INDIA MARK II HANDPUMPS WITH OPEN TOP CYLINDERS IN LOW LIFT APPLICATION

PERFORMANCE REPORT 1986 — 1989

TRAINING & MAINTENANCE DIVISION
DANIDA PROJECT DIRECTORATE
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ACKNOWLEDGEMENTS

This report on the performance of modified India Mark II hand Pumps with Open Top Cylinders in Low Lift application represents the collective efforts of a number of Divisions of this project over the last four years.

The staff of Delang Sub-Division, Puri Field Division of the project were responsible for installation of the pumps in 1986.

Training & Maintenance Division has monitored the pumps during the entire period and ensured their maintenance.

Water Resources Division have provided basic data on the wells whenever needed and the project Laboratory conducted analysis of all water samples.

Data processing and its tabulation was done at the Socio-Economic Division.

Mr. L. V. R. Reddy, Consultant, assisted greatly in data interpretation and finalisation of this report.

Lastly, the active interest of the Project Director and successive Chief Advisers have ensured the management attention that such a long term activity needs.

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20th. June, 1990

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1 Summary:

1.1 The Orissa Drinking Water Supply Project is a bilaterally aided project implemented by the Public Health Engineering Department of the Government of Orissa, and assisted by Danida, Government of Denmark.

1.2 The project area is in the coastal saline tract of Orissa, covering an area of 20 Blocks mostly in the Cuttack and Puri districts, aiming to provide drinking water in about 2,500 villages to a population of about 2.5 million people.

1.3 Phase I of the project started in August 1985, and was completed by Dec. 87, with the installation of about 1650 hand pumps on tube wells in 3 blocks by Dec 87.

1.4 Among the activities of Phase I of the project, the Hand Pump Testing Programme was taken up as a Research & Development activity, to be conducted by the Training & Maintenance Division of the project. The purpose of the testing programme was to conduct field trials on existing designs of hand pumps in order to provide a basis for choosing an appropriate design of a hand pump for the hydrogeological conditions of the project area.

1.5 The India Mark II hand pump with modifications of the Open Top Cylinder, Light T-Bar handle, Third Plate, and modified Head was one of the pumps chosen for field trials. 29 such pumps were installed in Low Lift configuration, with cylinders placed between 9 m and 12 m below ground level and came to be termed as the IM II OTC LL hand pumps and later as the IM III. These pumps were installed on newly constructed wells during 1986 in Delang Block, about 35 Km south of Bhubaneshwar (Fig. 1).

1.6 Water quality problems affected the performance and usage of pumps on 13 sites out the original 29 installations. After an average usage of about 11 months, these 13 installations were removed and reinstalled on 13 other new tube wells in Delang block.

1.7 All the pumps were monitored on a regular basis. At the time of such visits, preventive maintenance was completed, depth of water level in the tube well from the ground level was measured, and the

discharge of the pump was recorded. Periodically the data collected during monitoring and other visits was analysed and reported.

1.8 By the end of 1988, it was apparent that this pump, showed substantial technical and cost advantages over the standard India Mark II Deep Well hand pump for application in the purpose of project area. However, the problem of corrosion of 2 1/2"diameter GI riser pipes in the OTC application was one of the main disadvantages of large scale introduction of the IM II OTC LL pump in coastal Orissa where water quality problems were to be expected.

1.9 Therefore it was decided to use the proven advantages of the IM II OTC LL design in future installations of the project. Features such as the light T-bar handle and third plate were adopted for installations of Phase II A of the project, along with installation of the standard pump cylinder at 9 m to 12 m below ground level, i.e. in the low lift configuration. It was also agreed that the IM II OTC LL installations in Delang block should continue to be monitored, and a larger number of OTC LL pumps be installed in one block, on new tube wells reasonably free of water quality problems to be constructed by the project.

1.10 This report presents the conclusions and the data collected for the 29 IM II OTC LL pumps of Delang since their installations in 1986 and up to 31st. December 1989.

1.10 Detailed data has been presented in annexures, and has been analysed considering three main parameters :

Static Water Level

Pump Performance

Pump Maintenance Needs

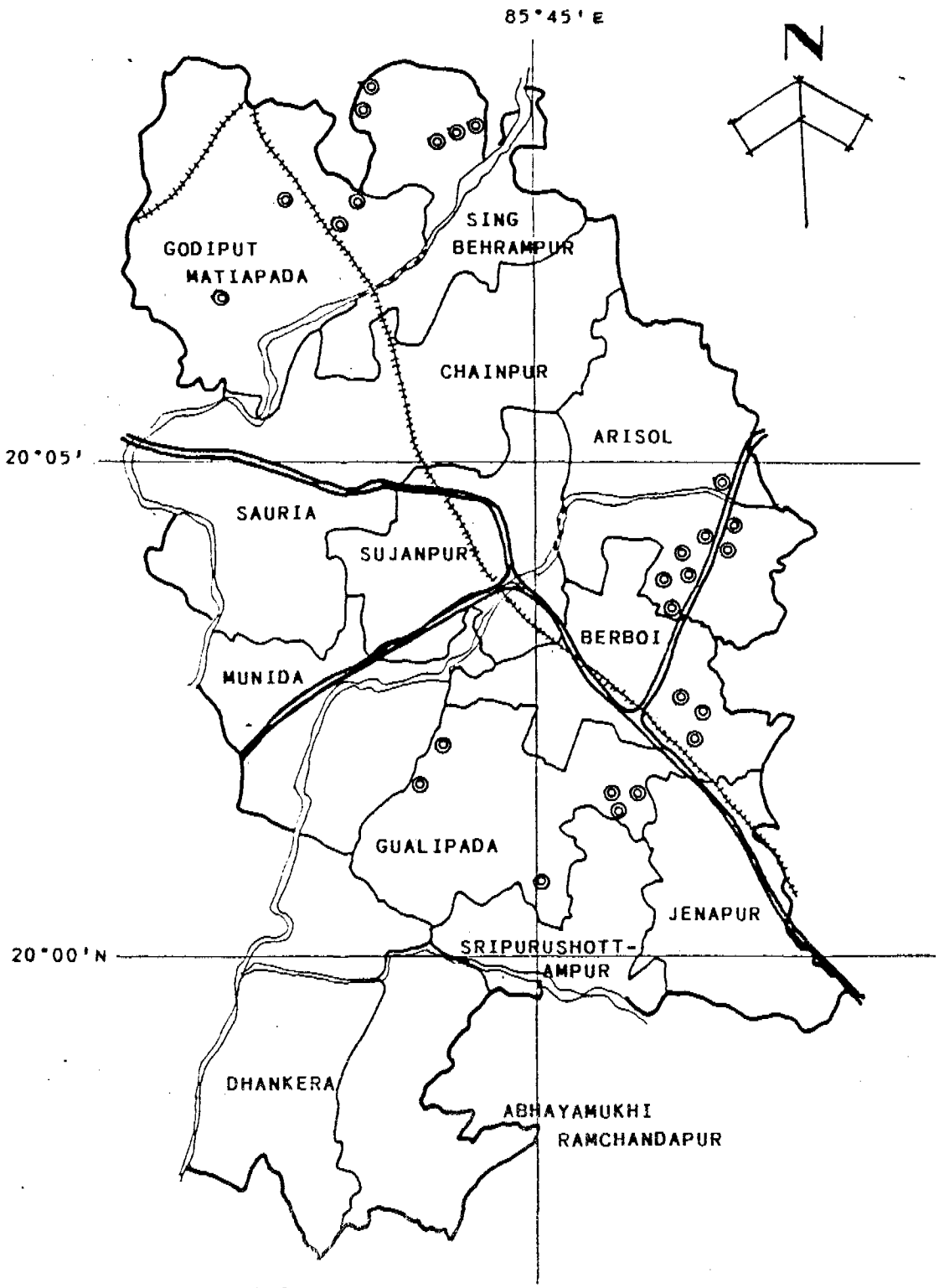


Fig. 1 : Block Map of Delang

2 General Conclusions:

2.1 The modifications to the India Mark II deep well hand pump i.e., the Third Plate, modified Head, Light T-Bar Handle, modified Water Tank, 2 1/2" diameter Riser Pipes, and Open Top Cylinder made the IM II OTC LL pump much more suited to the conditions of the Orissa project.

2.2 These modifications presented substantial advantages in cost since the length of riser pipe was substantially reduced, offsetting the price difference between 2 1/2" diameter pipe and 1 1/4" diameter pipe. Of much more significance was the fact that maintenance of the pumps became much more simpler and required much fewer tools.

2.3 Modifications such as the light T-bar handle, and he third plate, significantly reduced the replacement rate of handle bearings decreasing the possibility of impact and mishandling of pump handles, and eliminating the need to remove handle axles when dismantling pumps. Nitrile cup washers in the pump cylinder showed excellent performance, with a very low replacement rate.

2.4 Preventive maintenance and replacement of nuts and bolts when necessary, accounted for a majority of maintenance needs of all pumps. Though additional maintenance to pumps was also necessary, the occurrence of pump break-downs was low since poor performance of pumps could be identified and repaired before break-downs occurred.

2.5 The water quality of the project area posed a serious drawback in using 2 1/2" GI riser pipes due to corrosion related problems. In the fist instance, it resulted in a high need to remove riser pipes, substantially reducing the advantage of the OTC system. It also led to a high replacement rate of riser pipe assembly components, increasing the maintenance cost.

3 Specific Conclusions:

The data accumulated for the 29 pumps since their installation in 1986 till 31st. December 1989 lead to the following conclusions:

3.1 **Pump Age:** The average of the pumps since their installation till 31st. December 1989 was 1282 days or 42.7 months.

3.2 Continuity of Installations: The locations of 13 installations had to be changed after about 11 months since installation due to water quality problems. Of the remaining 16 installations, 3 were replaced with other pumps during 1989 and 13 installations continued undisturbed till the end of 1989. This resulted in data for 29 pumps being collected over 42 sites.

3.3 Visits to Pumps: Monitoring visits were planned on a monthly schedule to the 29 pumps. In actual practice, routine visits for monitoring and preventive maintenance averaged a time interval of a little over 2 months between consecutive visits. Routine visits accounted for 83.4% of the total visits, indicating that most maintenance needs were predictable. Similarly, unforseen visits were 3.7% of the total visits, indicating that breakdowns were low and avoidable. A total of 699 visits were recorded for 29 pumps till December 1989.

3.4 Static Water Level Observations: A total of 459 observations of depth to static water level (SWL) were recorded during monitoring visits to the pumps during 1986-89. 98.3% of the observations fell in the range of 0 m to 7 m below ground level, indicating that most wells would have delivered water with suction pumps.

3.5 Pump Performance: Pump performance, measured by converting pump discharge observations to volumetric efficiency computations, indicated that 94.5% of the computations came in the range of 90% to 150% volumetric efficiency. 1.7% and 3.8% of the computations fell in the volumetric efficiency ranges of 60%-90% and 150%-180%, respectively. A total of 580 computations were available for this analysis.

3.6 Correlation between SWL and Volumetric Efficiency: There were 419 observations of SWL which had corresponding computations of volumetric efficiency. The mathematical correlation that emerged between these two parameters was:

$$\text{Volumetric Efficiency} = 129.95 \, [\, \text{SWL} \,]^{-0.097}$$

The graphic representation of this equation has been presented in Fig. 4.

3.7 Maintenance Categorisation: Maintenance records for 29 pumps on 42 sites indicate the following:

1. 28.6% (or 12) sites needed only preventive maintenance and no other maintenance or replacements.

2. An additional 28.6% (or 12) sites needed replacement of nuts and bolts only along with preventive maintenance, and no other maintenance.

3. The remaining 42.8% (or 18) sites needed maintenance of above-ground and below-ground assemblies.

4. There were a total of 18 above-ground maintenance interventions, of which 9 were due to poor performance, 4 were due to break-downs and 5 were for other reasons.

5. There were 24 below-ground interventions, of which 16 were due to poor performance, 4 were due to break-downs, and 4 were for other reasons.

6. Of the 24 below-ground maintenance interventions, 11 interventions needed only the extraction of the plunger assembly through the riser pipes, using the open top cylinder mechanism and the remaining 13 interventions needed the extraction of riser pipes. This relatively high need to extract riser pipes in OTC installations was unexpected and probably due to poor pipe jointing at the time of installation in the first instance and later due to corrosion and other water quality related problems.

7. The total of 42 maintenance interventions on 18 sites had an average time interval of 318 days. When considered over 29 pumps, the average time interval between maintenance interventions would be 885 days or once in 2 years 5 months.

3.8 Component Replacement: The maintenance records indicate the following regarding replacement needs of components:

1. Nuts and bolts were the most common replacement item, but still this replacement need was low. The average need for nuts was 0.9 per pump per year and bolts the need was 0.7 per pump per year.

2. Single occurrences of replacements were recorded for cylinder components such as the upper valve, the check valve assembly and the bottom cap.

3. In cases of bearings and cylinder cup washers, the usage was fairly low. A total of 9 bearings and 4 pairs of cup washer were replaced.

4. 'O' ring replacements were high. A total of 11 replacements were made some of which may not have been necessary.

3.9 Specific Problems:

1. Five out the total 8 break-downs were due to disconnections of connecting rod joints which indicates that this was a major cause for break-downs.

2. Corrosion related problems of the below-ground assemblies caused a comparatively high need for riser pipe removals and replacements of pipes, pipe sockets and connecting rods.

4 Static Water Level Measurements:

4.1 Measurements of water levels in the wells, recorded at the time of monitoring visits, have been shown in Annexures 1 & 3. In Table 1 and Fig. 2 these observations of Depth to Static Water Level- SWL, have been grouped in one meter intervals. The conclusions from this analysis are:

1. A total of 459 observations of SWL were made.

2. The highest water level recorded was 0.1 m below ground level at Humara, Talasahi, 13122411003, in Sept. 88.

3. The lowest water level recorded was 9.7 m below ground level at Aragada, Mudulisahi, 13122400301, in March 89.

4. Most SWL measurements were within 5 m below ground level. Their distributions was :

   83.7% observations were in the range of 0m - 5m.
   14.6% observations were in the range of 5m - 7m.
   1.7% observations were in the range of 7m - 10m.

5. The single largest fraction of observations, 30.9%, fell in the range of 1m to 2m below ground level.

4.2 Taking 7m below ground level (b.g.l.) as the practical limit for installation of suction pumps, 98.3% observations of SWL fell within this limit. This would indicate that suction pumps would have served in most of the wells rather than placing the pump cylinder below ground level.

Table 1 : Distribution of Static Water Level Observations

Sl. No.	S W L Range	Numbers of Observations	Percentage of Total Obsv.
1.	0 m to 1 m	48	10.5%
2.	1 m to 2 m	142	30.9%
3.	2 m to 3 m	95	20.7%
4.	3 m to 4 m	55	12.0%
5.	4 m to 5 m	44	9.6%
6.	5 m to 6 m	38	8.3%
7.	6 m to 7 m	29	6.3%
8.	7 m to 8 m	6	1.3%
9.	8 m to 9 m	-	-
10.	9 m to 10 m	2	0.4%
11.	TOTAL	459	100.0%

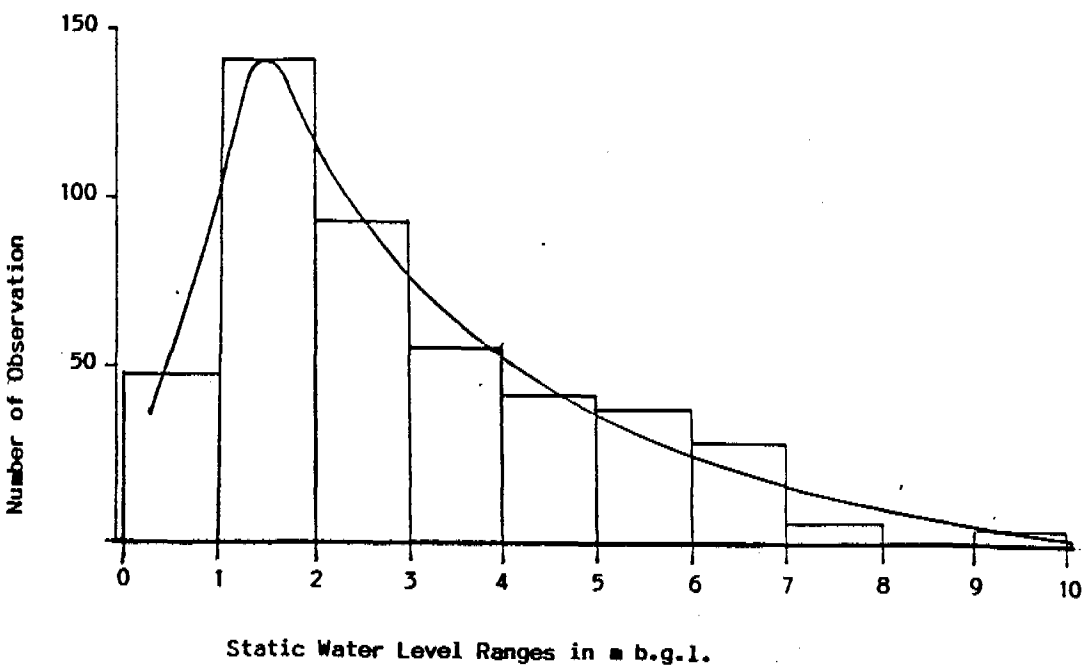


Fig. 2 : Distribution of Static Water Level Observations

5 Performance Measurement:

5.1 At each monitoring visit, after completion of preventive maintenance of the pumps and static water level measurement, the discharge of each pump was measured. This was done by manually operating the pump at the rate of 40 strokes per minute. Three observations of discharge were recorded for each pump at each visit, and was averaged to arrive at the mean discharge for that pump for that visit, measured in liters per minute. This mean discharge was used to arrive at the Volumetric Efficiency - Vol. Eff. by the following formula:

$$\text{Vol. Eff.} = \frac{\text{Mean Discharge (lit/min)}}{\text{Theoretical Discharge (lit/min)}} \times 100\ \%$$

5.2 Vol. Eff. values have been recorded in Annexure 1 & 3. In Table 2 and Fig. 3 these values have been grouped in ranges of 10% from 60% to 190%. The conclusions from this analysis are:

1. A total of 580 values of Vol. Eff. were available for analysis.

2. As is evident from Table 2, Vol. Eff. values ranged from the group of 60% to 70% to the group of 180% to 190%.

3. While the lower ranges of Vol. Eff. values could be explained by factors such as poor pump performance it was not possible to find an explanation for the very values of Vol. Eff. However, these high values, in the ranges of 150% to 190%, constituted only 3.8% of the total number of Vol. Eff. observations. While high values of Vol. Eff. tended to have corresponded to low values of Static Water Level, the reverse was not necessarily true.

