		-100.00%				•								
f. Number of days stock	2		/3	3900, 13x		-100.001				1			: : :		;	• ! !		
(4) REPAIRS & MAINTENANCE A. Material cost						; ; ;				; ; ;			; ; ;		;	} 		
(a) Pumping station	24300		76100	213.17%	89400	17.48X	0.02	0.05	0.06	0.02	0.08	0.09	0.15	0.48	0.42			
(b) Distribution system :			74700	32,21%		64.26%	0.04	0.05	0.09	0.05	0,08	0.13	22.0	0.47	0.58			
(c) Overhead tanks	900		3300	266.67%	500	-84.85%	0.00	0.00	0.00	0,00	0.00	0.00	0.01	0.02	0.00			
(d) Others	16850		7400	-56.08%	13965	88.72%	0.01	0.01	0.01	0.02	0.01	0.01	0.10	0.05	0.07			
TOTAL :	98550		161500	£3.981	226565	40.29%	0.07	0.12	0.16	: 0.09	0.16	0.23	: 0.60	1.02	1.08			
: :						;				:			; ;		;			
1						;				:			; ;		;			
Labour cost : (a) Pumping station :				EAR		ERR :				:			:		:			
(b) Distribution system :				ERR		ERR :				•			· !		:			
(c) Overhead tanks				ERR		ERR !				•			ì		•			
(d) Others				ERR		ERR :				:			!					
idi oners				Ou.						;								
TOTAL				£196		ERR :				1			:		;			
:						1				;			•		;			
:						i i				:			! !		:			
Total cost						;				:			•		i			
(a) Pumping station	24300		76100	213.17%	87400	17.48%;	0.02	0.05	0.06	0.02	0.08	0.09	0.15	0.48	0.42			
(b) Distribution system :	56500		74700		122700	64.26%	0.04	0.05	0.09	0.05	0.08	0.13	0.35	0.47	0.58 :			
(c) Overhead tanks	900			266.67%	500	-84.65%	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00 :			
(d) Others	16850		7400	-56.08X	13965	88.72%	0.01	0.01	0.01	0.02	0.01	0.01	0.10	0.05	0.07 :			
										!			!		:			
TOTAL :	98550		161500	92.86X	Z26565	40.291	0.07	0.12	0.16	: 0.09	0.16	0.23	0.60	1.02	1.08 :			

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UP JAL NIGAN INDO DUTCH PROJECT REVIEW OF DAY COSTS

PIPED SCHEME: TIKRI

	:		TUTA	LS			: 0051	PERKLOF!	MATER PRODUCED	: COST F	ER KL DF I	MATER DISTRIBUTED	COST PER	KL OF WAT	OR SOLD	: COMP	OSITION OF	TOTAL
PARTICULARS	:1 <b>797-7</b> 0	X INC	1990-91	x DC	1991-92	k INC	:1989-90	1990-91	1991-92	:1 <del>989-9</del> 0	1990-91	1991-92	:1989-90	1990-91	1991-92	1 <b>987-9</b> 0	1990-91	1991-97
D. Haintenance budget (a) Pumping station (b) Distribution system (c) Overhead tanks	:			ERR Err		ERR ERR	:			1						:		
(d) Others	!			ERR		ERA				i						1		
TOTAL	: :			ERR		ERR	:			ì			Ì			:		
	}						1 1			; !			1			1		
(4) OTHER COSTS	} }						1			;			1			:		
A, Equipments (a) Total cost (b) % for CMM	; ; ;			ERR		EPRR	} ; }			- 1			; ; ;	`		; ;		
(c) Diet cost	t ;			ERA		err	:			:			;			:		
B. Vehicles (a) Total cost	: : : 36900		10700	-71.00%		2.901	: : : 0.03	0.01	10.0	0.04	0.01	0.01	0.23	0.07	0.05	:		
(b) % for Old (c) Did cost	; 5.00% ; 1845 ;		5.00% 5.35	-71.00%	5.00x 550	2.80%	0.00	0.00	0.00	1.00	0.00	0.00	; 0.01	0.00	0.00	:		
C. Others	: : 7700		<b>690</b> 0	-10.391	8530	23.624	: : 0.01	0.00	10.0	0.01	10.0	10.0	0.05	0.04	0.04	} !		
TOTAL	; ; 9545		7435	-22.111	9090	22.13%	0.01	0.01	0.01	0.01	0.01	0.01	0.06	0.05	0.04	}		
	(   						!			1			;			;		
(6) DEPRECIATION	310000		210000		310000		0,22	0.X	0,22	0.29	0.31	0.37	1.90	1.90	1.47	; :		
(7) INTEREST	} !			ERR		EPR	; ;			;			:			:		