4. A majority of Vol. Eff. values fell in the range of 90% to 150%. Their distribution was :

   71.8% of the observations were in the 100% to 130% of Vol. Eff. values.

   94.5% of the observations were in the range of 90% to 150% of Vol. Eff. values.

Table 2 : Distribution of Volumetric Efficiency Values

Sl. No.	Vol. Eff. Ranges	Number of Observations	Percentage of Total Obsv.
1.	61% to 70%	1	0.2%
2.	71% to 80%	3	0.6%
3.	81% to 90%	5	0.9%
4.	91% to 100%	30	5.7%
5.	101% to 110%	150	28.2%
6.	111% to 120%	133	25.1%
7.	121% to 130%	98	18.5%
8.	131% to 140%	56	10.6%
9.	141% to 150%	34	6.4%
10.	151% to 160%	9	1.7%
11.	161% to 170%	7	1.3%
12.	171% to 180%	1	0.2%
13.	181% to 190%	3	0.6%
14.	TOTAL	530	100.0%

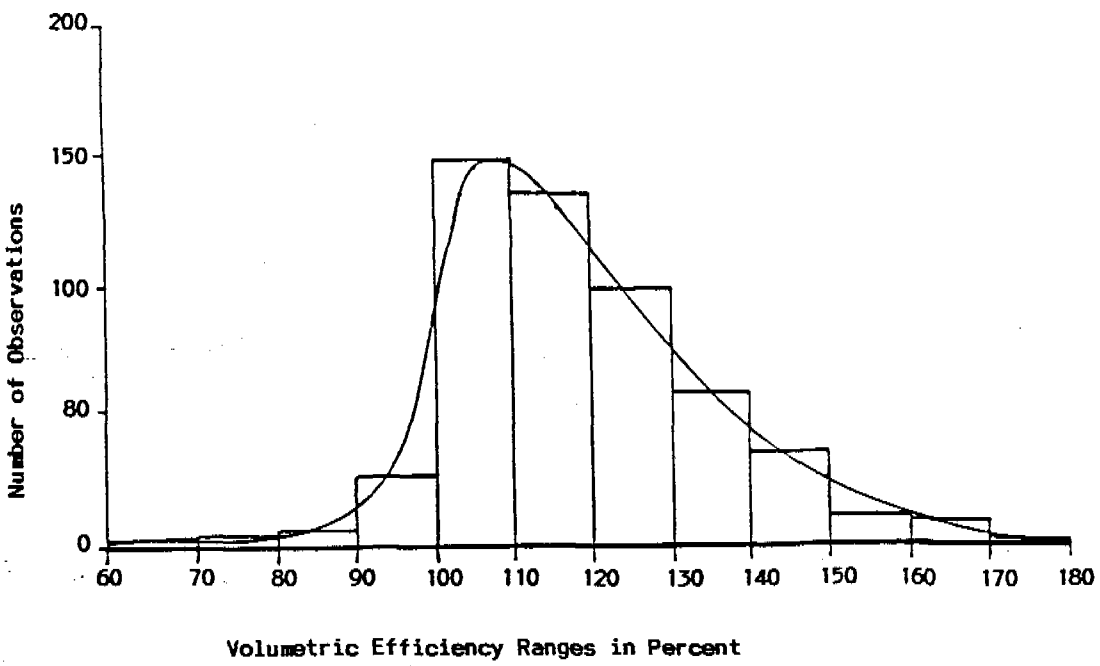


Fig. 3 : Distribution of Volumetric Efficiency Values

5. This was an expected pattern of pump performance, considering that static water levels were generally close to ground level. The tendency of water to surge, by momentum, through valves, against gravity and after the end of the upward movement of the pump piston, may provide an explanation to this phenomenon of high Vol. Eff. values, resulting in discharges that were much higher than theoretically expected.

6 Correlation between Static Water Level & Volumetric Efficiency:

6.1 Annexure 2 has recorded Vol. Eff. values where SWL measurements were simultaneously available. For this group of observations, SWL readings were first grouped in one meter intervals, and all SWL readings in each interval were averaged. Vol. Eff. observations, corresponding to an one meter interval of SWL readings, were also averaged. Therefore, for a given one meter range of SWL, an Average SWL and an Average Vol. Eff. were available. These average values have been shown in Table 3 and plotted in Fig. 4. In plotting the curve between average SWL and average Vol. Eff., some corrections have been made. Extremely low values of Vol. Eff. (in the range of 60% to 80%) were eliminated from the calculations of average values when it was observed that such values were directly related to pump condition. That is, if poor performance of a pump led to a low value of Vol. Eff., then that Vol. Eff. and its corresponding SWL value were not considered for calculation of averages. The conclusions from this analysis are:

1. A mathematical correlation existed between SWL and Vol. Eff. The best fit curve was provided by the equation:

$$Y = 129.949185\ X^{-0.096786}$$

where X is the depth to static water level from ground level in meters, and Y is the corresponding value of volumetric efficiency in percentage.

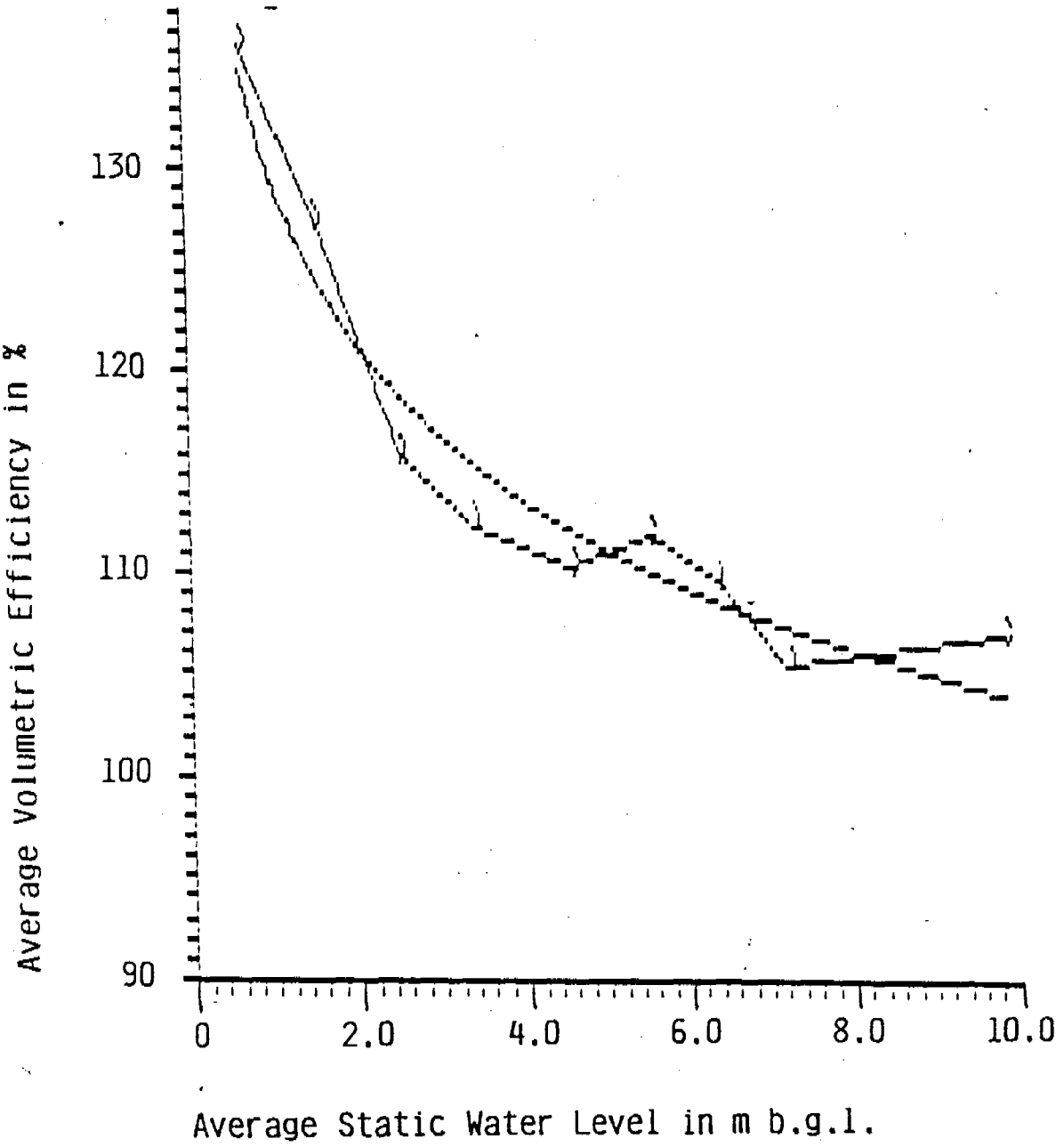
2. The general shape of the curve indicated that as SWL approached 0 m, Vol. Eff. approached infinity, i.e., as the well came closer and closer to an artesian flowing condition, pumping became less and less necessary. This

was, of course, completely expected.

3. Similarly, as SWL values increased the Vol. Eff. values tended to flatten out to a steady value of 100%. This would indicate that as the water level in the well dropped, the tendency of water to surge through the cylinder also decreased.

Table 3 : Correlation between Static Water Level & Volumetric Efficiency

Sl. No.	S W L Range (m - b.g.l.)	Numbers of Observations	Average Values of S W L m-bgl	Vol.Eff %
1.	0 m to 1 m	45	0.68	136.3
2.	1 m to 2 m	134	1.54	127.4
3.	2 m to 3 m	85	2.51	115.9
4.	3 m to 4 m	47	3.39	112.4
5.	4 m to 5 m	41	4.57	110.3
6.	5 m to 6 m	33	5.55	111.9
7.	6 m to 7 m	27	6.37	109.6
8.	7 m to 8 m	5	7.23	105.6
9.	8 m to 9 m	-	-	-
10.	9 m to 10 m	2	9.87	107.0
11.	TOTAL	419		



Best Fit: $Y = 129.949185\ X^{-0.096786}$

Fig. 4 : Correlation between Static Water Level & Volumetric Efficiency

7 Age of Pumps:

7.1 As has been mentioned earlier, installation sites for 13 out of the 29 pumps had to be changed after about 11 months. These 13 pumps were reinstalled on different sites. The changing of pump sites required a categorisation of pump ages into 4 groups in order to arrive at an average age by 31st. Dec. 89. This is summarised below :

Table 4 : Average Age of pumps by 31st Dec.89.

Average age of 13 pumps on their original sites before removal	321 days
Average age of 13 pumps after their removal	947 days
Average age of 16 pumps which continued in 1989	1293 days
Average age of all 29 pumps on 42 sites	1282 days

8 Age Correction for Maintenance:

8.1 Annexure 1, Pg.1 has provided a detailed record of the age (in months) of each site.

8.2 13 pumps had accumulated an average age of 321 days before they were reinstalled on new sites. To establish a correct age for correlating maintenance needs with pump age, this average accumulated age of 321 days has been added to the ages of the same 13 pumps that were reinstalled and went on to accumulate an average age of 947 days on their reinstallation sites. In the case of the 16 pumps that remained on their original sites, no such age correction was necessary. By this method, the records of 42 sites have been reduced to 29 pumps when chronological continuity has been necessary for analysis of data, as in the case of maintenance.

8.3 The age correction mentioned above is not reflected in Annexure 2 : Occurrence of Maintenance, or in Annexure 3 : Data Summary Sheets for each pump, since these are individual site records of each pump with reference to dates of installation or reinstallation. However, the age correction has been incorporated in Table 6 : Frequencies and Intervals of Maintenance

Interventions, Table 11 : Component Replacement Frequencies & Intervals, and Table 12 : Occurrences of Specific Problems & Interventions.

9 Visits to Pumps:

9.1 Since the pumps were under observation since their installation, they were supposed to be visited on a monthly schedule. The purpose of these Routine Visits was to complete preventive maintenance of the pumps, measure depths of water levels in the wells, and make pump discharge observations. Over and above Routine Visits, pumps needed Unforseen Visits for purposes such as break-down repairs. The third kind of visit was classified as Other Visits for purposes such as special observations, demonstration of the pump type, etc.

9.2 Annexure 1, Pg.2 has provided the detailed analysis of visits to each pump. The conclusions from this analysis are:

Table 5 : Analysis of Visits to Pumps

Purpose of Visit	Nos.	Percentage
Routine Visits	583	83.4%
Unforseen Visits	26	3.7%
Other Visits	90	12.9%
Total Visits	699	100.0%

9.3 The above analysis indicates that Routine Visits provided almost all the occasions at which time pumps could be maintained, and that Unforseen Visits were quite rare.

9.4 An average of 20.1 routine visits and 23.4 total visits were made to the 29 pumps which had accumulated an average age of 42.7 months by 31st. Dec. 89. That is, the actual routine visit schedule averaged an interval of a little more than 2 months between visits, as against the planned schedule of one visit per month. This frequency of one routine visit in 2 months resulted in the need for unforeseen visits was about 0.9 visits per pump for the entire period or about 1 unforseen visit per 4 years.

10 Maintenance Categorisation: Whether a pump was working or not, all interventions or interruptions to a pump, which led to any maintenance, repairs or replacements, has been considered as "maintenance". Pump maintenance has been categorised by two main considerations: Reason and Location.

10.1 Reason for Maintenance: This was further categorised under 4 groups:

1. Preventive Maintenance - PM: This was done on all pumps during all routine monitoring visits. It included functions such as greasing of chain, tightening of all nuts and bolts,replacement of damaged or missing nuts or bolts, etc.

2. Poor Performance - PP: Observations of pump performance during monitoring visits (such as delayed discharge, lowering of yield, excessive handle movement) or reports from users led to the need for maintenance due to poor performance. Sometimes PP maintenance could be completed during monitoring visits and sometimes at a pre-planned visit after observation or a report.

3. Break Down - BD: Maintenance on these occasions were when the pump had stopped working due to a malfunction.Such visits were generally unforeseen.

4. Other Maintenance - OTH: These were interventions when pump assemblies were dismantled and refitted for reasons other than PM, PP or BD. Generally these were special visits, for example, to demonstrate the OTC removal system, at which time necessary repairs or replacements were also completed.

10.2 Location of Maintenance: This had two subcategories:

1. Above Ground Assembly Maintenance - AGA: Maintenance to the head, handle, water tank, and pedestal of the pump, i.e., components above the ground level, was classified in this category.

2. Below Ground Assembly Maintenance - BGA:This category included maintenance to connecting rods, riser pipes and cylinder. BGA maintenance needed a further categorisation. Those maintenance interventions which needed only removal of connecting rods for cylinder repair (by picking up the plunger and the check valve and bringing them above ground for maintenance) have been classified as BGA-OTC. Below ground maintenance which required the removal of riser pipes along with connecting rods to reach the cylinder have been categorised as BGA-RP.

10.3 The categorisation by Reason and Location, described above, were not independent of each other. A combination of Reason and Location categories was used to describe the nature of maintenance. The nature of maintenance was then related to time, measured as the Average Interval in days between maintenance interventions for a given category or combination of categories of maintenance.

11 Methodology of Maintenance Need Analysis:

The maintenance needs of pumps have been analysed from three different points of view:

1. Maintenance Categorisation
2. Component Replacement Cycle
3. Specific Problems

11.1 Maintenance Categorisation:

11.1.1 The categorisation of maintenance by Reason (PM,PP,BD & OTH) and by Location (AGA & BGA), has been described earlier. An additional category of PM-N&B has also been used to identify maintenance interventions or pumps that needed only replacement of nuts & bolts. A combination of Reason and Location codes have then been used to categorise each maintenance occurrence in Annexure 2 from where a corresponding age (in days) was also available. Age corrections were made in the 13 reinstalled pumps.

11.1.2 This method allowed an easy identification of pumps which needed PM or only PM-N&B. The remaining pumps needed AGA and BGA maintenance. There were cases where nuts and bolts were replaced as a part of an AGA or BGA repair, and these were not considered separately as PM-N&B.

11.1.3 Within the AGA and BGA groups further analysis was possible by firstly considering them together, i.e., AGA+BGA, then separately as only AGA and only BGA, then by considering AGA and BGA separately in sub-groups of PP, BD and OTH. All BGA interventions were also categorised into BGA-OTC and BGA-RP.

11.1.4 When analysing each category or sub-category of maintenance need, all other maintenance interventions apart from the group being analysed have been disregarded for age and replacement interval calculations. For example, when only AGA interventions have been analysed, age and occurrence interval calculations have been made between consecutive AGA interventions, regardless of whether there have been BGA interventions in between or not. Similarly within AGA intervention when considering AGA-PP interventions, the occurrences of AGA-BD or AGA-OTH interventions have been ignored. Therefore a hierarchy of maintenance interventions by reason and location categorisation has been created. By this hierarchy, AGA+BGA interventions, when treated together, gave the most representative picture of maintenance needs. After this, further categorisation becomes increasingly limited in its interpretation. Despite this weakness, the analysis of sub-categories was done to understand the implications of looking at the maintenance needs in totality and in isolated parts.

11.1.4 The analysis by maintenance categorisation is presented in Tables 6 to 9.

11.2 Component Replacement Cycle: From Annexure 2, the components of pumps needing replacement were analysed separately. For each component, the numbers used, the number of occurrences on which they were used, the numbers of pumps on which they were used , the interval in days for the first replacement and between subsequent replacements were compiled. Appropriate age corrections were

made on reinstallation sites. When considering the replacement pattern of one particular component at one site, other interventions and replacements were ignored. The average interval between replacement for each component for all the sites where replacements occurred, was then calculated.Table 11 : Component Replacement Cycle & Intervals, gives this analysis.

11.3 Specific Problems: The analysis of AGA and BGA maintenance indicated that specific problems that led to maintenance needed special attention. Generally these were causes for pump break-down,AGA-BD or BGA-BD, or causes for maintenance in the categories of BGA-RP. Problems like corrosion, leakage of riser pipes, scaling and slime deposit on BGA components, which affected pump performance (BGA-PP or BGA-OTH) were also considered, though they did not have their origins with the mechanical operation of the pump. Using a methodology similar to that for component replacement data, selected problems were identified and analysed. This data is presented in Table 13 : Occurrence of Specific Problems & Interventions, and Table 14 : Interventions related to Riser Pipes & Connecting Rods.

12 Results from Maintenance Categorisation: The results of the maintenance need analysis by categorisation are presented in Tables 6, 7, 8 & 9. The conclusion emerging from these tables are :

12.1 Preventive Maintenance, Nuts & Bolts Replacement:

12.1.1 11 sites, before reinstallation, and 1 pump after reinstallation needed only preventive maintenance.

12.1.2 12 sites needed preventive maintenance and replacement of nuts & bolts only.

12.1.3 The maintenance categories of PM and PM-N&B accounted for maintenance needs of 57.2% (24 out of 42 sites) sites.

12.1.4 This meant that regular preventive maintenance with replacement of missing or damaged nuts and bolts was sufficient to assure the uninterrupted operation of pumps on 57% of the sites. In terms of numbers of pumps, 13 out of 29 pumps (44.8%) needed PM and PM-N&B only.

12.2 Above-ground & Below-ground Maintenance:

12.2.1 AGA and BGA maintenance was necessary for 18 sites (42.8%), or 16 pumps (53.2%). Therefore, only about half the pumps needed AGA or BGA maintenance. There were a total of 42 AGA and BGA occurrences.

12.2.2 Considering AGA and BGA interventions together, multiple interventions were common and occurred in 14 out of 42 sites (33%). Within multiple interventions, the occurrence of 2 interventions were recorded in 9 sites and 3 interventions were recorded on 3 sites.

12.2.3 Considering AGA interventions alone, they were needed on 14 out of 42 sites (33%) with an average interval of 501 days. Within this group, AGA-PP was recorded on 8 sites and AGA-BD on 4 sites.

12.2.4 In the category of BGA interventions, 24 interventions were recorded on 12 sites (28.6% of 42 sites) with an average interval of 363 days. Two interventions per site was common, recorded on 8 out of 12 sites.

12.2.5 Within BGA interventions, the average intervals in the sub-categories of BGA-OTC and BGA-RP were the same, 363 days.However, riser pipe removal was more frequent (13 occurrences on 10 sites) than OTC extraction (11 occurrences on 7 sites).

12.2.6 Therefore, within the BGA group, it became necessary to remove riser pipes more often than to use the OTC system to accomplish the necessary BGA maintenance.

12.2.7 This was contrary to expectations since the purpose of the OTC design was to drastically reduce the need for riser pipe removal. A closer examination of the occurrences of riser pipe removal indicates that corrosion, leakage, and the need to clean BGA components were the causes for BGA-RP interventions.This observation has been discussed again later.

12.2.8 Within the BGA category, when PP and BD were considered separately,BGA-PP was recorded with 16 occurrences on 10 sites (23.8% of 42 sites) and BGA-BD was recorded with 4 occurrences on 4 sites (9.5%). This meant that BGA maintenance was done mostly without

the occurrence of breakdowns. The comparison of average intervals - 441 days for BGA-PP as compared to 1114 days for BGA-BD, also confirms this conclusion.

12.2.9 A comparison of average intervals from the Table 6 indicate that when all AGA and BGA interventions were treated together, the average interval between interventions was 318 days, but when they were considered separately, AGA and BGA maintenance had occurrence interval of 501 days and 567 days.

12.2.10 This indicated that calculation of maintenance intervals for each category separately would give an impression of lowered maintenance need (by increased maintenance intervals) than by viewing all maintenance needs together.

12.2.11 Therefore, there is an obvious weakness in considering maintenance data by categories only without an overview of the total maintenance needs.

Table 6 : Frequencies & Intervals of Maintenance Interventions

Maintenance Category	Number of Inter-ven-tions	Number of Sites	Per-cen-tage of 42 Sites	Average Interval between Interven-tions
Only P M		11	28.6%	
P M with N & B only	31	12	28.6%	501 days
Total A G A + B G A	42	28	42.8%	318 days
All A G A	18	14	30.4%	501 days
A G A - P P	9	8	19.0%	567 days
A G A - B D	4	4	9.5%	335 days
A G A - O T H	5	5	11.9%	268 days
All B G A	24	12	28.6%	363 days
B G A - P P	16	10	23.8%	441 days
B G A - B D	4	4	9.5%	1114 days
B G A - O T H	4	4	9.5%	631 days
B G A - O T C	11	7	16.7%	363 days
B G A - R P	13	10	23.8%	363 days

Table 7 : All A G A & B G A Interventions

Numbers of Interventions per Site	Numbers of Sites
Single Interventions	4 Sites
Two Interventions	9 Sites
Three Interventions	3 Sites
Four Interventions	1 Site
Seven Interventions	1 Site
All Interventions considered together	42 interventions on 18 sites
Average Interval between Interventions	318 days

Table 8 : All A G A Interventions only

All A G A Interventions	
Number of Interventions	18 interventions in 14 sites
Single Interventions	10 pumps
Two Interventions	4 pumps
Average Interval between Interventions	501 days
A G A - P P Interventions	
Number of Interventions	9 interventions in 8 sites
Single Interventions	7 pumps
Two Interventions	1 pump
Average Interval between Interventions	567 days
A G A - B D Interventions	
Number of Interventions	4 interventions on 4 sites
Average Interval between Interventions	335 days
A G A -O T H Interventions	
Number of Interventions	5 interventions in 5 sites
Average Interval between Interventions	268 days

Table 9 : All B G A Interventions only

All B G A Interventions Number of Interventions	24 interventions in 12 sites
Single Interventions	3 sites
Two Interventions	8 sites
Five Interventions	1 site
Average Interval between Interventions	363 days
B G A - P P Interventions Number of Interventions	11 interventions on 7 sites
Single Interventions	4 sites
Two Interventions	2 sites
Three Interventions	1 site
Average Interval between Interventions	363 days
B G A - B D Interventions Number of Interventions	4 interventions on 4 sites
Average Interval between Interventions	1114 days
B G A - O T H Interventions Number of Interventions	4 interventions on 4 sites
Average Interval between interventions	631 days
B G A - O T C Interventions Number of Interventions	11 interventions on 7 sites
Single Interventions	4 sites
Two Interventions	2 sites
Three Interventions	1 site
Average Interval between Interventions	363 days
B G A - R P Interventions Number of Interventions	13 interventions on 10 sites
Single Interventions	7 sites
Two Interventions	3 sites
Average Interval between Interventions	363 days

12.3 Component Replacement:

12.3.1 **Nuts & Bolts:** The replacement needs of nuts and bolts has been summarised in Table 10. The average need was for 2.6 bolts and 3.5 nuts for 26 pumps which needed N&B replacements. This indicated that the replacement of nuts and bolts was negligible - 0.7 bolts and 0.9 nuts per pump per year averaged over all 29 pumps. However, the replacement of nuts and bolts during preventive maintenance probably played a very important part in lowering the occurrence of AGA and BGA interventions. This is evident form the fact that
12 sites out of 42 (28.6%) needed no maintenance other than PM-N&B.

12.3.2 Low Usage Components:

1. As indicated in Table 11, single occurrences of replacements were recorded for the following components:

   Upper valve
   Check valve assembly complete
   Bottom cap

2. Relatively low usage was recorded for the following components:

Inspection cover	3 nos.
Inspection Cover Bolt	2 nos.
Chain Nut & Bolt	2 nos.
Sealing Rings	4 nos.
Plunger Rods	4 nos.

3. The usage of all the above components can be considered low or exceptional. Deterioration of the upper valve rubber seating was to be expected in a few cases but occurred only once. Plunger rods were replaced since original plunger rods were of galvanised bright steel. Stainless steel plunger rods were used as replacement whenever plungers were extracts.This was done even if the plunger rod may not have needed replacement.

Table 10 : Replacement of Nuts & Bolts

1.	Needing replacement of Nuts & Bolts only	12 sites
2.	Needing replacement of Nuts & Bolts along with other repairs (AGA, BGA)	14 sites
3.1	Needing replacement of Nuts & Bolts only once	21 sites
3.2	Needing replacement of Nuts & Bolts twice	5 sites
4.1	Total number of instances of replacement of Nuts & Bolts	31 instances
4.2	Average Interval between replacements	501 days
5.1	Bolts: Total numbers replaced Average Interval	68 bolts 534 days
5.2	Nuts: Total numbers replaced Average Interval	90 nuts 443 days
6.	Average Rate of Replacement : Bolts Nuts	2.6 per site 3.5 per site
7.	Most Frequent Multiple Replacements: Bolts Nuts	 2 bolts 2 nuts

Table 11 : Component Replacement Frequencies & Intervals

Sl. No.	Component	Numbers Used	Numbers of Pumps	Numbers of Occurr-ences	Average Inter-val (days)
1.	Bolts	68	27	34	534
2.	Nuts	90	27	35	443
3.	Inspec. Cover	3	3	3	1083
4.	Insp.Cov. Bolt	2	2	2	422
5.	Chain Nut & Bolt	2	2	2	200
6.	Bearings	9	7	8	443(per Bearing)
7.	'O' Rings	11	8	11	499
8.	Cup Washers	4pr.	3	4	776
9.	Plunger Rods	4	4	4	1122
10.	Upper Valve	1	1	1	986
11.	Check Valve Assembly	1	1	1	741
12.	Bottom Cap	1	1	1	741
13.	Sealing Rigs	2pr.	2	2	910
14.	Connecting Rods	10	3	5	1037
15.	Riser Pipes	2	2	2	983
16.	Pipe Sockets	3	2	2	869

12.3.3 Components needing periodical replacement: In this group the following components were considered:

Table 12 : Selected Component Replacement Summary

Component	Numbers Used	Numbers of Sites	Occur-rences	Average Interval
Bearings	9	7	8	443 days
'O' Rings	11	8	11	449 days
Cup Washers	4 pr.	3	4	837 days

12.3.4 Bearings:

1. The usage of bearings was very unexpected. Bearings would normally have needed replacement in pairs. However 6 of the 7 sites where bearings were replaced, recorded the replacement of one bearing only. The seventh site needed replacement of both bearings on the first occasion and then one bearing on the second occasion. This replacement pattern would indicate that the need to replace bearings had been misjudged. The low average interval between replacements, of 443 days, as opposed to the lack of repeat replacements, also indicates that the diagnosis for bearing replacement may have been incorrect, but were replaced in any case after removal of one bearing for verification.

2. Despite the above possibility, the replacement pattern also indicates the bearing life was very good and that replacement frequency was low. While 7 pumps out of 29 needed bearing replacement,22 pumps out of 29 did not need bearing replacement after an average age of 1282 days.

3. One factor that could have contributed significantly to the life of bearings is the overall design of the pump which incorporated a number of changes to the standard India Mark II Deep Well pump design. These changes were:

4. The Light T-Bar handle, which made it difficult to operate the pump while standing at the side of the handle, thereby reducing the tendency to move the handle laterally while operating the handle. The light T-bar handle also made it possible to use the pump in the LOW LIFT configuration with the cylinder installed at 9 m to 12 m below ground level. This made the pumping easier, with lesser chances of impacts on the handle bearings as the handle stopped at the upper and lower extremities of its travel.

5. The Third Plate flange below the head flange, and the modified pump head, which allowed the head to be dismantled without removing the handle axle. The use of the Third Plate virtually eliminated the need to remove handle axles thereby preventing the axial shocks that bearings were subjected to in the process of axle removal in the standard pumps.

12.3.5 'O' Rings:

1. A total of 11 'O' rings were replaced on 8 pumps with an average interval of 499 days between replacements. 6 sites needed 'O' ring replacement once, 1 site needed it twice and 1 pump recorded three replacements.

2. Ideally, 'O' ring replacements would have been necessary because of cylinder leakage only. In actual practice, the reasonns for the 11 replacements were :

4 nos.:	due to reports of leakage
1 no. :	due to overhaul of cylinder components after BGA-OTC intervention.
1 no. :	due to overhaul of cylinder components after BGA-BD-RP intervention.
1 no.. :	due to possible damage or deterioration during changing of pump sites, since the replacement occurred soon after changing of site.
4 nos.:	were replaced without a clear report of leakage.

3. From the above it could be concluded that identifiable reasons for replacement of 'O' rings were recorded in 7 out of 11 cases 64% of the replacements and that the reasons for replacements in 4 out of 11 cases on 56% cases was not clear cut. The latter group indicates the possibility that there may have been cases of 'O' ring replacements though there may not have been corresponding check valve leaks. This conclusion is further substantiated by the following:

   In Aragada, Mudulisahi (Annex. 3 Pg. 15), the 'O' ring replacement was followed by the detection of a loose riser pipe joint.

   In Banga, Harijansahi (Annex. 3 Pg. 20), the 'O' ring replacement was preceded by repeated reports of turbidity ending in cleaning of riser pipes and connecting rods.The leakage could have resulted from a water quality problem.

   At Machhapada, Ward No. 7 (Annex.3 Pg. 43), The first replacement of the 'O' ring was without a stated reason. The second replacement, also uncertain, follows a BGA-BD-RP which resulted from riser pipe corrosion. Therefore, a deterioration of the 'O' ring was possible.

4. Given a leakage report, 'O' ring replacement was the easiest and cheapest BGA intervention. Therefore, it was entirely justifiable that leakage rectification would be first attempted by replacement of 'O' rings. Only after such a replacement had failed, subsequent BGA-RP interventions became unavoidable to rectify pipe leakage or cylinder malfunction.

5. Lastly, considering that 8 pumps needed replacement of 'O' rings, it follows that 21 pumps did not need "O" ring replacement after an average of 1282 days use each.

12.3.6 Cylinder Cup Washers:

1. All 29 pumps were initially installed with nitrile rubber cup washers with metal reinforcement rings. 26 out of 29 pumps

(89.7%) did not need replacement of cup washers during their average installed age of 1282 days each.

2. 4 pairs of cup washers were replaced on 3 pumps with an average interval of 776 days. 2 pumps needed one replacement each of cup washers after an average interval of 1182 days. One of these two pumps used leather cup washers as replacement without any adverse report for 137 days after replacement, i.e., till 31 Dec. 89 and continued to function satisfactorily. The third pump (Jamuna Jharpada, Gudiasahi, Annex. 3 Pg. 10)needed two replacements of cup washers of which the first replacement was with leather cup washers after 513 days, and the second replacement with nitrile cup washers was 228 days after the first replacement. While the leather washers were in use, BGA-PP due to leakage was reported, but BGA-OTC intervention was unsuccessful since the leather washers fouled inside the first pipe joint. Therefore, a BGA-PP-OTC turned into a BGA-BD-RP till the riser pipes could be removed. This intervention affected the overall performance of cup washers adversely, especially that of leather washers. It also confirmed other independent observations that leather was not a reliable material for cup washer applications in hand pumps. In the case of OTC applications, the unpredictability of leather cup washers became even more significant because of the possibility of fouling at pipe joints .

12.3.7 Pipes, Pipe Sockets & Connecting Rods:

1. The detailed replacement of these three components for each site is given in Table 14 : Interventions Related to Riser Pipes & Connecting Rods and summarised below:

Table 13 : Summary of Below-ground Replacements

Component	Numbers Used	Numbers of Pumps	Occurr-ences	Average Interval
Pipes	2	2	2	983 days
Pipe Sockets	3	3	2	869 days
Connecting Rod	10	3	5	1037 days

2. While the above replacement record may seem low, the overall performance of BGA components of pipes, sockets, and connecting rods must be considered in a larger context for a clearer analysis.

3. Table 14 : Interventions Related to Riser Pipes & Connecting Rods, would indicate that there were 12 interventions in this group, that the need for BGA cleaning, occurrences of leakage, and corrosion, were the most frequent causes for these interventions.

4. Considering that there were a total of 42 interventions for all AGA and BGA categories (Table 6), the occurrence of 12 interventions (26.2%) due to pipes and rods is quite high.The general water quality of the test sites, which led to formation of scales and slime in the first instance, and corrosion over a longer period partially explains the high occurrence of interventions which required replacement of pipes and rods, rethreading of pipe ends and replacement of sockets. The uncertain quality of the initial installations, as evident from the occurrence of unsatisfactory joints, was the other contributing factor for these interventions.

Table 14 : Interventions related to Riser Pipes & Connecting Rods

Sl. No.	Site	Occurrence Age	Maintenanace Needed
1.	Nuagaon	1079 (321+758)*	BGA cleaned
2.	J.J'pada,Talasahi	228	Joint leakage
3.	J J'pada, Gudiasahi	513	Pipe leakage, rethreading, 1 socket
4.	Aragada, Mudulisahi	333	Joint loose
5.	Banga, Harijansahi	521	BGA cleaned
6.	Bolakana, Paridasahi	811	2 rods repl.
7.	Bolakana, Paridasahi	1174	1 pipe, 2 rods repl.
8.	Rencha, Mohantysahi	667 (321+346)*	BGA cleaned
9.	Rencha, Kasiabindha	712 (321+391)*	Rods cleaned
10.	Humara, Mojhisahi	1215	BGA cleaned 3 rods repl.
11.	Machhapada, Ward No. 7	792	1 pipe, 1 rod repl.
12.	Machhapada, Ward No. 7	282 (1074-792)*	All pipe ends rethreaded, 3 rods, 2 sockets repl.