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UP JAL NISAM INDO DUTCH PROJECT REVIEW OF OUR COSTS

PIPED SCHEME: TIKRI

	:	TOTA	LS		_	: 0087 #	PERKLOF (	MATER PRODUCED	: 00051 6	PER KLOF	WATER DISTRIBUTED	-COST PER	KL OF WATE	R SOLD	: COMPO	SITION OF	TOTAL
PARTICULARS	1989-90 % INC	1990-91	x INC	1991-92	K INC	:1 <del>989-9</del> 0	1990-91	1991-92	1989-90	1990-91	1991-92	1989-90	1990-91	1991-92	:1989-90	1990-91	1991-92
REAL COST BASIS	;					1		· <del></del>	1			!			1		
TOTAL OCUPACE	; ; 163000	158000	-3.071	206000	30.38%	: : 0.12	0.11	0.15		0.44	2.21	1			:		
TOTAL REVENUE	1 183000	130070	-3.0/1	200000	30.367	0.12	0.11	0.13	0.15	0.16	0.21	1.00	1.00	0.98			
VARIABLE COST	;					:			:			;			:		
(a) Power	402557	402545	0.00%	592733	47.25%	0.29	0.29	0.42	: 0.38	0.41	0.61	2,47	2,55	2.81	38.201	33.31%	42.03
(b) Chemicals	5229	5437	4.00%	7240	33.16X	0.00	0.00	0.01	0.00	0.01	0.01	: 0.03	0.03	20.0		0.45%	0.51
(c) Repair materials	1 98550	161500	63.88x	226565	40.29%	0.07	0.12	0.16	: 0.09	0.16	0.23	1 0.60	1.02	1.08	9.351	13.361	16.08
(d) Casuals	1		ERR		ERR :	!			:			:			1		
Total	506335	569482	12,47%	924238	45.14%	0.36	0.41	0.59	: 0.48	0.58	38.0	; 3.11	3.60	3.92	48.051	47.12%	58.60
	!					٠						!			1		
CONTRIBUTION	-3432725	-411482	19.80%	-620538	50.81%	-0.25	-0.30	-0.44	: -0.33	-0.42	-0.64	-2.11	-2.60	-2.95	:		
FIXED COST									•						; !		
(a) Managuer	227900	321600	41.18%	264750	-17.68%	0.16	0.23	0.19	0.22	0.33	0.27	1,40	2.04	1.26	21,62%	26.61X	16.77
(b) Others	9545	7435	-22,11%		22.13%		0.01	0.01	: 0.01	0.01	0.01	0.06	0.05	0.04		0.62%	0 64
(c) Depreciation	: 310000	310000		310000		0.22	0.22	0.22	0.29	0.31	0.32	1.90	1.96	1.47		25.65%	
(d) Interest	1		ERR	_	ERR ;				:			1					
Total	547345	639035	16.75%	583830	-8.64X	0.39	0.46	0.41	0.52	0.65	0.60	: 3.36	4.04	2,77	\$1.95%	52.88%	41,40
SURPLUS/DEFICIT	: -890680	-1050517	17,95%	1204368	: 14.65%!	-0.64	-0.75	-0.65	: :-0.65	-1.07	-1.25	; ; -5.46	-6.65	-5.72	\ <b>\</b>		
TOTAL COST (FIXED+VC)	! : 1053 <b>68</b> 0	1208517	14 404	1410368	16,70%;				÷			: !			100.00x	100.00%	100.00

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ALLHHABAD HAND PURP SCHEDE

		•	: :		D	IRECT C	061				:		INDIRECT C	net		:	:
		-1	·				<del></del>				·;					·	;
SOIDE	h P Number	:	: SAL-MSC	SAL-JE	CHEMICALS	TOTAL	MATERIALS	r (L M Labour	TOTAL	DIRECT	: EXE SAL :	VEHICLE	ADMN 0/H	DEPR			: SAD . TOTAL : WITHOUT t DEP
KAURTHAR	1	: 1989-90	: 141	102		243	19	105	124	367	: 20	31	53	900	1003	: 1370	: 470
		: 1990-91	: 133	96		729	77	105	182	411	: 19	36	51	900	1007	: [418	: 518
		: 1991-92	: 124	89		213	138	240	378		: 19	40	50	900	1008	: 1599	: 699
		TOTAL	399	287		686	223	450	683	1369	58	107	153	2700	3019	4397	
KALIRIHAR	_	: 1999-90		102		243	19	105	124	367		31	53	900	1003		-
		: 1990-91 :	: 132	9€		229	50	105	155	385	: 19	36	51	900	1007	: 1391	: 491
		: 1991-92 :	124	<b>6</b> 9		213	158	240	398	611	: 19	40	50	900	1008	1619	719
		TUTAL	399	287		484	227	450	677	1362	: 58	107	153	2700	3018	4380	
Kaur i Har	_	: 1 <del>787-7</del> 0 :		102		243	19	105	124	367		31	33	900	1003		
		1990-91	133	96		229	50	210	260	490	: 19	34	51	900	1007	: 1496	: 596
		: 1991-92 :	124	29		213	201	120	321	` 535	: 19	40	50	900	1008 :	1543	643
		TOTAL :	399	267		686	270	435	705	1391	: 58	107	153	2700	3018	4409	
KAUR I HAR	4 :	1989-90 :	141	102		243	23	105	128	371	20	31	53	900	1003	1374	474
		: 1990-91 :	133	98		229	59	105	164	394	: 19	36	51	900	1007	1400	500
		1991-92 :	124	B9		213	96	120	216	429	: 19	40	50	900	1008	1438	538
-		TOTAL :	399	297		686	178	220	508	1194	58	107	153	2700	3018	4212	1512 :
CALIFILITIES	5 :	1989-90 :	141	102		243	19	105	124	367	20	31	5,3	900	1003 :	1370	470
		: 1990-91 :	122	%		229	50	105	155	385 :	: 19	26	51	900	1007 1	1371	491
	1	1991-92 :	124	<b>9</b> 9		213	196	240	436	649 :	. 19	40	50	900	1009 :	1657	757 :
		TOTAL :	399	287		686	265	450	715	1400 :	58	107	153	2700	3018	4418 :	1718 :
ALIRIHMR	6:	1999-90 :	141	102		243	19	105	124	367 :		31	53	900	1003 :	1370 :	
		1990-91 :	122	9£		229	80	105	185	415 :	19	36	51	900	1007 :	1421 :	521 :
	1	1991-92 :	124	89		213	96	120	216	429 :	19	40	50	900	1008 :	1438 :	538 1
		TOTAL :	266	287		484	195	220	525	1211 :	58	107	153	2700	3018 :	4729 :	
ALR I HAR		1999-90 :	141	102		243	19	105	124	367 :		31	33	900	1003 :	1370 :	470 :
		1990-91 :	127	96		229	103	210	313	543 1		26	51	900	1007 :		
		1991-92 :	124	89		213	129	120	248	461 :	19	40	50	900	1008 1	1470 :	570 1
	:	TOTAL :	399	<b>29</b> 7		686	750	422	685	1371 ;	58	107	153	2700	3018 :	4389 :	1689 :
		·															