* Figures in brackets indicate age corrections

12.4 Specific Problems: The occurrence of some specific problems leading to the need for maintenance have been listed in Table 15. Noticeable from this table are the following:

1. Rod Disconnections at the chain resulted in 3 AGA-BD occurrences.

2. There were two occurrences of connecting rod disconnections which resulted in BGA-BD-RP interventions.

3. There was one instance when the plunger could not be extracted because of which a BGA-PP-OTC was unsuccessful and became a BGA-BD-RP.

4. There were 11 occurrences of 'O' ring replacement on 8 sites.

5. There were 6 occurrences of corrosion and subsequent problems recorded on 5 sites.

6. There were 5 occurrences of cleaning of BGA components from 5 sites.

7. From the above problems, it can be seen that rod disconnections led to a total of 5 out of the total 8 break downs. This could be reduced by more careful installation. Other selected problems mentioned above have been discussed earlier in the report in detail.

Table 15 : Occurrence of Specific Problems and Interventions

Sl. No.	Nature of Problem/ Cause for Intervention	Nos. of Pumps	Nos. of Occur-rences	Average Inter-val
1.	Con. Rod disconnection at Chain : AGA-BD	3	3	421
2.	Con. Rod disconnection below-ground : BGA-BD	2	2	817
3.	Plunger jammed during removal : BGA-PP-OTC becoming BGA-BD-RP	1	1	741
4.	Check Valve 'O' Ring replacement : BGA-PP	8	11	449
5.	Pipe leakage or Joint leakage : BGA-PP	5	6	554
6.	Pipe/Con. Rod cleaning : BGA-PP or BGA-OTH	5	5	839

ANNEXURE 1

ANALYSIS OF AGE
ANALYSIS OF VISITS
ANALYSIS OF S W L
ANALYSIS OF VOLUMETRIC EFFICIENCY

ANALYSIS OF AGE

SL NO	REGN. NO.	HABITATION	DATE OF INSTL	DATE OF REMOVAL	AGE MONTHS BY DEC '89
**	**NUAGAON**				
1	13122311302	DIHASAHI	10/04/87		33
**	**KHELAUR**				
2	13122311403	BHOISAHI	08/04/87		33
3	13122311404	SANAPADA	08/04/87		33
**	**JAMURA JHARAPADA**				
4	13122400102	MOJHI SAHI	17/06/86	30/03/87	10
5	13122400103	TALA SAHI	17/06/86	29/03/87	10
6	13122400104	TALA SAHI	17/06/86	30/03/87	10
7	13122400105	NUA SAHI	17/06/86	29/03/87	10
8	13122400107	BHOISAHI	18/07/86		42
9	13122400108	GUDIASAHI	22/11/86		38
**	**GODIPUT MATIAPADA**				
10	13122400203	HARIPUR JENA SAHI	30/05/86	27/03/87	10
11	13122400204	HARIPUR TALA SAHI	30/05/86	27/03/87	10
12	13122400205	HARIPUR DOMO SAHI	30/05/86	31/03/87	10
13	13122400207	BARAPADA	18/07/86		42
**	**AHAGADA**				
14	13122400301	MUDULI SAHI	03/03/86		47
15	13122400302	BEHERASAHI	02/07/86		43
16	13122400303	GODISAHI	02/07/86	31/08/87	14
17	13122400304	GODISAHI	28/07/86	30/05/87	10
**	**BANGA**				
18	13122400401	JENASAHI	29/05/86		44
19	13122400402	HARIJANSAHI	06/07/86		42
**	**BHANSAR**				
20	13122400801	TANGI	02/06/86	05/07/87	13
21	13122400802	TANGI	29/05/86		44
22	13122400803	NIMA BASANTA	25/06/86		43
23	13122400804	NIMA BASANTA	18/07/86		42
**	**RENGAL**				
24	13122402602	ICHHAPUR	12/06/86	28/03/87	10
25	13122402604	TALASAHI	18/07/86	28/03/87	8
**	**ARISOL**				
26	13122405501	BHOISAHI	09/04/87		33
27	13122405502	GATESWARPUR	09/04/87	17/07/89	28
**	**BRAHMANA TARABOI**				
28	13122405602	MUDULI SAHI	10/04/87		33
29	13122405604	BHOISAHI	06/04/87		33
30	13122405605	MALISAHI	06/04/87		33
**	**BOLAKANA**				
31	13122408503	DOMOSAHI	15/05/86	09/07/87	14
32	13122408504	TALABANIA	02/05/86		45
33	13122408505	PARIDA SAHI	31/05/86		44
**	**ODATARABOI**				
34	13122409102	MALIKSAHI	07/04/87	07/11/89	32
35	13122409103	JENASAHI	07/04/87		33
**	**RENCHA**				
36	13122409301	MOHANTYSAHI	06/07/87		30
37	13122409304	KASIABINDHA	06/07/87	15/07/89	25
**	**JOKANADUA**				
38	13122409402	TELISAHI	08/07/87		30
**	**RUMANA**				
39	13122410401	DIANKASAHI	26/05/86		44
40	13122410402	MOJHISAHI	26/05/86		44
41	13122410404	TALASAHI	26/05/86		44
**	**MACHHAPADA**				
42	13122411003	WARD. 7	31/05/86		44

ANALYSIS OF VISITS

SL	RENO	HABITATION	ROUTINE.	UNFORE SEEN	OTHER	TOTAL
	** NUAGAON					
1	2311302	DIHASAHI	16	2	4	22
	** KHKLAUR					
2	2311403	BHOISAHI	16	0	4	20
3	2311404	SANAPADA	16	1	4	21
	** JAMUNA JHARAPADA					
4	2400102	MOJHI SAHI	5	0	2	7
5	2400103	TALA SAHI	6	0	2	8
6	2400104	TALA SAHI	5	0	2	7
7	2400105	NUA SAHI	5	0	2	7
8	2400107	BHOISAHI	21	1	4	26
9	2400108	GUDIASAHI	15	2	1	18
	** GODIPUT MATIAPADA					
10	2400203	HARIPUR JENA SAHI	5	0	2	7
11	2400204	HARIPUR TALA SAHI	6	0	2	8
12	2400205	HARIPUR DOMO SAHI	5	0	2	7
13	2400207	BARAPADA	22	0	1	23
	** ARAGADA					
14	2400301	MUDULI SAHI	21	0	1	22
15	2400302	BEHERASAHI	21	0	2	23
16	2400303	GODISAHI	5	0	2	7
17	2400304	GODISAHI	6	0	2	8
	** BARGA					
18	2400401	JENASAHI	20	0	2	22
19	2400402	HARIJANSAHI	20	1	2	23
	** BHANSAR					
20	2400801	TANGI	7	0	3	10
21	2400802	TANGI	20	0	1	21
22	2400803	NIMA BASANTA	20	0	2	22
23	2400804	NIMA BASANTA	20	0	1	21
	** RENGAL					
24	2402602	ICHHAPUR	5	0	2	7
25	2402604	TALASAHI	5	0	2	7
	** ARISOL					
26	2405501	BHOISAHI	16	0	3	19
27	2405502	GATESWARPUR	13	0	2	15
	** BRAHMANA TARABOI					
28	2405602	MUDULI SAHI	16	1	4	21
29	2405604	BHOISAHI	16	0	3	19
30	2405605	MALISAHI	16	0	2	18
	** BOLAKANA					
31	2408503	DOMOSAHI	7	0	1	8
32	2408504	TALABANIA	18	1	1	20
33	2408505	PARIDA SAHI	17	4	1	22
	** ODATARABOI					
34	2409102	MALIKSAHI	16	0	3	19
35	2409103	JENASAHI	16	0	2	18
	** RENCHA					
36	2409301	MOHANTYSAHI	14	3	2	19
37	2409304	KASIABINDHA	11	1	3	15
	** JOKANADUA					
38	2409402	TELISAHI	14	1	2	17
	** HUMARA					
39	2410401	DIANKASAHI	21	1	1	23
40	2410402	MOJHISAHI	19	3	3	25
41	2410404	TALASAHI	21	0	2	23
	** MACHHAPADA					
42	2411003	WARD. 7	19	4	1	24

ANALYSIS OF SWL

SL	REGN.NO.	HABITATION	FROM MON/YR	TO MON/YR	NO OF OBS.	MAX (M)	MIN (M)
**	**BUAGAON**						
1	13122311302	DIHASAHI	15/04/87	01/12/89	13	5.43 (May89)	1.90 (Aug89)
**	**KHELAUR**						
2	13122311403	BHOISAHI	10/04/87	01/12/89	15	3.06 (May89)	0.75 (Sep89)
3	13122311404	SANAPADA	07/07/87	01/12/89	13	3.40 (May89)	0.95 (Aug89)
**	**JAMUNA JHARAPADA**						
4	13122400102	MOJHI SAHI	19/08/86	09/12/86	3	3.04 (Dec86)	1.63 (Sep86)
5	13122400103	TALA SAHI	19/08/86	09/12/86	3	5.20 (Aug86)	3.02 (Dec86)
6	13122400104	TALA SAHI	19/08/86	09/12/86	3	3.02 (Dec86)	2.10 (Aug86)
7	13122400105	NUA SAHI	19/08/86	30/09/86	2	5.78 (Aug86)	2.58 (Sep86)
8	13122400107	BHOISAHI	18/07/86	02/12/89	19	6.32 (Dec89)	1.92 (Aug89)
9	13122400108	GUDIASAHI	13/07/87	02/12/89	13	7.65 (Dec89)	2.22 (Sep88)
**	**GODIPUT MATIAPADA**						
10	13122400203	HARIPUR JENA SAHI	14/08/86	08/12/86	3	3.00 (Dec86)	1.47 (Sep86)
11	13122400204	HARIPUR TALA SAHI	14/08/86	08/12/86	3	1.90 (Aug86)	1.47 (Sep86)
12	13122400205	HARIPUR DOMO SAHI	14/08/86	08/12/86	3	2.95 (Dec86)	0.83 (Aug86)
13	13122400207	BARAPADA	18/08/86	02/12/89	17	7.12 (May89)	0.46 (Aug89)
**	**ARAGADA**						
14	13122400301	MUDULI SAHI	14/08/86	23/12/89	17	9.70 (Mar89)	1.94 (Dec89)
15	13122400302	BEHERASAHI	14/08/86	23/12/89	17	6.80 (May89)	2.21 (Dec89)
16	13122400303	GODISAHI	14/08/86	09/12/86	3	2.50 (Aug86)	0.93 (Sep86)
17	13122400304	GODISAHI	14/08/86	15/04/87	4	3.48 (Apr87)	1.71 (Dec86)
**	**BANGA**						
18	13122400401	JENASAHI	16/08/86	02/12/89	16	6.45 (May89)	2.49 (Aug89)
19	13122400402	HARIJANSAHI	16/08/86	02/12/89	17	6.58 (Apr87)	1.95 (Aug89)
**	**BHANSAR**						
20	13122400801	TANGI	16/08/86	16/04/87	4	4.76 (Dec86)	3.63 (Sep86)
21	13122400802	TANGI	16/08/86	02/12/89	17	7.28 (May88)	2.39 (Aug89)
22	13122400803	NIMA BASANTA	16/08/86	02/12/89	17	7.46 (May89)	2.64 (Aug89)
23	13122400804	NIMA BASANTA	16/08/86	02/12/89	17	5.94 (May89)	1.53 (Sep87)
**	**RENGAL**						
24	13122402602	ICHHAPUR	18/08/86	09/12/86	3	4.58 (Dec86)	1.28 (Aug86)
25	13122402604	TALASAHI	18/08/86	09/12/86	3	5.00 (Dec86)	2.82 (Aug86)
**	**ARISOL**						
26	13122405501	BHOISAHI	14/07/87	14/08/89	9	3.23 (May89)	1.00 (Sep87)
27	13122405502	GATESWARPUR	14/07/87	08/05/89	9	4.35 (May89)	1.50 (Sep87)
**	**BRAHMANA TARABOI**						
28	13122405602	MUDULI SAHI	10/04/87	01/12/89	12	3.04 (May89)	0.71 (Aug89)
29	13122405604	BHOISAHI	10/04/87	01/12/89	14	2.45 (May89)	0.20 (Aug89)
30	13122405605	MALISAHI	10/04/87	01/12/89	14	3.23 (May89)	0.97 (Aug89)
**	**BOLAKANA**						
31	13122408503	DOMOSAHI	11/08/86	09/07/87	5	2.27 (Apr87)	0.98 (Aug86)
32	13122408504	TALABANIA	11/08/86	22/12/89	15	3.04 (Mar89)	1.40 (Sep88)
33	13122408505	PARIDA SAHI	11/08/86	07/11/89	14	3.95 (Apr87)	2.05 (Aug89)
**	**ODATARABOI**						
34	13122409102	MALIKSAHI	10/04/87	29/10/89	12	2.76 (May89)	0.42 (Nov88)
35	13122409103	JENASAHI	10/04/87	01/12/89	14	3.20 (May89)	1.08 (Aug89)
**	**RENCHA**						
36	13122409301	MOHANTYSAHI	15/07/87	06/12/89	13	3.37 (May89)	1.32 (Sep89)
37	13122409304	KASIABINDHA	14/07/87	04/05/89	9	2.84 (May89)	0.88 (Sep88)
**	**JOKAMADUA**						
38	13122409402	TELISAHI	15/07/87	10/08/89	10	2.53 (May89)	0.51 (Aug89)
**	**KUMARA**						
39	13122410401	DIANKASAHI	06/08/86	22/12/89	17	2.60 (Jul87)	0.39 (Sep87)
40	13122410402	MOJHISAHI	06/08/86	22/12/89	16	3.20 (Apr89)	0.70 (Sep88)
41	13122410404	TALASAHI	06/08/86	22/12/89	16	2.13 (Oct89)	0.10 (Sep88)
**	**MACHHAPADA**						
42	13122411003	WARD. 7	08/08/86	13/12/89	15	3.65 (Nov89)	0.30 (Aug89)

ANALYSIS OF VOLUMETRIC EFFICIENCY

SL	REGN. NO.	HABITATION	FROM MON/YR	TO MON/YR	NO OF OBS.	MAX	MON/YR	MIN	MON/YR	AVERAGE
	** BUDAGAON									
1	13122311302	DIHASAHI	15/04/87	01/12/89	15	136	Dec 87	106	Mar 89	119
	** KHELAUR									
2	13122311403	BHOISAHI	10/04/87	01/12/89	16	147	Apr 87	101	Oct 89	127
3	13122311404	SANAPADA	10/04/87	01/12/89	16	142	Sep 87	107	Mar 89	126
	** JAMUNA JHARAPADA									
4	13122400102	MOJHI SAHI	19/08/86	31/01/87	4	117	Sep 86	105	Jan 87	112
5	13122400103	TALA SAHI	19/08/86	09/12/86	4	112	Sep 86	104	Dec 86	108
6	13122400104	TALA SAHI	30/09/86	31/01/87	3	119	Sep 86	108	Dec 86	111
7	13122400105	NUA SAHI	19/08/86	31/01/87	4	128	Aug 86	114	Jan 87	121
8	13122400107	BHOISAHI	18/08/86	12/11/89	17	123	Apr 87	91	Jan 87	110
9	13122400108	GUDIASAHI	30/05/87	12/11/89	12	121	Aug 89	103	May 87	112
	** GODIPUT MATIAPADA									
10	13122400203	HARIPUR JENA SAHI	14/08/86	29/01/87	4	118	Sep 86	108	Aug 86	111
11	13122400204	HARIPUR TALA SAHI	14/08/86	25/09/86	2	115	Sep 86	105	Aug 86	110
12	13122400205	HARIPUR DOMO SAHI	14/08/86	29/01/87	4	115	Sep 86	104	Aug 86	111
13	13122400207	BARAPADA	18/08/86	12/11/89	16	121	Apr 87	75	May 88	101
	** ARAGADA									
14	13122400301	MUDULI SAHI	14/08/86	23/12/89	19	133	Sep 88	99	Jan 87	111
15	13122400302	BEHERASAHI	14/08/86	23/12/89	19	135	Apr 87	101	Nov 89	110
16	13122400303	GODISAHI	14/08/86	29/01/87	4	142	Sep 86	120	Jan 87	131
17	13122400304	GODISAHI	14/08/86	15/04/87	5	131	Apr 87	106	Aug 86	122
	** BANGA									
18	13122400401	JENASAHI	16/08/86	08/11/89	18	129	Jul 87	93	Nov 89	111
19	13122400402	HARIJANSAHI	16/08/86	08/11/89	18	126	Jul 87	69	Nov 89	105
	** BHANSAR									
20	13122400801	TANGI	16/08/86	30/05/87	6	120	Apr 87	99	Aug 86	107
21	13122400802	TANGI	16/08/86	02/12/89	19	126	May 87	99	Aug 86	112
22	13122400803	NIMA BASANTA	16/08/86	02/12/89	19	132	Dec 87	98	Aug 86	110
23	13122400804	NIMA BASANTA	16/08/86	02/12/89	19	125	Jul 87	101	Aug 86	113
	** RENGAL									
24	13122402602	ICHHAPUR	18/08/86	30/01/87	4	109	Sep 86	85	Jan 87	100
25	13122402604	TALASAHI	18/08/86	30/01/87	4	109	Sep 86	95	Jan 87	101
	** ARISOL									
26	13122405501	BHOISAHI	10/04/87	01/12/89	15	150	Sep 87	99	Mar 89	125
27	13122405502	GATESWARPUR	10/04/87	08/05/89	12	165	Sep 87	109	Dec 88	129
	** BRAHMANA TARABOI									
28	13122405602	MUDULI SAHI	10/04/87	01/12/89	16	157	Apr 87	93	Mar 89	123
29	13122405604	BHOISAHI	10/04/87	01/12/89	16	183	Sep 87	103	Mar 89	136
30	13122405605	MALISAHI	10/04/87	01/12/89	16	145	Sep 87	108	Mar 89	124
	** BOLAKANA									
31	13122408503	DOMOSAHI	11/08/86	09/07/87	7	141	Sep 86	114	Jan 87	131
32	13122408504	TALABANIA	11/08/86	22/12/89	17	150	Sep 87	107	Aug 86	123
33	13122408505	PARIDA SAHI	11/08/86	07/11/89	14	127	Dec 87	93	Nov 89	111
	** ODATARABOI									
34	13122409102	MALIKSAHI	10/04/87	29/10/89	14	145	Apr 87	100	Mar 89	126
35	13122409103	JENASAHI	10/04/87	01/12/89	16	138	Sep 87	106	Mar 89	119
	** RENCHA									
36	13122409301	MOHANTYSAHI	15/07/87	06/12/89	13	160	Sep 87	107	Dec 89	126
37	13122409304	KASIABINDHA	14/07/87	04/05/89	11	150	Dec 87	105	Mar 89	121
	** JOKANADUA									
38	13122409402	TELISAHI	15/07/87	02/12/89	12	165	Dec 87	105	Mar 89	136
	** HUMARA									
39	13122410401	DIANKASAHI	06/08/86	07/11/89	18	142	Dec 87	106	Apr 89	120
40	13122410402	MOJHISAHI	06/08/86	07/11/89	18	141	Mar 88	85	Nov 89	116
41	13122410404	TALASAHI	06/08/86	22/12/89	20	189	Sep 87	106	Apr 89	144
	** MACHHAPADA									
42	13122411003	WARD. 7	08/08/86	13/12/89	18	146	Apr 87	72	Dec 88	110