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		:	:			LIRECT C	061				1	1	INDIRECT C	<b>120</b>		:	1
SCHOLE		: YEAR	: :	SAL-JE	OFFICALS	TOTAL	MATERIALS	R & M S LABOUR	TOTAL	DIRECT	: EXE SAL :	VEHICLE	ADMN 0/H	DEPR	INDIRECT		: GRD.TOTAL : WITHOUT : DEP
KAURTHAR	8	: 1989-90	•	102		243	19	105	124	367	: 20	31	53	900	1003	: 1370	: 470
		: 1990-91		96		229	50	105	155	385	: 19	36	51	900	1007	: 1391	: 491
		: 1991-92		<del>89</del>		213	118	120	238	452	: 19	40	50	900	1008	: 1460	: 560
		: TOTAL	: 399	287		686	187	330	517	1203	: 59	107	153	2700	3018	: 4221	: 1521
KAURIHAR		: 1 <b>787-7</b> 0		102		243	19	105	124	367		31	53	90c	1003	: 1370	: 470
		: 1990-91		96		229	67	210	277	507		36	51	900	1007		
		: 1991-92		<b>89</b>		213	80	120	200	414	: 19	40	50	90c	1008	1422	
		: TOTAL :	399	287		686	166	435	601	1287	: 58	107	153	2700	3018	•	•
Kaurihar		: 1989-90 :		102		243	27	105	132	375		31	53	900	1002		
		: 1990-91 1		96		229	74	210	284	514		36	51	900	1007		
		: 1991-92 : :	124	89		213	<b></b>	120	200	414	: 19	40	50	900	1008 :	1422	
		: TOTAL :	399	287		686	181	4.25	616	1302		107	153	2700	3018 :	4320	1620
KAURIHAR	11	: 1989-90 :	141	102		243	19	105	124	367	•	31	53	900	1003 1	1370 :	470
		: 1 <del>990-9</del> 1 :	132	96		229	440	105	545	775 :	19	36	51	900	1007 :	1781 :	198
		: 1991-92 : ::	124			213	78	150	198	431 :	-		50	900	: 8001	1419 :	519 :
		TOTAL .	399	287		686	536	220	B66	1552 :	58	107	153	2700	3018 :	4570 :	1870 :
Kaurihar		1989-90 :	141	102		243	18	105	123	365 :		21	23	900	1003 :		
		1990-91 :	123	86		229	135	210	345	575 :		36	51	900	1007 :	1581 :	681 :
	:	1991-92 :	124	<b>89</b>		213	482	120	<b>₩</b> 02	: 815 :			50	900	1008 :	1824 :	1
	:	TOTAL :	399	287		686	<u>ست</u>	475	1070	1755 ;	58	107	153	2700	3018 :	4774 :	2074 :
(AURIHAR	13 :	1989-90 :	141	102		243	19	105	124	367 :	20	31	53	900	1003 :	1370 :	470 :
		1990-91 :	123	96		229	92	210	302	531 :	19	36	51	900	1007 :	1538 :	638 :
		1991-92 :	124	<b>89</b> 		213	% 	120	216	429 :	19	40	50 	900	: 8001	1438 :	: 539 :
	:	TOTAL :	399	287		686	206	435	641	1327 :	58	107	153	2700	3018 :	4345 :	1645 :
AURIHAR	•	1 <del>989-9</del> 0 :	141	102		243	67	105	172	415 :	20	31	53	900	1003 :	1418 :	518 :
		1990-91 :	122	96		229	125	210	222	564 r	19	36	51	<del>90</del> 0	1007 :	1571 :	671 :
	:	1991-92 :	124	89		213	π ———	120	197	410 :		40	50 	900	: 8001	1418 :	518 : 
		TOTAL :	379	287	<u>.</u>	686	268	435	703	1387 :	58	107	153	2700	3018 :	4407 (	1707 :
ALR IHAR	15 :	19 <del>99-9</del> 0 :	141	102		243	51	210	261	503 :	20	31	53	900	1003 :	1506 t	606 t
		1990-91 :	133	96		229	70	210	280	509 :	19	36	51	900	1007 :	1516 t	616 :
		1991-92 : 	124	<b>89</b>		213	27	120	147	360 :	19	40	<b>5</b> 0	900	1908 :	1366 :	1448 :
<del> </del>		TOTAL 1	399	297		484	147	540	<b>68</b> 7	1372 :		107	152	2700	3018 :	4391 :	1691 1
OTAL		1 <del>787-9</del> 0 t	2119	1524		3643	372	1680	2052	5695 ¢	294	465	788	13500	15046 1	20741 :	7241 ±
	-	1990-91 t	2002	1440		3442	1522	2415	3937	7379 :	290	540	770	12200	15100 :	22479 1	9979 t 9036 t
		1991-92 :	1862	1.559		7201	2049	2160	4209	7410 :	263	600	743	12200	15126 1	22536 I	7VJ6 [
	1	TOTAL- 1	5983	4302		10285	2944	6253	10199	20484 :	967	1605	2300	40500	45272 1	65756 1	25256 (

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Deviced.    16   1999-90   100   36   135   135   135   20   31   961   1012   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147   1147							ALLAHA54	C HAND PURE	SCHEME								
MARKER			-				DIRECT C	057				•	INDIRECT	C06T		-	-
DAYNAL   16   1997-97   100   34   132   133   20   31   941   1012   1147   1997-97   101   34   177   73   240   315   450   19   40   941   1020   1470   265   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267   267	SDEPE		:	t	SAL-JE	CHEMICALS	TOTAL			TOTAL	DIRECT	:	VEHICLE ADIN O/H	DEPR	INDIRECT COST	: TOTAL :WITH DEP	I WITHOUT
1971-72   101   36   137   73   240   315   450   19   40   461   1020   1470   10   1470   10   1470   10   1470   10   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470   1470	CHAYAL	16											31	<del>96</del> 1		•	186
Total   101   108										-	-						
CHAYMA  17   1969-90   100   36   125   125   120   31   941   1012   1147   1   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   1167   116				1								:				t	: 509 :
1997-97   101   36   137   34   210   244   381   19   36   961   1016   1398   1   1997-97   101   36   137   20   120   140   277   19   40   961   1020   1297   3   3   3   1   1   1   1   1   1   1			: TOTAL	ı 301	108		410		345	427	836	: 58 :	107	2963	3048	3984	1001
1991-92   101   35   137   20   120   140   277   19   40   961   1020   1297   3   3   108   1108   410   54   330   394   793   58   107   2883   3048   3841   59   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1047   1	CHAYAL	17															
TOTAL   301   108																	
DAYNAL   18 : 1999-90   100   36   135   135   20   31   961   1012   1147   1   1   1   1   1   1   1   1   1			: 1991-92	: 101 1———	79		137		120	140			40 	961			1 229 1
1990-91   101   36   137   20   105   125   262   19   36   961   1016   1278   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   101   10			: TOTAL	: 301	108		410	54	3230	384	793	58	107	2883	3048	: 3941	: 958 :
: 1991-92 : 101 36	CHAYAL	18											-	961	1012	: 1147	: 186 :
TOTAL   SOI   108   410   269   445   734   1143   58   107   2883   3048   4191   13																	
CMAYAL 19: 1999-70: 100 36 135				: 101 1	36		137	249	360		746 :	: 19 :	40	961	1020	1766	: 905 :
CHAYAL  19: 1999-90: 100 36 135  137 70 210 280 417: 19 36 961 1012: 1147: 1 1:1991-92: 101 36 137 70 210 280 417: 19 36 961 1012: 1147: 1 1:1991-92: 101 36 137 25 240 265 400: 19 40 961 1020: 1420: 4  1: TUTAL I 301 108 410 93 450 543 952: 58 107 2883 3048: 4000: 11  CHAYAL  20: 1989-90: 100 36 135  135: 20 31 961 1012: 1147: 11 1: 1991-91: 101 36 137 623 105 710 847: 19 36 961 1016: 1866: 19 36 1: 1991-91: 101 36 137 3 120 123 280: 19 40 961 1016: 1866: 19 36 1: 1991-91: 101 36 137 3 120 123 280: 19 40 961 1016: 1866: 19 36  CHAYAL  21: 1989-90: 100 36 135  137 208 315 523 460: 19 36 961 1016: 1867: 17 14  CHAYAL  21: 1999-90: 100 36 137 208 315 523 460: 19 36 961 1016: 1867: 17 14  CHAYAL  21: 1999-90: 100 36 137 208 315 523 460: 19 36 961 1016: 1867: 17 14  CHAYAL  22: 1999-90: 101 36 137 62 240 302 439: 19 40 961 1000: 1459: 44  1: TUTAL I 301 108 410 270 555 825 1235: 58 107 2883 3048: 4282: 140  CHAYAL  22: 1999-90: 100 36 135 137 62 240 302 439: 19 40 961 1012: 1147: 18 1990-91: 101 36 137 62 240 302 439: 19 40 961 1012: 1147: 18 1990-91: 101 36 137 62 240 302 439: 19 40 961 1016: 1850: 36 1990-91: 101 36 137 62 315 537 514: 19 36 961 1016: 1350: 36 1990-91: 101 36 137 62 315 377 514: 19 36 961 1016: 1350: 36 1990-91: 101 36 137 62 315 377 514: 19 36 961 1016: 1350: 36 1990-91: 101 36 137 62 315 377 514: 19 36 961 1016: 1350: 36 1990-91: 101 36 137 38 135 377 514: 19 36 961 1012: 1147: 18 1990-91: 101 36 137 38 120 125 272: 19 36 961 1016: 1279: 31 1990-91: 101 36 137 38 120 125 272: 19 36 961 1016: 1279: 31 1990-91: 101 36 137 38 120 135 272: 19 36 961 1016: 1279: 31 1990-91: 101 36 137 38 120 135 272: 19 36 961 1016: 1279: 33 100141 1301 108 410 35 225 280 689: 58 107 2883 3048: 3737: 85  204441 24: 1999-90: 101 36 137 38 120 135: 20 31 961 1012: 1147: 18 11990-91: 101 36 137 38 120 135 20 31 961 1012: 1147: 18 11990-91: 101 36 137 38 120 135 20 31 961 1012: 1147: 18 11990-91: 101 36 137 38 120 135 20 31 961 1012: 1147: 18 11990-91: 101 36 137 38 120 135 20 31 961 1012: 1147: 18 11990-91: 101 36 137 3				301	108		410	269	465	734	1143 :	58	107	2883	3048	4191	: 1308 :
1991-92   101   36   137   23   240   263   400   19   40   961   1020   1420   4	CHAYAL	19	•	100	36		135				135	20	31	961	1012	: 1147	: 186 (
TUTAL   301   108   410   93   450   343   952   58   107   2883   3048   4000   11																	
CHAYAL 20: 1989-90: 100 36 135 135 20 31 961 1012: 1147: 11 1199-91: 101 36 137 605 105 710 847: 19 36 961 1016: 1864: 9 1 1991-92: 101 36 137 3 120 123 260: 19 40 961 1020: 1280: 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			1 1991-92	: 101 :			137	23	240	263	400 :	19	<b>4</b> 0	961	1020	: 1420 :	: 459 : :
1970-91   101   36   137   605   105   710   847   19   36   961   1016   1864   99     1991-92   101   36   137   3   120   123   260   19   40   961   1020   1280   3     10704   301   108   410   608   225   833   1243   58   107   2883   3048   4291   144     11989-90   100   36   135   135   523   660   19   36   961   1012   1147   18     1990-91   101   36   137   208   315   523   660   19   36   961   1016   1677   17     1991-92   101   36   137   62   240   302   439   19   40   961   1020   1459   36     10704   301   108   410   270   535   825   1235   58   107   2883   3048   4283   140     108476   22   1989-90   100   36   135   377   514   19   36   961   1016   1530   36     1991-92   101   36   137   62   315   377   514   19   36   961   1016   1530   36     1991-92   101   36   137   62   315   377   514   19   36   961   1020   1453   49      10704   23   1989-90   100   