ANNEXURE 2

ANALYSIS OF AGE & VISITS
ANALYSIS OF S W L & VOLUMETRIC EFFICIENCY
ANALYSIS OF OCCURRENCES OF MAINTENANCE

ANALYSIS OF AGE AND VISITS

SL NO.	REGN. NO.	HABITATION	DATE OF INSTL	DATE OF REMOVAL	AGE MONTHS BY DEC '89	TOTAL VISITS	UNFRSN. VISITS
	** NUAGAON						
1	13122311302	DIHASAHI	10/04/87		33	22	2
	** KHELAUR						
2	13122311403	BHOISAHI	08/04/87		33	20	0
3	13122311404	SANAPADA	08/04/87		33	21	1
	** JAMUNA JHARAPADA						
4	13122400102	MOJHI SAHI	17/06/86	30/03/87	10	7	0
5	13122400103	TALA SAHI	17/06/86	29/03/87	10	8	0
6	13122400104	TALA SAHI	17/06/86	30/03/87	10	7	0
7	13122400105	NUA SAHI	17/06/86	29/03/87	10	7	0
8	13122400107	BHOISAHI	18/07/86		42	26	1
9	13122400108	GUDIASAHI	22/11/86		38	18	2
	** GODIPUT MATIAPADA						
10	13122400203	HARIPUR JENA SAHI	30/05/86	27/03/87	10	7	0
11	13122400204	HARIPUR TALA SAHI	30/05/86	27/03/87	10	8	0
12	13122400205	HARIPUR DOMO SAHI	30/05/86	31/03/87	10	7	0
13	13122400207	BARAPADA	18/07/86		42	23	0
	** ARAGADA						
14	13122400301	MUDULI SAHI	03/03/86		47	22	0
15	13122400302	BEHERASAHI	02/07/86		43	23	0
16	13122400303	GODISAHI	02/07/86	31/08/87	14	7	0
17	13122400304	GODISAHI	28/07/86	30/05/87	10	8	0
	** BANGA						
18	13122400401	JENASAHI	29/05/86		44	22	0
19	13122400402	HARIJANSAHI	06/07/86		42	23	1
	** BHANSAR						
20	13122400801	TANGI	02/06/86	05/07/87	13	10	0
21	13122400802	TANGI	29/05/86		44	21	0
22	13122400803	NIMA BASANTA	25/06/86		43	22	0
23	13122400804	NIMA BASANTA	18/07/86		42	21	0
	** RENGAL						
24	13122402602	ICHHAPUR	12/06/86	28/03/87	10	7	0
25	13122402604	TALASAHI	18/07/86	28/03/87	8	7	0
	** ARISOL						
26	13122405501	BHOISAHI	09/04/87		33	19	0
27	13122405502	GATESWARPUR	09/04/87	17/07/89	28	15	0
	** BRAHMANA TARABOI						
28	13122405602	MUDULI SAHI	10/04/87		33	21	1
29	13122405604	BHOISAHI	06/04/87		33	19	0
30	13122405605	MALISAHI	06/04/87		33	18	0
	** BOLAKANA						
31	13122408503	DOMOSAHI	15/05/86	09/07/87	14	8	0
32	13122408504	TALABANIA	02/05/86		45	20	1
33	13122408505	PARIDA SAHI	31/05/86		44	22	4
	** ODATARABOI						
34	13122409102	MALIKSAHI	07/04/87	07/11/89	32	19	0
35	13122409103	JENASAHI	07/04/87		33	18	0
	** RENCHA						
36	13122409301	MOHANTYSAHI	06/07/87		30	19	3
37	13122409304	KASIABINDHA	06/07/87	15/07/89	25	15	1
	** JOKANADUA						
38	13122409402	TELISAHI	08/07/87		30	17	1
	** HUMARA						
39	13122410401	DIANKASAHI	26/05/86		44	23	1
40	13122410402	MOJHISAHI	26/05/86		44	25	3
41	13122410404	TALASAHI	26/05/86		44	23	0
	** MACHHAPADA						
42	13122411003	WARD. 7	31/05/86		44	24	4

SWL & VOLUMETRIC EFFICIENCY OBSERVATIONS

SL NO	DT. VISIT	SWL(mtr)	VOL EFF (%)
** NUAGAON			
13122311302	DIHASAHI		
1	15/04/87	2.85	131
2	14/07/87	2.31	127
3	28/09/87	2.26	132
4	03/12/87	2.27	136
5	24/03/88	2.99	127
6	27/05/88	3.00	112
7	28/09/88	2.15	131
8	16/12/88	2.5	125
9	18/03/89	4.72	106
10	09/05/89	5.43	110
11	14/08/89	1.90	109
12	09/11/89	2.92	116
13	01/12/89	3.24	106
** KHELAUR			
13122311403	BHOISAHI		
1	10/04/87	1.80	147
2	07/07/87	1.58	147
3	29/09/87	1.38	139
4	03/12/87	1.12	129
5	29/03/88	1.81	141
6	27/05/88	1.31	120
7	29/09/88	1.36	140
8	16/12/88	1.38	126
9	16/03/89	2.94	106
10	08/05/89	3.06	114
11	10/08/89	0.83	122
12	24/10/89	1.20	101
13	09/11/89	1.74	124
14	01/12/89	2.12	122
13122311404	SANAPADA		
1	07/07/87	1.52	134
2	29/09/87	1.48	142
3	03/12/87	1.45	135
4	29/03/88	2.05	142
5	27/05/88	1.68	119
6	28/09/88	1.49	140
7	16/12/88	1.82	126
8	16/03/89	2.63	107
9	09/05/89	3.40	117
10	10/08/89	0.95	109
11	24/10/89	2.13	124
12	09/11/89	2.07	124
13	01/12/89	2.65	122

SL NO	DT. VISIT	SWL(mtr)	VOL EFF (%)
** JAMUNA JHARAPADA			
13122400102	MOJHI SAHI		
1	19/08/86	1.88	111
2	30/09/86	1.63	117
3	09/12/86	3.04	116
13122400103	TALA SAHI		
1	19/08/86	5.20	108
2	30/09/86	4.52	112
3	09/12/86	3.02	104
13122400104	TALA SAHI		
1	30/09/86	2.23	119
2	09/12/86	3.02	108
13122400105	NUA SAHI		
1	19/08/86	5.78	128
2	30/09/86	2.58	125
13122400107	BHOISAHI		
1	18/08/86	3.58	100
2	30/09/86	4.59	109
3	16/04/87	5.91	123
4	13/07/87	4.48	116
5	29/09/87	4.03	113
6	09/12/87	4.91	113
7	28/03/88	5.77	114
8	26/05/88	5.39	105
9	29/09/88	2.80	116
10	08/12/88	5.12	112
11	29/03/89	6.10	113
12	05/05/89	6.25	108
13	18/08/89	1.92	116
14	12/11/89	6.30	101
15	02/12/89	6.32	91
13122400108	GUDIASAHI		
1	13/07/87	4.79	117
2	29/09/87	3.78	117
3	09/12/87	5.38	114
4	28/03/88	5.90	112
5	26/05/88	5.39	104
6	29/09/88	2.22	112
7	29/03/89	6.05	114
8	05/05/89	7.10	114
9	12/08/89	3.70	121
10	12/11/89	6.57	103
11	02/12/89	7.65	99

SWL & VOLUMETRIC EFFICIENCY OBSERVATIONS (Contd.)

** GODIPUT MATIAPADA

13122400203 HARIPUR JENA SAHI

1	14/08/86	1.57	108
2	25/09/86	1.47	113
3	08/12/86	3.0	110

13122400204 HARIPUR TALA SAHI

1	14/08/86	1.9	105
2	25/09/86	1.47	115

13122400205 HARIPUR DGMO SAHI

1	14/08/86	0.83	104
2	25/09/86	0.83	115
3	08/12/86	2.95	110

13122400207 BARAPADA

1	18/08/86	1.38	103
2	09/10/86	1.35	100
3	08/12/86	3.13	99
4	16/04/87	5.88	121
5	13/07/87	4.06	117
6	29/09/87	2.74	121
7	09/12/87	3.42	118
8	28/03/88	5.52	96
9	26/05/88	4.14	75
10	29/09/88	1.70	108
11	08/12/88	4.07	80
12	31/03/89	6.10	83
13	05/05/89	7.12	92
14	12/11/89	4.54	85
15	02/12/89	4.82	99

** ARAGADA

13122400301 MUDULI SAHI

1	14/08/86	3.10	103
2	30/09/86	4.25	101
3	09/12/86	3.39	102
4	16/04/87	6.33	119
5	13/07/87	5.30	126
6	29/09/87	3.88	112
7	09/12/87	4.99	115
8	28/03/88	6.45	111
9	26/05/88	5.80	104
10	29/09/88	2.93	133
11	08/12/88	9.04	106
12	29/03/89	9.70	108
13	05/05/89	6.89	109
14	22/09/89	3.29	120
15	12/11/89	6.23	116
16	23/12/89	1.94	107

13122400302 BEHERASAHI

1	14/08/86	3.06	103
2	30/09/86	4.88	108
3	09/12/86	4.49	106
4	16/04/87	6.13	135
5	13/07/87	5.40	112
6	29/09/87	5.13	110
7	09/12/87	4.51	112
8	28/03/88	6.56	113
9	26/05/88	6.58	104
10	29/09/88	2.50	126
11	08/12/88	5.70	110
12	31/03/89	6.00	110
13	09/05/89	6.80	109
14	22/09/89	2.93	108
15	12/11/89	6.05	101
16	23/12/89	2.21	107

13122400303 GODISAHI

1	14/08/86	2.5	121
2	25/09/86	0.93	142
3	09/12/86	1.5	142

13122400304 GODISAHI

1	14/08/86	3.32	106
2	25/09/86	1.79	130
3	09/12/86	1.71	125
4	15/04/87	3.48	131

** BANGA

13122400401 JENASAHI

1	16/08/86	3.08	101
2	25/09/86	3.35	112
3	08/12/86	4.67	101
4	13/07/87	4.57	129
5	29/09/87	4.00	118
6	09/12/87	4.38	125
7	28/03/88	5.47	113
8	26/05/88	5.78	110
9	29/09/88	3.62	123
10	08/12/88	5.00	106
11	31/03/89	5.40	109
12	05/05/89	6.45	106
13	12/08/89	2.49	108
14	08/11/89	5.35	93
15	02/12/89	5.70	91

SWL & VOLUMETRIC EFFICIENCY OBSERVATIONS (Contd.)

** BANGA

13122400402 HARIJANSAHI

1	16/08/86	3.28	99
2	25/09/86	3.38	110
3	08/12/86	5.51	108
4	16/04/87	6.58	125
5	13/07/87	4.70	126
6	29/09/87	3.78	125
7	09/12/87	4.91	105
8	28/03/88	6.27	114
9	26/05/88	5.97	98
10	29/09/88	2.82	109
11	09/12/88	5.70	83
12	31/03/89	6.30	104
13	08/05/89	6.41	91
14	22/09/89	3.82	109
15	08/11/89	5.81	69

** BHANSAR

13122400801 TANGI

1	16/08/86	4.28	99
2	25/09/86	3.63	102
3	08/12/86	4.76	102
4	16/04/87	4.63	120

13122400802 TANGI

1	16/08/86	2.73	99
2	25/09/86	3.08	104
3	08/12/86	4.30	108
4	16/04/87	6.18	121
5	13/07/87	4.52	124
6	29/09/87	4.03	116
7	09/12/87	4.46	126
8	28/03/88	4.77	114
9	26/05/88	7.28	109
10	29/09/88	2.80	118
11	08/12/88	4.82	120
12	31/03/89	5.60	117
13	05/05/89	5.34	106
14	12/08/89	2.39	109
15	08/11/89	5.25	101
16	02/12/89	5.68	107

13122400803 NIMA BASANTA

1	16/08/86	3.48	98
2	25/09/86	3.61	102
3	08/12/86	5.21	114
4	16/04/87	6.92	119
5	13/07/87	5.17	121
6	29/09/87	4.73	116
7	09/12/87	5.48	122
8	28/03/88	6.27	104
9	26/05/88	6.01	107
10	29/09/88	2.90	116
11	08/12/88	6.35	112
12	31/03/89	6.70	112
13	05/05/89	7.46	106
14	12/08/89	2.64	105
15	08/11/89	6.15	101
16	02/12/89	7.20	107

13122400804 NIMA BASANTA

1	16/08/86	3.00	101
2	25/09/86	2.90	104
3	08/12/86	3.77	116
4	16/04/87	5.48	115
5	13/07/87	3.63	125
6	29/09/87	1.53	124
7	09/12/87	3.83	124
8	28/03/88	4.27	112
9	26/05/88	4.80	110
10	29/09/88	2.55	118
11	08/12/88	4.33	114
12	31/03/89	5.00	117
13	05/05/89	5.94	114
14	12/08/89	2.39	106
15	08/11/89	5.37	108
16	02/12/89	4.65	114

** RENGAL

13122402602 ICHHAPUR

1	18/08/86	1.28	103
2	30/09/86	3.68	109
3	09/12/86	4.58	103

13122402604 TALASAHI

1	18/08/86	2.82	97
2	30/09/86	4.33	109
3	09/12/86	5.00	106

SWL & VOLUMETRIC EFFICIENCY OBSERVATIONS (Contd.)

** ARISOL

13122405501 BHOISAHI

1	14/07/87	1.29	138
2	28/09/87	1.00	150
3	03/12/87	1.28	137
4	24/03/88	1.92	125
5	27/05/88	1.68	120
6	28/09/88	1.05	148
7	16/03/89	3.15	99
8	09/05/89	3.23	120
9	14/08/89	1.15	104

13122405502 SATESWARPUR

1	14/07/87	1.59	139
2	28/09/87	1.50	165
3	03/12/87	1.83	135
4	24/03/88	2.29	127
5	27/05/88	1.76	122
6	28/09/88	1.53	140
7	10/12/88	2.00	109
8	16/03/89	3.24	114
9	08/05/89	4.35	117

** BRAHMANA TARABOI

13122405602 MUDULI SAHI

1	10/04/87	1.20	157
2	07/07/87	1.75	123
3	28/09/87	1.90	142
4	27/05/88	1.37	115
5	28/09/88	1.76	142
6	25/11/88	1.13	122
7	16/03/89	1.70	93
8	09/05/89	3.04	113
9	14/08/89	0.71	118
10	24/10/89	1.05	124
11	09/11/89	2.05	108
12	01/12/89	2.14	122

13122405604 BHOISAHI

1	10/04/87	1.28	163
2	07/07/87	1.08	156
3	28/09/87	0.93	183
4	03/12/87	0.77	134
5	24/03/88	0.99	160
6	27/05/88	0.73	121
7	28/09/88	0.89	164
8	25/11/88	0.47	141
9	16/03/89	2.07	103
10	09/05/89	2.45	120
11	14/08/89	0.20	124
12	24/10/89	0.46	108
13	09/11/89	1.01	124
14	01/12/89	1.45	130

13122405605 MALISAHI

1	10/04/87	1.98	141
2	07/07/87	1.93	131
3	28/09/87	1.54	145
4	03/12/87	1.47	135
5	24/03/88	1.57	127
6	27/05/88	1.95	110
7	28/09/88	1.51	134
8	25/11/88	1.32	122
9	18/03/89	2.82	108
10	09/05/89	3.23	120
11	14/08/89	0.97	114
12	24/10/89	1.18	124
13	09/11/89	1.86	108
14	01/12/89	2.27	114

** BOLAKANA

13122408503 DOMOSAHI

1	11/08/86	0.98	119
2	20/09/86	1.09	141
3	04/12/86	1.67	140
4	09/04/87	2.37	140
5	09/07/87	2.22	133

13122408504 TALABANIA

1	11/08/86	1.58	107
2	20/09/86	1.52	124
3	04/12/86	1.50	126
4	09/04/87	2.98	134
5	09/07/87	2.92	120
6	28/09/87	1.49	150
7	05/12/87	1.73	142
8	23/03/88	2.51	115
9	21/05/88	2.07	121
10	17/09/88	1.40	134
11	10/12/88	1.95	114
12	18/03/89	3.04	120
13	07/11/89	2.06	124
14	22/12/89	2.30	107

13122408505 PARIDA SAHI

1	11/08/86	2.50	101
2	20/09/86	2.60	110
3	04/12/86	2.76	110
4	09/04/87	3.95	125
5	28/09/87	2.34	126
6	05/12/87	2.56	127
7	23/03/88	3.33	118
8	21/05/88	2.50	107
9	17/09/88	2.10	118
10	10/12/88	2.86	109
11	17/03/89	3.82	106
12	07/11/89	2.81	93

SWL & VOLUMETRIC EFFICIENCY OBSERVATIONS (Contd.)