36   137   58   240   296   434   19   40   961   1020   1453   49      10704   23   1989-90   100   36   137   20   105   125   242   19   36   961   1016   1279   31      1991-92   101   36   137   20   105   125   242   19   36   961   1016   1279   31      1991-92   101   36   137   35   120   135   272   19   40   961   1020   1312   38      10704   23   1989-90   100   36   137   20   105   125   242   19   36   961   1016   1279   31      1991-92   101   36   137   35   120   135   272   19   40   961   1020   1312   38      1991-92   101   36   137   35   120   135   272   19   40   961   1020   1312   38      1991-90   100   36   137   35   120   135   272   19   40   961   1020   1312   33      1991-90   101   36   137   35   120   135   272   19   40   961   1016   1177   118      1991-90   101   36   137   35   120   135   272   19   40   961   1016   1177   118      1991-90   100   36   137   35   120   135   272   19   40   961   1016   1177   118      1991-90   100   36   137   137   138   138   138   138   138   138   138   138   138   138   138   138   138   138   138   138   138   138   138   138   138			: TOTAL :	301	108		410	93	450	543	952 :	58	107	2983	3048	4000	1117 :
: 1991-92 : 101 36	CHAYAL	20	: 1989-90 :	100									31	961	1012	1147	186 :
CHAYAL 21: 1787-90: 100 36 135 135: 20 31 961 1012: 1147: 18 1 1797-91: 101 36 137 208 315 523 660: 19 36 961 1016: 1677: 71 1 1797-92: 101 36 137 62 240 302 439: 19 40 961 1020: 1459: 45  1 TUTAL: 301 108 410 270 335 825 1235: 59 107 2883 3048: 4283: 144  DAYAL 22: 1787-90: 100 36 137 62 315 377 514: 19 36 961 1016: 1530: 36 1 177 62 315 377 514: 19 36 961 1016: 1530: 36 1 177 62 315 377 514: 19 36 961 1016: 1530: 36 1 177 62 315 377 514: 19 36 961 1016: 1530: 36 1 1074L: 301 108 410 118 335 673 1083: 58 107 2883 3048: 4283: 40  THAYAL 23: 1787-90: 100 36 137 62 315 377 514: 19 36 961 1016: 1530: 36 1 1074L: 301 108 410 118 335 673 1083: 58 107 2883 3048: 4130: 124  THAYAL 23: 1787-90: 100 36 137 20 105 125 262: 19 36 961 1016: 1279: 31 1 1797-91: 101 36 137 20 105 125 262: 19 36 961 1016: 1279: 31 1 1797-92: 101 36 137 20 105 125 262: 19 36 961 1016: 1279: 31 1 1797-92: 101 36 137 35 120 135 272: 19 40 961 1020: 1312: 35  TUTAL: 301 108 410 55 225 280 689: 58 107 2883 3048: 3737: 88  TUTAL: 301 108 410 55 225 280 689: 58 107 2883 3048: 3737: 88  TUTAL: 301 108 410 55 225 280 689: 58 107 2883 3048: 3737: 88					_												
CHAYAL 21: 1989-90: 100 36 135 135 20 31 961 1012: 1147: 16 1: 1990-91: 101 36 137 208 315 523 660: 19 36 961 1016: 1677: 71 1: 1991-92: 101 36 137 62 240 302 439: 19 40 961 1020: 1459: 45  1: TOTAL: 301 108 410 270 535 825 1235: 58 107 2883 3048: 4283: 140  CHAYAL 22: 1989-90: 100 36 135 135 377 514: 19 36 961 1012: 1147: 18 1: 1990-91: 101 36 137 62 315 377 514: 19 36 961 1016: 1330: 36 1: 1991-92: 101 36 137 62 315 377 514: 19 36 961 1016: 1330: 36 1: 1991-92: 101 36 137 56 240 296 434: 19 40 961 1020: 1453: 49  CHAYAL 23: 1999-90: 100 36 137 56 240 296 434: 19 40 961 1020: 1453: 49  CHAYAL 23: 1999-90: 100 36 137 20 105 125 242: 19 36 961 1016: 1279: 31 1: 1991-92: 101 36 137 35 120 135 292: 19 40 961 1020: 1312: 35  TOTAL: 301 108 410 55 225 280 689: 58 107 2883 3048: 3737: 85  CHAYAL 24: 1999-90: 100 36 137 35 120 135 292: 19 40 961 1020: 1312: 35  TOTAL: 301 108 410 55 225 280 689: 58 107 2883 3048: 3737: 85  CHAYAL 24: 1999-90: 100 36 137 35 120 135 292: 19 40 961 1016: 1373: 35  TOTAL: 301 108 410 55 225 280 689: 58 107 2883 3048: 3737: 85  CHAYAL 24: 1999-90: 100 36 135 135 120 135 292: 19 40 961 1016: 1353: 19			: 1991-92 : :	101			137		120	123	260 : :		40	<del>96</del> 1	1020	12790	319 :
CHAYAL 21: 1989-90: 100 36 135 135 20 31 961 1012: 1147: 18				301	108		410	608	225	823	1243 :	58	107	2983	3048 1	4291	1408 ;
1 1971-92; 101 36 137 62 240 302 439; 19 40 961 1020; 1459; 45  1 TOTAL: 301 108 410 270 535 825 1235; 58 107 2883 3048; 4283; 140  DARYAL 72: 1989-90; 100 36 135 135 20 31 961 1012; 1147; 18  1 1971-92; 101 36 137 62 315 377 514; 19 36 961 1016; 1530; 36  1 1071-12: 101 36 137 56 240 296 434; 19 40 961 1020; 1453; 49  1 TOTAL: 301 108 410 118 335 673 1083; 38 107 2883 3048; 4130; 124  23: 1997-90; 100 36 135 135 20 31 961 1012; 1147; 18  1 1997-90; 101 36 137 20 105 125 242; 19 36 961 1016; 1279; 31  1 1071-12: 101 36 137 35 120 135 292; 19 40 961 1020; 1312; 35  1 TOTAL: 301 108 410 55 225 280 689; 38 107 2883 3048; 3737; 85  24: 1999-90; 101 36 137 35 120 135 292; 19 40 961 1020; 1312; 35  1 TOTAL: 301 108 410 55 225 280 689; 38 107 2883 3048; 3737; 85  24: 1999-90; 100 36 137 35 120 135 292; 19 40 961 1020; 1312; 35  1 TOTAL: 301 108 410 55 225 280 689; 38 107 2883 3048; 3737; 85  24: 1999-90; 100 36 135 135 120 135; 292; 19 40 961 1012; 1147; 18  1 1991-90; 100 36 137 35 120 135 292; 19 40 961 1016; 1373; 18	CHAYAL	21	1989-90 :														
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: 1991-92 : 101 36 137 56 240 296 434 : 19 40 961 1020 : 1453 : 49  : TUTAL : 301 108 410 118 335 673 1083 : 38 107 2883 3048 : 4130 : 124  DARYAL 23 : 1999-90 : 100 36 135 135 20 31 961 1012 : 1147 : 18  : 1990-91 : 101 36 137 20 105 125 262 : 19 36 961 1016 : 1279 : 31  : 1991-92 : 101 34 137 35 120 135 272 : 19 40 961 1020 : 1312 : 35  : TUTAL : 301 108 410 35 225 280 689 : 58 107 2883 3048 : 3737 : 65  24947AL 24 : 1999-90 : 100 36 135 135 137 135 : 100 136 137 : 18  : 1990-91 : 101 36 135 135 135 135 136 137 136 961 1016 : 1153 : 18	DHAYAL			100	36		125				135 :	20	31	-	1012 1		
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23   1997-90   100   36   135   135   20   31   961   1012   1147   18		1	TOTAL 1	301	108		410	118	355	673	1063 :	58	107	2963	3048 i	4130 :	1247 i
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	HAYAL				<b>3</b> 6		125				135	20					196 r 192 r
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ALLAHABAD HAND PUPP SCHENE

		:	: :		ı	DIRECT C	120ST				:	INDIRECT C	120		:	:
SCHEDE	NUMBER		: SAL-HSC	SAL-JE	CHENICALS	TOTAL	MATERIALS	r & H Labour	TOTAL	TOTAL DIRECT COST	:	VEHICLE ADMN 0/H	DEPR	TOTAL INDIRECT COST	1 TOTAL	EGRO. TOTAL E WITHOUT E DEP
CHAYAL	25	1 1999-90	: 100	36		133				135	: 20	31	961	1012	1 1147	1 186
		1990-91	101	36		137				137	: 19	36	961	1016	: 1153	: 192
		: 1991-92	101	36		137	20	120	140	277	: 19	40	961	1020	r 1297	t 229
		TOTAL	301	108	<del></del>	410	20	120	146	549	: 58	107	2883	3048	1 3597	: 714
CHAYAL	26	1989-90	100	36		135				1.75	20		961	1012	: 1147	: 196
	1	1990-91 :	101	36		137	173	315	486	625	: 19	36	961	1016	1 1641	: 680 :
	:	1991-92	101	36		137	22	120	142	279	19	40	961	1020	: 1299	
	1	TOTAL	301	108		410	195	435	630	1039	58	107	2983	3048	: 4087	1204
CHAYAL	27	1989-90	100	36		135				135	20	31	961	1012	: 1147	: 186 :
		1990-91 (	101	36		137	195	210	405	542 :	19	36	961	1016	: 1558	: 597 :
	1	1991-92 :	101	36		137	21	120	141	278 :	19	40	961	1020	1298	: 337 :
	1	TOTAL 1	301	108		410	215	330	545	955 :	58	107	2883	3048	4002	1119
TOTAL	: :	1 <del>787-9</del> 0 :	1195	430		1625				1625 :	235	372	11532	12139	1 13764	2232
	1	1990-91 :	1209	435		1644	1395	1995	2290	5034 :	232	422	11537	12196	17230	5698 :
		1991-92 :	1711	435		1646	603	2160	2763	4409 1	226	480	11537	12238	16647	: 5115 :
,		TUTAL 6	3615	1300		4915	1998	4155	6153	11068 :	693	1284	34596	36573	47641	: 13045