** ODATARABOI

13122409102 MALIKSAHI

1	10/04/87	1.31	145
2	07/07/87	1.48	132
3	28/09/87	1.94	145
4	03/12/87	1.02	139
5	24/03/88	1.57	134
6	27/05/88	1.08	121
7	28/09/88	1.9	136
8	25/11/88	0.42	114
9	02/03/89	2.20	100
10	08/05/89	2.76	113
11	14/08/89	0.51	117
12	29/10/89	0.66	124

13122409103 JENASAHI

1	10/04/87	1.92	136
2	07/07/87	2.15	132
3	28/09/87	1.70	138
4	03/12/87	1.49	126
5	24/03/88	1.74	127
6	27/05/88	1.61	108
7	28/09/88	1.67	123
8	25/11/88	1.29	112
9	02/03/89	2.57	106
10	09/05/89	3.20	114
11	16/08/89	1.08	117
12	24/10/89	1.13	108
13	09/11/89	1.87	108
14	01/12/89	2.29	114

** RENCHA

13122409301 MOHANTYSAHI

1	15/07/87	1.60	128
2	29/09/87	2.38	160
3	02/12/87	1.60	144
4	29/03/88	1.55	134
5	25/05/88	1.92	128
6	14/09/88	1.98	148
7	24/11/88	1.67	122
8	02/03/89	2.82	112
9	04/05/89	3.37	114
10	10/08/89	1.42	108
11	07/11/89	1.57	108
12	06/12/89	2.61	107

13122409304 KASIABINDHA

1	14/07/87	1.41	129
2	29/09/87	1.23	134
3	02/12/87	1.10	150
4	21/03/88	1.40	140
5	25/05/88	1.40	142
6	04/07/88	1.40	142
7	14/09/88	0.88	142
8	02/03/89	2.23	105
9	04/05/89	2.84	114

** JOKANADUA

13122409402 TELISAHI

1	15/07/87	1.20	140
2	29/09/87	0.68	139
3	02/12/87	0.90	165
4	21/03/88	1.33	158
5	25/05/88	1.08	145
6	14/09/88	0.55	163
7	24/11/88	0.68	131
8	02/03/89	2.03	105
9	04/05/89	2.53	120
10	10/08/89	0.51	114

** HUMARA

13122410401 DIANKASAHI

1	06/08/86	0.6	112
2	22/09/86	0.86	125
3	04/12/86	1.26	123
4	13/04/87	1.96	125
5	07/07/87	2.60	111
6	28/09/87	0.39	141
7	02/12/87	0.82	142
8	21/03/88	1.30	127
9	21/05/88	1.78	122
10	14/09/88	1.50	132
11	24/11/88	0.63	121
12	29/01/89	1.15	114
13	03/04/89	2.10	106
14	15/08/89	0.40	116
15	07/11/89	1.13	116
16	22/12/89	1.26	99

SWL & VOLUMETRIC EFFICIENCY OBSERVATIONS (Contd.)

** HUMARA

13122410402 MOJHISAHI

1	06/08/86	1.60	101
2	22/09/86	1.61	101
3	04/12/86	1.93	105
4	13/04/87	2.66	127
5	07/07/87	1.59	125
6	28/09/87	1.72	131
7	09/12/87	1.83	140
8	21/03/88	1.22	141
9	21/05/88	0.81	113
10	14/09/88	0.70	135
11	24/11/88	1.71	121
12	29/01/89	2.40	109
13	03/04/89	3.20	106
14	15/08/89	1.41	109
15	07/11/89	2.62	85
16	22/12/89	2.32	89

13122410404 TALASAHI

1	06/08/86	1.33	135
2	22/09/86	0.55	158
3	04/12/86	0.57	163
4	07/07/87	1.20	148
5	28/09/87	0.36	169
6	02/12/87	0.47	171
7	21/03/88	1.33	148
8	21/05/88	0.86	144
9	14/09/88	0.10	163
10	24/11/88	0.38	163
11	29/01/89	0.80	160
12	03/04/89	1.80	106
13	15/08/89	0.40	113
14	24/10/89	2.13	116
15	07/11/89	0.89	132
16	22/12/89	0.94	114

** MACHHAPADA

13122411003 WARD. 7

1	08/08/86	1.80	97
2	22/09/86	1.84	105
3	03/12/86	2.04	102
4	13/04/87	3.25	146
5	09/07/87	3.20	104
6	28/09/87	1.74	134
7	01/12/87	1.93	126
8	24/03/88	2.36	126
9	21/05/88	2.93	103
10	17/09/88	1.70	95
11	10/12/88	2.33	72
12	17/03/89	2.72	101
13	15/08/89	0.30	125
14	11/11/89	3.65	108
15	13/12/89	2.55	107

OCCURRENCE OF MAINTENANCE

SL NO	SITE DETAILS	DT. VISIT	AGE DAYS	DAYS/ LAST VISIT	MAINTENANCE DETAILS
VIL: NUAGAON					
** 13122311302	HAB:DIHASAHI	DOI:10/04/87			
1		02/05/87	22	22	CHAIN DISCONECTION REPAIRED .
2		03/12/87	237	215	REPLACED 2 BOLTS, 3 NUTS.
3		07/05/89	758	521	RISER PIPES AND CONNECTING RODS CLEANED.
VIL: KHELAUR					
** 13122311403	HAB:BHOISAHI.	DOI:08/04/87			
1		03/12/87	239	239	REPLACED 3 BOLTS,2 NUTS.
** 13122311404	HAB:SANAPADA	DOI:08/04/87			
1		13/04/87	5	5	REPLACED NYLOC NUT & BOLT,2 BEARINGS.
2		03/12/87	239	234	REPLACED 2 NUTS & BOLTS.
3		29/03/88	356	117	REPLACED 1 BEARING, 2 NUTS & BOLTS.
VIL: JAMUNA JHARAPADA					
** 13122400102	HAB:MOJHI SAHI	DOI:17/06/86			
1		30/03/87	286	286	PUMP REMOVED .
** 13122400103	HAB:TALA SAHI	DOI:17/06/86			
1		19/08/86	63	63	LEAKAGE
2		30/09/86	105	42	LEAKAGE
3		25/10/86	130	25	'O' RING REPLACED
4		09/12/86	175	45	LEAKAGE, TURBIDITY.
5		31/01/87	228	53	HIGH LEAKAGE, TURBIDITY, 'O' RING REPLACED
6		29/03/87	285	57	PUMP REMOVED.
** 13122400104	HAB:TALA SAHI	DOI:17/06/86			
1		19/08/86	63	63	BREAK DOWN SINCE 15 DAYS AFTER INSTALLATION.
2		31/01/87	228	165	HIGH LEAKAGE, LEAKAGE IN PIPE SOCKETS, LOOSE BOTTOM CYLINDER CAP.REPLACED 'O' RING,7 NUTS.
3		30/03/87	286	58	PUMP REMOVED.
** 13122400105	HAB:NUA SAHI	DOI:17/06/86			
1		29/03/87	285	285	PUMP REMOVED .

OCCURRENCE OF MAINTENANCE (Contd.)

** 13122400107 HAB:BHOISAHI DOI:18/07/86

1	09/12/86	144	144	DEVELOPMENT OF WELL BY COMPRESSOR.
2	09/12/87	509	365	REPLACED 2 NUTS, 3 BOLTS.
3	28/03/88	619	110	SAND IN WATER. REPLACED 2 NUTS & BOLTS, 1 HANDLE BEARING.

** 13122400108 HAB:GUDIASAHI DOI:22/11/86

1	30/05/87	189	189	LEAKAGE.
2	13/07/87	233	44	LEAKAGE.
3	09/12/87	382	149	LEAKAGE.
4	28/03/88	492	110	REPLACED 1 BEARING, 2 NUTS & BOLTS.
5	18/04/88	513	21	BELOW GROUND ASSEMBLY REMOVED. REPLACED "O" RING,PIPE SOCKET,2 LEATHER CUP WASHERS.
6	02/12/88	741	228	BREAK DOWN FOR 5 DAYS. SEM WAS UNABLE TO REPAIR SINCE REPLACED CYL.BOTTOM CAP,SS PLUNGER ROD,LOWER VALVE ASSY.,2 NITRILE CUP WASHERS,2SEALING RINGS. CRACKED UPPER CAP NOT REPLACED.

VIL: GODIPUT MATIAPADA

** 13122400203 HAB:HARIPUR JENA SAHI DOI:30/05/86

1	27/03/87	301	301	PUMP REMOVED.

** 13122400204 HAB:HARIPUR TALA SAHI DOI:30/05/86

1	27/03/87	301	301	PUMP REMOVED.

** 13122400205 HAB:HARIPUR DOMO SAHI DOI:30/05/86

1	31/03/87	305	305	PUMP REMOVED.

** 13122400207 HAB:BARAPADA DOI:19/07/86

1	18/08/86	31	31	SLIGHT LEAKAGE.
2	30/09/86	74	43	BREAK DOWN, CHAIN BOLT, NYLOC NUT HAD BEEN REMOVED BY THE VILLAGERS.
3	09/10/86	83	9	CHAIN BOLT REPLACED BY VILLAGERS. NO PROBLEM.
4	28/03/88	619	536	REPLACED 2 BOLTS AND NUTS,1 BEARING .

VIL: ARAGADA

** 13122400301 HAB:MUDULI SAHI DOI:03/03/86

1	25/10/86	236	236	REPLACED "O" RING.
2	09/12/86	281	45	SLIGHT LEAKAGE CONTINUED.
3	30/01/87	333	52	LEAKAGE, REMOVED BELOW-GROUND ASSEMBLY. RISER JOINT LOOSE. REPAIRED.REPLACED 1 NUT & BOLT.
4	28/03/88	756	423	IRON TASTE. REPLACED 1 NUT & BOLT.

OCCURRENCE OF MAINTENANCE (Contd.)

** 13122400302 HAB:BEHERASAHI DOI:02/07/86

1	30/01/87	212	212	DRAIN BROKEN.
2	13/07/87	376	164	WASTE WATER DISPOSAL PROBLEM.
3	09/12/87	525	149	REPLACED 2 BOLTS AND 3 NUTS.

** 13122400303 HAB:GODISAHI DOI:02/07/86

1	25/09/86	85	85	PLATFORM NOT CLEAN
2	31/08/87	425	340	PUMP REMOVED

** 13122400304 HAB:GODISAHI DOI:28/07/86

1	30/05/87	306	306	TURBID WATER. PUMP REMOVED.

VIL: BANGA

** 13122400401 HAB:JENASAHI DOI:29/05/86

1	09/12/87	559	559	TURBIDITY. REPLACED 2 BOLTS AND NUTS.

** 13122400402 HAB:HARIJANSAHI DOI:06/07/86

1	09/12/87	521	521	REMOVED PIPES,CONNECTING RODS. REFITTED AFTER CLEANING. NO REPLACEMENT.
2	29/03/88	631	110	REPLACEMENT OF 2 NUTS & BOLTS.
3	15/08/88	771	140	REPLACED "O" RING.
4	09/12/88	887	116	CHAIN NOT FREE, GREASED.

VIL: BHANSAR

** 13122400801 HAB:TANGI DOI:02/06/86

1	05/07/87	398	398	PUMP REMOVED.

** 13122400802 HAB:TANGI DOI:29/05/86

1	23/03/88	669	669	TURBIDITY.REPLACED 1 NUT & BOLT.

** 13122400803 HAB:NIMA BASANTA DOI:25/06/86

1	09/12/87	532	532	TURBIDITY.REPLACED 1 BOLT & 2 NUTS.

** 13122400804 HAB:NIMA BASANTA DOI:18/07/86

1	09/12/87	509	509	REPLACED 3 BOLTS & 2 NUTS.
2	29/03/88	619	110	REPLACED 1 BEARING.

OCCURRENCE OF MAINTENANCE (Contd.)

VIL: RENGAL

** 13122402602 HAB:ICHHAPUR DOI:12/06/86

1	29/03/87	289	289	PUMP REMOVED.

** 13122402604 HAB:TALASAHI DOI:18/07/86

1	29/03/87	253	253	PUMP REMOVED.

VIL: ARISOL

** 13122405501 HAB:BHOISAHI DOI:09/04/87

1	03/12/87	238	238	SALINE TASTE. REPLACED 3 BOLTS & 4 NUTS
2	24/03/88	350	112	REPLACED 1 NUT AND BOLT.

** 13122405502 HAB:GATESWARPUR DOI:09/04/87

1	03/12/87	238	238	REPLACED 2 BOLTS, 3 NUTS.
2	17/07/89	830	592	WELL DEVELOPED,CLEANED FOR CONVERSION TO PVC RISER PIPES. OTC PUMP REMOVED.

VIL: BRAHMANA TARABOI

** 13122405602 HAB:MUDULI SAHI DOI:10/04/87

1	19/04/87	9	9	REPLACED 1 BOLT ,8 NUTS.
2	22/11/89	957	948	REPLACED 2 BOLTS & NUTS.

** 13122405604 HAB:BHOISAHI DOI:06/04/87

1	03/12/87	241	241	REPLACED 2 BOLTS,3 NUTS.

** 13122405605 HAB:MALISAHI DOI:06/04/87

1	03/12/87	241	241	REPLACED 2 BOLTS,3 NUTS.

VIL: BOLAKANA

** 13122408503 HAB:DOMOSAHI DOI:15/05/86

1	09/07/87	420	420	SALINE WATER,PUMP REMOVED.

** 13122408504 HAB:TALABANIA DOI:02/05/86

1	09/07/87	433	433	SALINITY,WASTE WATER DISPOSAL PROBLEM.
2	05/12/87	582	149	REPLACED 3 NUTS & BOLTS.
3	17/08/88	838	256	REPLACED INSPECTION COVER, 4 WASHER.

OCCURRENCE OF MAINTENANCE (Contd.)

** 13122408505 HAB:PARIDA SAHI DOI:31/05/86

1	05/12/87	553	553	REPLACED 2 BOLTS & AND 3 NUTS.
2	19/12/87	567	14	REPLACED INSPECTION COVER.
3	19/08/88	811	244	REPLACED 2 CONNECTING RODS.
4	16/08/89	1173	362	BREAK DOWN.
5	17/08/89	1174	1	BELOW GROUND ASSY. REMOVED.STONE AT LOWER VALVE DAMAGED "O"RING. BOTTOM RISER PIPE CORRODED. REPLACED 1 RISER PIPE,SS PLUNGER ROD, 2 LEATHER CUP WASHERS. "O" RING, 1 CONNECTING ROD, 2 BOLTS, 3 NUTS.

VIL: ODATARABOI

** 13122409102 HAB:MALIKSAHI DOI:07/04/87

1	03/12/87	240	240	SLIGHT TURBIDITY.REPLACED 3 BOLTS, 2 NUTS.
2	07/11/89	945	705	WELL DEVELOPED AND CLEANED FOR PVC RISER INSTALLATION .OTC PUMP REMOVED.

** 13122409103 HAB:JENASAHI DOI:07/04/87

VIL: RENCHA

** 13122409301 HAB:MOHANTSAHI DOI:06/07/87

1	02/12/87	149	149	REPLACED 3 BOLTS & NUTS.
2	21/08/88	412	263	WASHED WELL WITH BLEACHING POWDER.
3	02/08/89	758	346	BELOW GROUND ASSEMBLY REMOVED.RISER PIPES,CONNECTING RODS,CYLINDER CLEANED. REPLACED 2 LEATHER SEALING RINGS ,SS PLUNGER ROD,4 NUTS & BOLTS.UNSATISFACTORY TASTE IN WATER.

** 13122409304 HAB:KASIABINDHA DOI:06/07/87

1	14/07/87	8	8	REPLACED "O" RING.
2	31/07/88	391	383	WASHED THE CONNECTING ROD AND PLUNGER ASSEMBLY.
3	15/07/89	740	349	WELL DEVELOPED, CLEANED FOR CONVERSION TO PVC RISER PIPES,OTC PUMP REMOVED.

VIL: JOKANADUA

** 13122409402 HAB:TELISAHI DOI:08/07/87

1	21/12/89	594	594	REPLACED INSPECTION COVERBOLT & WASHER.

OCCURRENCE OF MAINTENANCE (Contd.)

VIL: HUMARA

** 13122410401 HAB:DIANKASAHI DOI:26/05/86

1	04/10/86	131	131	REPLACED 1 BOLT & NUT.
2	13/04/87	322	191	REPLACED 1 BEARING.
3	02/12/87	555	233	REPLACED 2 BOLTS & NUTS.

** 13122410402 HAB:MOJHISAHI DOI:26/05/86

1	04/12/86	192	192	REPLACED 1 NUT.
2	30/09/88	858	666	BREAK DOWN. CHAIN DISCONNECTED. REPAIRED.
3	28/08/89	1190	332	POOR PERFORMANCE. BELOW-GROUND ASSY.REMOVED. REPLACED SS PLUNGER ROD,2 LEATHER CUP WASHERS,"O"RING.
4	22/09/89	1215	25	BREAKDOWN.CONNECTING ROD DISCONNECTED. BELOW-GROUND ASSY.REMOVED. RISER PIPES CLEANED. REPLACED 3 CONNECTING RODS.
5	27/10/89	1250	35	REPLACED INSPECTION COVER BOLT.

** 13122410404 HAB:TALASAHI DOI:26/05/86

1	02/12/87	555	555	REPLACED 3 BOLTS,2 NUTS.