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UP JAL NIGAM ALLAHABAD HANDPUMP SCHEME

SUMMARY

YAURIHAR			TOTAL		% of	TOTAL COS	ST.		PER PUMP	
	COST COMPONENTS	1989-90	1990-91	1991-92	1989-90	1990-91	1991-92	1989-90	1990-91	1991-92
	MANPOWER									
	~ EMPLOYEES	3936	3732	3484	18.98%	16.609	15.46%	262.43	248.78	232.26
	- LABOUR (R&M)	1680	2415	2160	8.107	10.74	9.58%	112.00	161.00	144.00
	R & M ~ MATERIALS	372	1522	2049	1.80%	6.77%	9.09%	24.82	101.47	136.62
	OTHERS	1253	1310	1343	6.04%	5.83×	5.96%	83.50	87.32	89.51
	DEPRECIATION	13500	13500	13500	65.09%	60.06%	59.90%	900.00	900.00	900.00
	TOTAL	20741	22479	22536	100.00%	100.00%	100.00%	1382.76	1498.58	1502.40
	TOT WITHOUT DEP	7241	8979	9036				482.76	598.58	602.40
	PHYSICAL									
	PARAMETERS									
		WI	TH DEPREC	H DEPRECIATION WITHOUT DEPRE			ECIATION			
	ND OF HP's	15	15	15	15	15	15			
	-COST PER HP	1383	1499	1502	483	599	602			
	POPULATION	3750	3844	3940	3750	3844	3940			
	-COST PER PERSON	6	٤	6	2	2	2			
	HOUSEHOLDS	750	<b>75</b> 0	750	750	750	750			
	-COST PER HOUSEHOLD	28	30	30	10	12	12			
	PRODUCTION(KL)	53950	53950	53840	53950	53950	53840			
	-COST PER KL '	0.38	0.42	0.42	0.13	0.17	0.17			
	NO.NOT WORKING I	80	80	91	80	80	91			

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## UP JAL NJGAM - ALLAHARAD HANDPUMP SCHEME

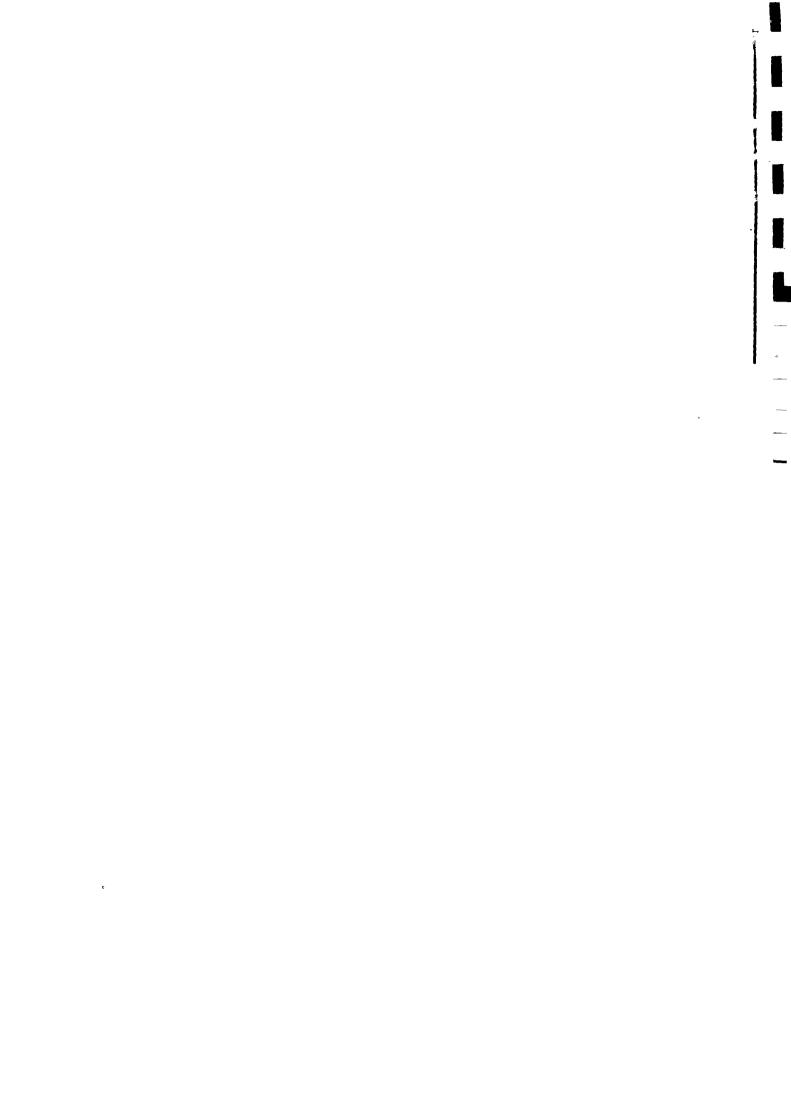
CHAYAL			TOTAL		% OF	TOTAL COS	ST		PER PUMP	
	COST COMPONENTS	1969-90	1990-91	1091-92	1989-90	1990-91	1991-92	198990	1990-91	1991-92
	MANPUWER									
	EMPLOYEES	1860	1874	1872	13.517	10.897	4 11.25%	154.98	156.35	156.00
	- LABOUP (RAM)		1995	2160		11.58	12.98%	:	166.25	180.00
	R & M - MATERIALS		1395	603		8.10	3.62%		116.27	50.27
	OTHERS	372	432	480	2.70%	2.51	4 2.8e%	31.00	36.00	40.00
	DEPRECIATION	11532	11532	11532	83.79%	66.93%	69.27%	961.00	961.00	961.00
	TOTAL	13764	17230	16647	100,009	100.00%	100.00%	1146.98	1435.87	1387.27
	TOT WITHOUT DEP	2232	5698	5115				185.98	474.87	426.27
	PHYSICAL									
	PARAMETERS									
		W)	TH DEPREC	CIATION	WITHOUT DEPRECIATION					
	NO OF HP's	12	12	12	12	12	12			
	-COST PER HP	1147	1436	1387	186	475	426			
	POPULATION	3000	2075	3152	3000	3075	3152			
	-COST PER PERSON	5	<del>ሪ</del>	5	1	2	2			
	HOUSEHOLDS	400	600	600	600	400	600			
	-COST FER HOUSEHOLD	23	29	58	4	9	9			
	PRODUCTION (KL)	43240	43240	43320	43240	43240	43320			
	-COST PER IL	0.32	0.40	0.38	0.05	0.13	0.12			
	NO.NOT WORKING II	56	56	48	56	56	48			