VIL: MACHHAPADA

** 13122411003 HAB:WARD. 7 DOI:31/05/86

1	13/04/87	317	317	REPLACED 1 BEARING.
2	09/07/87	404	87	IRON TASTE. REPLACED "O" RING.
3	01/12/87	549	145	IRON TASTE. REPLACED 2 BOLTS AND 3 NUTS.
4	31/07/88	792	243	BREAK DOWN. CONNECTING ROD DISCONNECTED.1 CONNECTING ROD,1 RISER PIPE REPLACED.
5	01/09/88	824	32	REPLACED INSPECTION COVER.
6	10/10/88	863	39	REPLACED "O" RING.
7	10/02/89	986	123	POOR PERFORMANCE. REPLACED UPPER VALVE GUIDE & SEATING.
8	12/04/89	1047	61	POOR PERFORMANCE, LEAKAGE. REMOVED BELOW-GROUND ASSY. RISER PIPE ENDS CORRODED AND PERFORATED.RETHREADED ALL PIPE ENDS. REPLACED "O" RING SS PLUNGER ROD, 3 CONNECTING RODS, 2 PIPE SOCKETS.

ANNEXURE 3

LIST OF SITES
DATA SUMMARY SHEETS

LIST OF SITES - IM II OTC PUMP INSTALLATIONS

SL NO	REGN. NO.	HABITATION	DATE OF INSTL	DATE OF REMOVAL
	** NUAGAON			
1	13122311302	DIHASAHI	10/04/87	
	** KHELAUR			
2	13122311403	BHOISAHI	08/04/87	
3	13122311404	SANAPADA	08/04/87	
	** JAMUNA JHARAPADA			
4	13122400102	MOJHI SAHI	17/06/86	30/03/87
5	13122400103	TALA SAHI	17/06/86	29/03/87
6	13122400104	TALA SAHI	17/06/86	30/03/87
7	13122400105	NUA SAHI	17/06/86	29/03/87
8	13122400107	BHOISAHI	18/07/86	
9	13122400108	GUDIASAHI	22/11/86	
	** GODIPUT MATIAPADA			
10	13122400203	HARIPUR JENA SAHI	30/05/86	27/03/87
11	13122400204	HARIPUR TALA SAHI	30/05/86	27/03/87
12	13122400205	HARIPUR DOMO SAHI	30/05/86	31/03/87
13	13122400207	BARAPADA	18/07/86	
	** ARAGADA			
14	13122400301	MUDULI SAHI	03/03/86	
15	13122400302	BEHERASAHI	02/07/86	
16	13122400303	GODISAHI	02/07/86	31/08/87
17	13122400304	GODISAHI	28/07/86	30/05/87
	** BANGA			
18	13122400401	JENASAHI	29/05/86	
19	13122400402	HARIJANSAHI	06/07/86	
	** BHANSAR			
20	13122400801	TANGI	02/06/86	05/07/87
21	13122400802	TANGI	29/05/86	
22	13122400803	NIMA BASANTA	25/06/86	
23	13122400804	NIMA BASANTA	18/07/86	
	** RENGAL			
24	13122402602	ICHHAPUR	12/06/86	28/03/87
25	13122402604	TALASAHI	18/07/86	28/03/87
	** ARISOL			
26	13122405501	SHOISAHI	09/04/87	
27	13122405502	GATESWARPUR	09/04/87	17/07/89
	** BRAHMANA TARABOI			
28	13122405502	MUDULI SAHI	10/04/87	
29	13122405504	BHOISAHI	06/04/87	
30	13122405505	MALISAHI	06/04/87	
	** BOLAKANA			
31	13122408503	DOMOSAHI	15/05/86	09/07/87
32	13122408504	TALABANIA	02/05/86	
33	13122408505	PARIDA SAHI	31/05/86	
	** ODATARABOI			
34	13122409102	MALIKSAHI	07/04/87	07/11/89
35	13122409103	JENASAHI	07/04/87	
	** RENCHA			
36	13122409201	MOHANTYSAHI	06/07/87	
37	13122409304	KASIABINDHA	06/07/87	15/07/89
	** JOKANADUA			
38	13122409402	TELISAHI	08/07/87	
	** HUMARA			
39	13122410401	DIANKASAHI	26/05/86	
40	13122410402	MOJHISAHI	26/05/86	
41	13122410404	TALASAHI	26/05/86	
	** MACHHAPADA			
42	13122411003	WARD. 7	31/05/86	

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	DIHASAHI	WELL DEPTH (m)	31.97	TOTAL VISITS	22
VILLAGE	HUAGAON	DT. DRILL COMPL	26/01/86	ROUTINE VISITS	16
G.P.	ARISOL	DT. PUMP INSTALL.	16/04/86	UNFORESEEN VIS	2
BLOCK	DELANG	DT. CONV. TO OTC	10/04/87	OTHER VISITS	4
PUMP NO	13122311302	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	01/05/86		30	0.7		OTHER	INITIAL WATER QUALITY.
2	01/11/86		40	0.15		OTHER	
3	15/04/87	2.85			131	ROUTINE	NO PROBLEM.
4	02/05/87					UNFRSN.	CHAIN DISCONECTION REPAIRED .
5	30/05/87				110	ROUTINE	NO PROBLEM.
6	14/07/87	2.31			127	ROUTINE	NO PROBLEM.
7	28/09/87	2.26			132	ROUTINE	NO PROBLEM.
8	03/12/87	2.27			136	ROUTINE	REPLACED 2 BOLTS, 3 NUTS.
9	24/03/88	2.99			127	ROUTINE	IRON TASTE, TURBIDITY.
10	27/05/88	3.00			112	ROUTINE	IRON TASTE, TURBIDITY.
11	07/07/88				115	ROUTINE	FINE SAND IN WATER.
12	28/09/88	2.15			131	ROUTINE	NO PROBLEM.
13	16/12/88	2.5			125	ROUTINE	NO PROBLEM.
14	18/03/89	4.72	20	0.4	106	ROUTINE	NO PROBLEM.
15	20/04/89					OTHER	RED PARTICLES IN WATER. REPORTED BY SEM.
16	07/05/89					UNFRSN.	RISER PIPES AND CONNECTING RODS CLEANED.
17	09/05/89	5.43	40	2.2	110	ROUTINE	NO PROBLEM.
18	14/08/89	1.90	30	7.5	109	ROUTINE	NO PROBLEM.
19	12/09/89		20	5.8		ROUTINE	
20	19/09/89					OTHER	TURBIDITY AFTER 10 MIN. STORAGE REPORTED BY SEM.
21	09/11/89	2.92	10	1.1	116	ROUTINE	NO PROBLEM.
22	01/12/89	3.24	20	0.3	106	ROUTINE	NO PROBLEM

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	BHOISAHI	WELL DEPTH (m)	40.00	TOTAL VISITS	20
VILLAGE	KHELAUR	DT. DRILL COMPL	30/09/85	ROUTINE VISITS	16
G.P.	ARISOL	DT. PUMP INSTALL.	31/12/85	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	08/04/87	OTHER VISITS	4
PUMP NO	13122311403	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	01/10/85		40	1.7		OTHER	INITIAL WATER QUALITY.
2	01/11/86		20	0.1		OTHER	
3	10/04/87	1.80			147	ROUTINE	NO PROBLEM.
4	28/05/87				131	ROUTINE	NO PROBLEM.
5	07/07/87	1.58			147	ROUTINE	NO PROBLEM.
6	29/09/87	1.38			139	ROUTINE	NO PROBLEM.
7	03/12/87	1.12			129	ROUTINE	REPLACED 3 BOLTS,2 NUTS.
8	29/03/88	1.81			141	ROUTINE	NO PROBLEM.
9	27/05/88	1.31			120	ROUTINE	NO PROBLEM.
10	07/07/88				131	ROUTINE	NO PROBLEM.
11	29/09/88	1.36			140	ROUTINE	NO PROBLEM.
12	16/12/88	1.38			126	ROUTINE	NO PROBLEM.
13	16/03/89	2.84	40	0.4	106	ROUTINE	NO PROBLEM.
14	18/04/89					OTHER	FINE SAND IN WATER. REPORTED BY SEM.
15	08/05/89	3.06	30	2.1	114	ROUTINE	NO PROBLEM.
16	10/08/89	0.83	20	1.60	122	ROUTINE	NO PROBLEM.
17	12/09/89	0.75	20	1.90		OTHER	
18	24/10/89	1.20	30	0.30	101	ROUTINE	NO PROBLEM.
19	09/11/89	1.74	20	0.50	124	ROUTINE	NO PROBLEM.
20	01/12/89	2.12	20	0.10	122	ROUTINE	NO PROBLEM

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DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	SANAPADA	WELL DEPTH (m)	42.00	TOTAL VISITS	21
VILLAGE	KHELAUR	DT. DRILL COMPL	30/09/85	ROUTINE VISITS	16
G.P.	ARISOL	DT. PUMP INSTALL.	29/12/85	UNFORESEEN VIS	1
BLOCK	DELANG	DT. CONV. TO OTC	08/04/87	OTHER VISITS	4
PUMP NO	13122311404	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	01/10/85		40	1.80		OTHER	INITIAL WATER QUALITY.
2	01/11/86		20	0.20		OTHER	
3	10/04/87				138	ROUTINE	NO PROBLEM.
4	13/04/87					UNFRSN.	REPLACED NYLOC NUT & BOLT,2 BEARINGS.
5	28/05/87				127	ROUTINE	NO PROBLEM.
6	07/07/87	1.52			134	ROUTINE	NO PROBLEM.
7	29/09/87	1.48			142	ROUTINE	NO PROBLEM.
8	03/12/87	1.45			135	ROUTINE	REPLACED 2 NUTS & BOLTS.
9	29/03/88	2.05			142	ROUTINE	REPLACED 1 BEARING, 2 NUTS & BOLTS.
10	27/05/88	1.68			119	ROUTINE	NO PROBLEM.
11	04/07/88				119	ROUTINE	NO PROBLEM.
12	28/09/88	1.49			140	ROUTINE	NO PROBLEM.
13	16/12/88	1.82			126	ROUTINE	NO PROBLEM.
14	16/03/89	2.63	30	0.4	107	ROUTINE	NO PROBLEM.
15	19/04/89					OTHER	FINE SAND IN WATER REPORTED BY SEM.
16	09/05/89	3.40	20	1.2	117	ROUTINE	NO PROBLEM.
17	10/08/89	0.95	40	0.3	109	ROUTINE	NO PROBLEM.
18	12/09/89		30	0.6		OTHER	
19	24/10/89	2.13	10	0.3	124	ROUTINE	NO PROBLEM.
20	09/11/89	2.07	20	0.4	124	ROUTINE	NO PROBLEM.
21	01/12/89	2.65	20	0.2	122	ROUTINE	NO PROBLEM

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	MOJHI SAHI	WELL DEPTH (m)	36.60	TOTAL VISITS	7
VILLAGE	JAMUNA JHARAPADA	DT. DRILL COMPL	02/05/86	ROUTINE VISITS	5
G.P.	GODIPUT MATIAPADA	DT. PUMP INSTALL.	17/06/86	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	17/06/86	OTHER VISITS	2
PUMP NO	13122400102	DT. OTC REMOVED	30/03/87		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	02/05/86		30	1.35		OTHER	INITIAL WATER QUALITY
2	19/08/86	1.88			111	ROUTINE	TURBIDITY
3	30/09/86	1.63			117	ROUTINE	NO PROBLEM
4	01/11/86		10	1.7		ROUTINE	
5	09/12/86	3.04			116	ROUTINE	NO PROBLEM
6	31/01/87		10	3.10	105	ROUTINE	TURBIDITY.
7	30/03/87					OTHER	PUMP REMOVED .

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DATA SUMMARY SHEET: IM II-OPEN TOP CYLINDER

HABITATION	TALA SAHI	WELL DEPTH (m)	36.90	TOTAL VISITS	8
VILLAGE	JAMUNA JHARAPADA	DT. DRILL COMPL	29/04/86	ROUTINE VISITS	6
G.P.	GODIPUT MATIAPADA	DT. PUMP INSTALL.	17/06/86	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	17/06/86	OTHER VISITS	2
PUMP NO	13122400103	DT. OTC REMOVED	29/03/87		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS, REMARKS
1	01/05/86		70	0.50		OTHER	INITIAL WATER QUALITY
2	19/08/86	5.20			108	ROUTINE	LEAKAGE
3	30/09/86	4.52			112	ROUTINE	LEAKAGE
4	25/10/86				108	ROUTINE	'O' RING REPLACED
5	01/11/86		70	0.5		ROUTINE	
6	09/12/86	3.02	10	1.2	104	ROUTINE	LEAKAGE, TURBIDITY.
7	31/01/87					ROUTINE	HIGH LEAKAGE, TURBIDITY, 'O' RING REPLACED
8	29/03/87					OTHER	PUMP REMOVED.

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DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	TALA SAHI	WELL DEPTH (m)	34.30	TOTAL VISITS	7
VILLAGE	JAMUNA JHARAPADA	DT. DRILL COMPL	14/05/86	ROUTINE VISITS	5
G.P.	GODIPUT MATIAPADA	DT. PUMP INSTALL.	17/06/86	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	17/06/86	OTHER VISITS	2
PUMP NO	13122400104	DT. OTC REMOVED	30/03/87		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	04/05/86		30	0.7		OTHER	INITIAL WATER QUALITY.
2	19/08/86	2.10				ROUTINE	BREAK DOWN SINCE 15 DAYS AFTER INSTALLATION.
3	30/09/86	2.23			119	ROUTINE	SLIGHT LEAKAGE.
4	01/11/86		30	11.8		ROUTINE	
5	09/12/86	3.02	10	10.1	108	ROUTINE	SLIGHT LEAKAGE, TURBIDITY.
6	31/01/87		20	11.5	108	ROUTINE	HIGH LEAKAGE, LEAKAGE IN PIPE SOCKETS, LOOSE BOTTOM CYLINDER CAP.REPLACED 'O' RING,7 NUTS.
7	30/03/87					OTHER	PUMP REMOVED.

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	NUA SAHI	WELL DEPTH (m)	35.70	TOTAL VISITS	7
VILLAGE	JAMUNA JHARAPADA	DT. DRILL COMPL	02/05/86	ROUTINE VISITS	5
G.P.	GODIPUT MATIAPADA	DT. PUMP INSTALL.	17/06/86	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	17/06/86	OTHER VISITS	2
PUMP NO	13122400105	DT. OTC REMOVED	29/03/87		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	02/05/86		100	2.2		OTHER	INITIAL WATER QUALITY.
2	19/08/86	5.78			128	ROUTINE	NO PROBLEM.
3	30/09/86	2.58			125	ROUTINE	NO PROBLEM.
4	01/11/86		50	5.1		ROUTINE	
5	09/12/86		40	1.9	120	ROUTINE	TURBIDITY, IRON TASTE
6	31/01/87		40	4.55	114	ROUTINE	TURBIDITY, IRON TASTE.
7	29/03/87					OTHER	PUMP REMOVED .

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	BHOISAHI	WELL DEPTH (m)	34.00	TOTAL VISITS	26
VILLAGE	JAMUNA JHARAPADA	DT. DRILL COMPL	19/05/86	ROUTINE VISITS	21
G.P.	GODIPUT MATIAPADA	DT. PUMP INSTALL.	18/07/86	UNFORESEEN VIS	1
BLOCK	DELANG	DT. CONV. TO OTC	18/07/86	OTHER VISITS	4
PUMP NO	13122400107	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	19/05/86		70	1.35		OTHER	INITIAL WATER QUALITY.
2	18/07/86	2.91				ROUTINE	OTC PUMP INSTALLED.
3	18/08/86	3.58			100	ROUTINE	TURBIDITY.
4	30/09/86	4.59			109	ROUTINE	TURBIDITY,SAND.
5	01/11/86		30	1.90		OTHER	
6	01/12/86		30	0.20		OTHER	
7	09/12/86	4.17				UNFRSN.	DEVELOPMENT OF WELL BY COMPRESSOR.
8	30/01/87		50	0.20	91	ROUTINE	NO PROBLEM.
9	01/02/87		40	1.65		OTHER	
10	16/04/87	5.91			123	ROUTINE	LEAKAGE .
11	30/05/87				112	ROUTINE	NO PROBLEM.
12	13/07/87	4.48			116	ROUTINE	NO PROBLEM.
13	29/09/87	4.03			113	ROUTINE	NO PROBLEM.
14	09/12/87	4.91			113	ROUTINE	REPLACED 2 NUTS, 3 BOLTS.
15	28/03/88	5.77			114	ROUTINE	SAND IN WATER. REPLACED 2 NUTS & BOLTS, 1 HANDLE BEARING.
16	26/05/88	5.39			105	ROUTINE	FINE SAND IN WATER.
17	26/07/88				112	ROUTINE	NO PROBLEM.
18	29/09/88	2.80			116	ROUTINE	NO PROBLEM.
19	08/12/88	5.12			112	ROUTINE	NO PROBLEM.
20	29/03/89	6.10	60	0.5	113	ROUTINE	NO PROBLEM.
21	05/05/89	6.25	50	0.5	108	ROUTINE	NO PROBLEM.
22	18/08/89	1.92	50	0.6	116	ROUTINE	NO PROBLEM.
23	28/08/89	2.29	50	0.2		ROUTINE	NO PROBLEM.
24	22/09/89	3.41	50	0.2		ROUTINE	NO PROBLEM.
25	12/11/89	6.30	40	0.2	101	ROUTINE	NO PROBLEM.
26	02/12/89	6.32	50	0.2	91	ROUTINE	NO PROBLEM