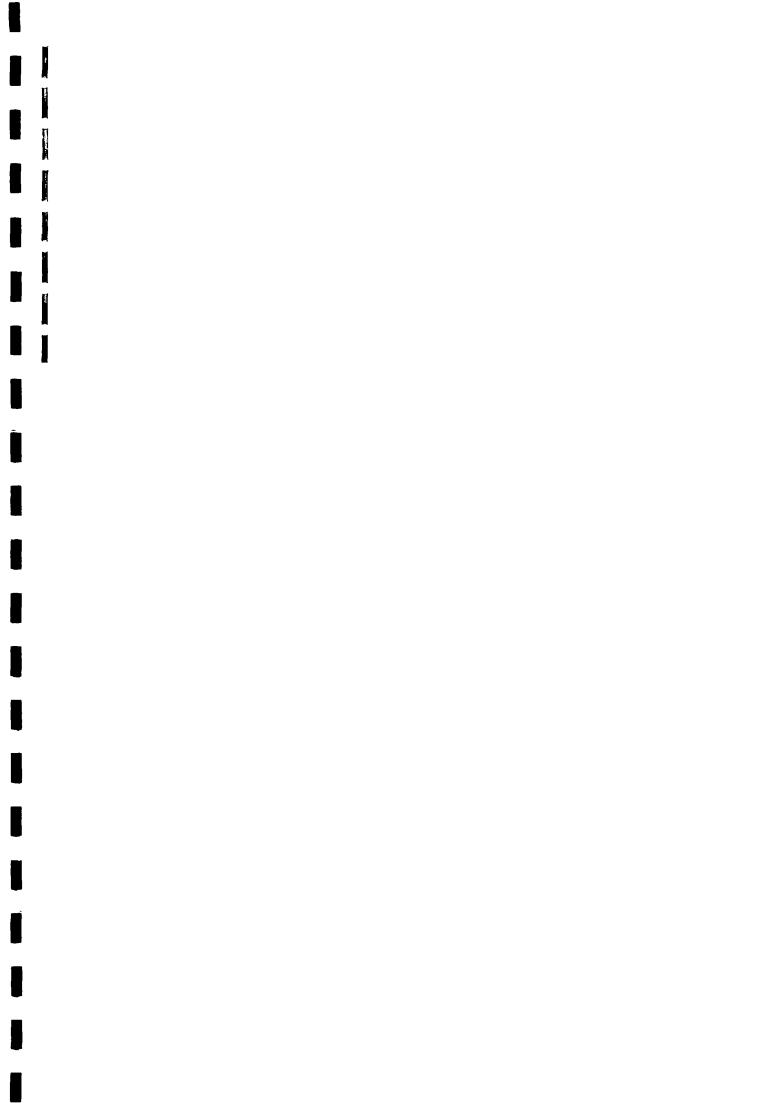
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UP JAL NIGAM ALLEMASAD HANDPUMP SCHEME

COMBINED			TOTAL		* 0E	TOTAL COS	•			
COURTINED			TOTAL		A 04"	TOTAL COS	) i			
	COST COMPONENTS	1989-90	1990-91	1991-92	1989-90	19 <del>9</del> 0-91	1991-92			
	MANPOWER									
	- EMPLOYEES	5796	560B	5356	16.80%	14.12%	13.67%			
	- LABOUR (R&M)	0841					XE0.11			
	R & M - MATERIALS	372	2917	2653	1.08%	7.35%	6.77%			
	OTHERS	1625	1742	1823	4.71	4.39%	4.65%			
	DEPRECIATION	25032	25032	25032	72.55X	63.04%	63.88%			
	TOTAL	34505	3970 <del>9</del>	39183	100.00%	100.00%	100.00%			
	TOT WITHOUT DEP	9473	14677	14151						
	PHYSICAL PARAMETERS									
	T APARTE CENTS	WTΤ	WITH DEPRECIATION				WITHOUT DEPRECIATION			
	NO OF HP's	27	27	27	27	27	27			
	-COST PER HP	1278	1471	1451	351	544	524			
	POPULATION	6750	6919	70 <b>9</b> 2	6750	6919	7092			
	-COST PER PERSON	5	6	6	1	2	2			
	HOUSEHOLDS	1350	1350	1350	1350	1350	1350			
	-COST PER HOUSEHOLD	26	29	29	7	11	10			
	PRODUCTION (k.L.)	97190	97190	97160	97190	97190	97160			
	-COST PER KL	0.36	0.41	0.40	0.10	0.15	0.15			
	NO.OF DAYS NOT WORKING	136	136	139	136	136	139			
BEP			TOTAL		COST PER PUMP (RS)					
	COST COMPONENTS	1989-90	1990~91	1991-92	1 <b>989</b> ~90	1990-91	1991-92			
,	VARIABLE COST									
	R & M - Materials	372	2917	2653	13.79	108.05	98.24			
	R & M - Labour	1680	4410	4320	62.22	163.33	160.00			
	Total VC	2052	7327	6973	76.01	271.38	258,24			
	FIXED COST									
	Man power - Employees	57 <del>9</del> 6	5609	5356	214.67	207.70	198.37			
	Others	1625	1742	1823	60.17	64.51	67.51			
	Total FC	7421	7350	7179	274.84	272.21	265.88			
	Total VC+FC	9473	14677	14151	350.86	543.60	524.12			
	Depreciation	25032	25032	25032	927.11	927.11	927.11			
	BRAND TOTAL	34505	39709	39183	1277.97	1470.71	1451.23			

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