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	GUDIASAHI	WELL DEPTH (m)	24.00	TOTAL VISITS	18
VILLAGE	JAMUNA JHARAPADA	DT. DRILL COMPL	11/08/86	ROUTINE VISITS	15
G.P.	GODIPUT MATIAPADA	DT. PUMP INSTALL.	22/11/86	UNFORESEEN VIS	2
BLOCK	DELANG	DT. CONV. TO OTC	22/11/86	OTHER VISITS	1
PUMP NO	13122400108	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M-	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	01/10/86		190	1.45		OTHER	INITIAL WATER QUALITY.
2	01/12/86		90	0.50		ROUTINE	
3	30/05/87				103	ROUTINE	LEAKAGE.
4	13/07/87	4.79			117	ROUTINE	LEAKAGE.
5	29/09/87	3.78			117	ROUTINE	NO PROBLEM.
6	09/12/87	5.38			114	ROUTINE	LEAKAGE.
7	28/03/88	5.90			112	ROUTINE	REPLACED 1 BEARING, 2 NUTS & BOLTS.
8	18/04/88	5.97				UNFRSN.	BELOW GROUND ASSEMBLY REMOVED. REPLACED "O" RING,PIPE SOCKET,2 LEATHER CUP WASHERS.
9	26/05/88	5.39			104	ROUTINE	NO PROBLEM.
10	26/07/88				109	ROUTINE	NO PROBLEM.
11	29/09/88	2.22			112	ROUTINE	NO PROBLEM.
12	02/12/88					UNFRSN.	BREAK DOWN FOR 5 DAYS. SEM WAS UNABLE TO REPAIR SINCE REPLACED CYL.BOTTOM CAP,SS PLUNGER ROD,LOWER VALVE ASSY.,2 NTTRILE CUP WASHERS,2SEALING RINGS. CRACKED UPPER CAP NOT REPLACED.
13	29/03/89	6.05	90	0.8	114	ROUTINE	NO PROBLEM.
14	05/05/89	7.10	90	0.9	114	ROUTINE	NO PROBLEM.
15	12/08/89	3.70	150	0.8	121	ROUTINE	NO PROBLEM.
16	22/09/89	3.52	130	0.70		ROUTINE	
17	12/11/89	6.57	90	0.50	108	ROUTINE	NO PROBLEM.
18	02/12/89	7.65	70	0.3	99	ROUTINE	NO PROBLEM

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	HARIPUR JENA SAHI	WELL DEPTH (m)	38.95	TOTAL VISITS	7
VILLAGE	GODIPUT MATIAPADA	DT. DRILL COMPL	25/03/86	ROUTINE VISITS	5
G.P.	GODIPUT MATIAPADA	DT. PUMP INSTALL.	30/05/86	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	30/05/86	OTHER VISITS	2
PUMP NO	13122400203	DT. OTC REMOVED	27/03/87		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	30/05/86		10	6.90		OTHER	INITIAL WATER QUALITY.
2	14/08/86	1.57			108	ROUTINE	TURBIDITY.
3	25/09/86	1.47			118	ROUTINE	TURBIDITY,IRON TASTE.
4	01/11/86		20	2.5		ROUTINE	
5	08/12/86	3.0	10	4.65	110	ROUTINE	TURBIDITY, IRON TASTE.
6	29/01/87		30	4.10	110	ROUTINE	TURBIDITY, IRON TASTE.
7	27/03/87					OTHER	PUMP REMOVED.

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	HARIPUR TALA SAHI	WELL DEPTH (m)	38.80	TOTAL VISITS	8
VILLAGE	GODIPUT MATIAPADA	DT. DRILL COMPL	23/04/86	ROUTINE VISITS	6
G.P.	GODIPUT MATIAPADA	DT. PUMP INSTALL.	30/05/86	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	30/05/86	OTHER VISITS	2
PUMP NO	13122400204	DT. OTC REMOVED	27/03/87		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	01/06/86		20	2.5		OTHER	INITIAL WATER QUALITY.
2	14/08/86	1.9			105	ROUTINE	TURBIDITY.
3	25/09/86	1.47			115	ROUTINE	TURBIDITY.
4	08/12/86	1.82				ROUTINE	TURBIDITY.
5	29/01/87		290	0.05		ROUTINE	TURBIDITY.
6	01/02/87		30	0.05		ROUTINE	
7	01/03/87		250	0.3		ROUTINE	
8	27/03/87					OTHER	PUMP REMOVED.

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	HARIPUR DOMO SAHI	WELL DEPTH (m)	40.80	TOTAL VISITS	7
VILLAGE	GODIPUT MATIAPADA	DT. DRILL COMPL	13/04/86	ROUTINE VISITS	5
G.P.	GODIPUT MATIAPADA	DT. PUMP INSTALL.	30/05/86	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	30/05/86	OTHER VISITS	2
PUMP NO	13122400205	DT. OTC REMOVED	31/03/87		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	30/05/86		10	1.15		OTHER	INITIAL WATER QUALITY.
2	14/08/86	0.83			104	ROUTINE	NO PROBLEM.
3	25/09/86	0.83			115	ROUTINE	NO PROBLEM.
4	01/11/86		10	1.00		ROUTINE	
5	08/12/86	2.95	10	0.7	110	ROUTINE	
6	29/01/87		20	1.2	115	ROUTINE	TURBIDITY.
7	31/03/87					OTHER	PUMP REMOVED.

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	BARAPADA	WELL DEPTH (m)	20.20	TOTAL VISITS	23
VILLAGE	GODIPUT MATIAPADA	DT. DRILL COMPL	03/05/86	ROUTINE VISITS	22
G.P.	GODIPUT MATIAPADA	DT. PUMP INSTALL.	18/07/86	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	18/07/86	OTHER VISITS	1
PUMP NO	13122400207	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	01/06/86		10	1.40		OTHER	INITIAL WATER QUALITY.
2	18/08/86	1.38			103	ROUTINE	SLIGHT LEAKAGE.
3	30/09/86					ROUTINE	BREAK DOWN, CHAIN BOLT, NYLOC NUT HAD BEEN REMOVED BY THE VILLAGERS.
4	09/10/86	1.35			100	ROUTINE	CHAIN BOLT REPLACED BY VILLAGERS. NO PROBLEM.
5	08/12/86	3.13	20	0.80	99	ROUTINE	NO PROBLEM.
6	29/01/87		10	1.80		ROUTINE	TURBIDITY.
7	16/04/87	5.88			121	ROUTINE	TURBIDITY,DEPLETION.
8	30/05/87				117	ROUTINE	TURBIDITY,DEPLETION.
9	13/07/87	4.06			117	ROUTINE	TURBIDITY,DEPLETION.
10	29/09/87	2.74			121	ROUTINE	TURBIDITY,DEPLETION.
11	09/12/87	3.42			118	ROUTINE	NO PROBLEM.
12	28/03/88	5.52			96	ROUTINE	REPLACED 2 BOLTS AND NUTS,1 BEARING .
13	26/05/88	4.14			75	ROUTINE	TURBIDITY.INTERMITTENT YIELD DUE TO DEPLETION.
14	26/07/88				103	ROUTINE	NO PROBLEM.
15	29/09/88	1.70			108	ROUTINE	NO PROBLEM.
16	08/12/88	4.07			80	ROUTINE	NO PROBLEM.
17	31/03/89	6.10	10	1.50	83	ROUTINE	NO PROBLEM.
18	05/05/89	7.12	20	0.50	92	ROUTINE	NO PROBLEM.
19	12/08/89	0.46	30	5.70		ROUTINE	
20	28/08/89		70	1.60		ROUTINE	
21	22/09/89	1.84	30	3.60		ROUTINE	
22	12/11/89	4.54	10	1.60	85	ROUTINE	NO PROBLEM.
23	02/12/89	4.82	10	0.9	99	ROUTINE	NO PROBLEM

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	MUDULI SAHI	WELL DEPTH (m)	46.00	TOTAL VISITS	22
VILLAGE	ARAGADA	DT. DRILL COMPL	17/04/86	ROUTINE VISITS	21
G.P.	GODIPUT MATIAPADA	DT. PUMP INSTALL.	03/03/86	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	03/03/86	OTHER VISITS	1
PUMP NO	13122400301	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	01/05/86		50	1.35		OTHER	INITIAL WATER QUALITY.
2	14/08/86	3.10			103	ROUTINE	NO PROBLEM.
3	30/09/86	4.25			101	ROUTINE	NO PROBLEM.
4	25/10/86		30	1.20		ROUTINE	REPLACED 'O' RING.
5	09/12/86	3.39			102	ROUTINE	SLIGHT LEAKAGE CONTINUED.
6	30/01/87				99	ROUTINE	LEAKAGE, REMOVED BELOW-GROUND ASSEMBLY. RISER JOINT LOOSE. REPAIRED.REPLACED 1 NUT & BOLT.
7	16/04/87	6.33			119	ROUTINE	NO PROBLEM.
8	30/05/87				117	ROUTINE	SALINE TASTE.
9	13/07/87	5.30			126	ROUTINE	NO PROBLEM.
10	29/09/87	3.88			112	ROUTINE	NO PROBLEM.
11	09/12/87	4.99			115	ROUTINE	SALINE TASTE.
12	28/03/88	6.45			111	ROUTINE	IRON TASTE. REPLACED 1 NUT & BOLT.
13	26/05/88	5.80			104	ROUTINE	IRON TASTE. NOT USED FOR DRINKING.
14	26/07/88				115	ROUTINE	SALINE.
15	29/09/88	2.93			133	ROUTINE	IRON TASTE. NOT USED FOR DRINKING.
16	08/12/88	9.04			106	ROUTINE	
17	29/03/89	9.70	50	2.0	108	ROUTINE	
18	05/05/89	6.89	40	6.4	109	ROUTINE	
19	12/08/89	2.77	30	4.7		ROUTINE	
20	22/09/89	3.29	40	0.3	120	ROUTINE	
21	12/11/89	6.23	40	1.0	116	ROUTINE	
22	23/12/89	1.94	70	1.6	107	ROUTINE	NO PROBLEM

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	BEHERASAHI	WELL DEPTH (m)	42.00	TOTAL VISITS	23
VILLAGE	ARAGADA	DT. DRILL COMPL	08/06/86	ROUTINE VISITS	21
G.P.	GODIPUT MATIAPADA	DT. PUMP INSTALL.	02/07/86	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	02/07/86	OTHER VISITS	2
PUMP NO	13122400302	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	02/07/86		160	1.90		OTHER	INITIAL WATER QUALITY.
2	14/08/86	3.06			103	ROUTINE	TURBID WATER.
3	30/09/86	4.88			108	ROUTINE	NO PROBLEM.
4	01/11/86		40	3.10		ROUTINE	
5	09/12/86	4.49	40	2.05	106	ROUTINE	TURBIDITY AND DEPLETION.
6	30/01/87		60	23.0	107	ROUTINE	DRAIN BROKEN.
7	16/04/87	6.13			135	ROUTINE	NO PROBLEM.
8	30/05/87				117	ROUTINE	NO PROBLEM.
9	13/07/87	5.40			112	ROUTINE	WASTE WATER DISPOSAL PROBLEM.
10	29/09/87	5.13			110	ROUTINE	NO PROBLEM.
11	09/12/87	4.51			112	ROUTINE	REPLACED 2 BOLTS AND 3 NUTS.
12	28/03/88	6.56			113	ROUTINE	NO PROBLEM.
13	26/05/88	6.58			104	ROUTINE	TURBIDITY. NO WATER AFTER 50 STROKES.
14	26/07/88				110	ROUTINE	TURBIDITY.
15	29/09/88	2.50			126	ROUTINE	TURBIDITY IN CONTINUOUS OPERATION.
16	08/12/88	5.70			110	ROUTINE	NO PROBLEM.
17	31/03/89	6.00	40	2.0	110	ROUTINE	NO PROBLEM.
18	23/04/89					OTHER	YIELD REDUCES AFTER 15 BUCKETS. REPORTED BY SEM.
19	09/05/89	6.80	50	2.3	109	ROUTINE	NO PROBLEM.
20	12/08/89	2.57	70	3.2		ROUTINE	NO PROBLEM.
21	22/09/89	2.93	80	2.3	108	ROUTINE	NO PROBLEM.
22	12/11/89	6.05	10	1.90	101	ROUTINE	NO PROBLEM.
23	23/12/89	2.21	30	1.4	107	ROUTINE	NO PROBLEM

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	GODISAHI	WELL DEPTH (m)	44.00	TOTAL VISITS	7
VILLAGE	ARAGADA	DT. DRILL COMPL	16/05/86	ROUTINE VISITS	5
G.P.	GODIPUT MATIAPADA	DT. PUMP INSTALL.	02/07/86	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	02/07/86	OTHER VISITS	2
PUMP NO	13122400303	DT. OTC REMOVED	31/08/87		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	01/06/86		20	1.2		OTHER	INITIAL WATER QUALITY.
2	14/08/86	2.5			121	ROUTINE	NO PROBLEM.
3	25/09/86	0.93			142	ROUTINE	PLATFORM NOT CLEAN
4	01/11/86		10	0.7		ROUTINE	
5	09/12/86	1.5	10	1.5	142	ROUTINE	TURBID WATER.
6	29/01/87		10	4.25	120	ROUTINE	TURBID WATER.
7	31/08/87					OTHER	PUMP REMOVED

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	GODISAHI	WELL DEPTH (m)	34.00	TOTAL VISITS	8
VILLAGE	ARAGADA	DT. DRILL COMPL	10/07/86	ROUTINE VISITS	6
G.P.	GODIPUT MATIAPADA	DT. PUMP INSTALL.	28/07/86	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	28/07/86	OTHER VISITS	2
PUMP NO	13122400304	DT. OTC REMOVED	30/05/87		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	10/07/86		10	0.50		OTHER	INITIAL WATER QUALITY.
2	14/08/86	3.32			106	ROUTINE	NO PROBLEM.
3	25/09/86	1.78			130	ROUTINE	NO PROBLEM.
4	01/11/86		10	3.70		ROUTINE	
5	09/12/86	1.71	10	1.00	125	ROUTINE	NO PROBLEM.
6	29/01/87		10	2.5	118	ROUTINE	TURBID WATER.
7	15/04/87	3.48			131	ROUTINE	TURBID WATER.
8	30/05/87					OTHER	TURBID WATER. PUMP REMOVED.

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	JENASAHI	WELL DEPTH (m)	22.30	TOTAL VISITS	22
VILLAGE	HANGA	DT. DRILL COMPL	26/03/86	ROUTINE VISITS	20
G.P.	SINGBERHAMPUR	DT. PUMP INSTALL.	29/05/86	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	29/05/86	OTHER VISITS	2
PUMP NO	13122400401	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	01/04/86		10	2.25		OTHER	INITIAL WATER QUALITY.
2	16/08/86	3.08			101	ROUTINE	NO PROBLEM.
3	25/09/86	3.35			112	ROUTINE	NO PROBLEM.
4	08/12/86	4.67			101	ROUTINE	NO PROBLEM.
5	29/01/87		10	2.70	104	ROUTINE	NO PROBLEM.
6	16/04/87				118	ROUTINE	TURBIDITY.
7	30/05/87				118	ROUTINE	TURBIDITY.
8	13/07/87	4.57			129	ROUTINE	IRON TASTE. TURBIDITY.
9	29/09/87	4.00			118	ROUTINE	NO PROBLEM.
10	09/12/87	4.38			125	ROUTINE	TURBIDITY. REPLACED 2 BOLTS AND NUTS.
11	28/03/88	5.47			113	ROUTINE	NO PROBLEM.
12	26/05/88	5.78			110	ROUTINE	TURBIDITY.
13	26/07/88				109	ROUTINE	TURBIDITY.
14	29/09/88	3.62	30	3.10	123	ROUTINE	IRON TASTE, ODOUR, TURBIDITY.
15	08/12/88	5.00			106	ROUTINE	NO PROBLEM.
16	31/03/89	5.40	10	2	109	ROUTINE	NO PROBLEM.
17	25/04/89					OTHER	IRON TASTE. BAD ODOUR REPORTED BY SEM.
18	05/05/89	6.45	20	8.60	106	ROUTINE	NO PROBLEM.
19	12/08/89	2.49	40	8.30	108	ROUTINE	NO PROBLEM.
20	22/09/89	3.61	10	3.70		ROUTINE	
21	08/11/89	5.35	20	6.70	93	ROUTINE	NO PROBLEM.
22	02/12/89	5.70	10	1.7	91	ROUTINE	NO PROBLEM

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DATA SUMMARY SHEET: IM II-OPEN TOP CYLINDER

HABITATION	HARIJANSAHI	WELL DEPTH (m)	44.30	TOTAL VISITS	23
VILLAGE	BANGA	DT. DRILL COMPL	31/05/86	ROUTINE VISITS	20
G.P.	SINGBERHAMPUR	DT. PUMP INSTALL.	06/07/86	UNFORESEEN VIS	1
BLOCK	DELANG	DT. CONV. TO OTC	06/07/86	OTHER VISITS	2
PUMP NO	13122400402	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS, REMARKS
1	01/06/86		10	0.50		OTHER	INITIAL WATER QUALITY.
2	16/08/86	3.28			99	ROUTINE	NO PROBLEM.
3	25/09/86	3.38			110	ROUTINE	NO PROBLEM.
4	08/12/86	5.51			108	ROUTINE	NO PROBLEM.
5	29/01/87				104	ROUTINE	NO PROBLEM.
6	16/04/87	6.58			125	ROUTINE	NO PROBLEM.
7	30/05/87				116	ROUTINE	NO PROBLEM.
8	13/07/87	4.70			126	ROUTINE	NO PROBLEM.
9	29/09/87	3.78			125	ROUTINE	NO PROBLEM.
10	09/12/87	4.91			105	ROUTINE	REMOVED PIPES, CONNECTING RODS. REFITTED AFTER CLEANING. NO REPLACEMENT.
11	28/03/88	6.27	220	1.40	114	ROUTINE	REPLACEMENT OF 2 NUTS & BOLTS.
12	26/05/88	5.97			98	ROUTINE	TURBIDITY.
13	26/07/88				98	ROUTINE	TURBIDITY.
14	15/08/88					UNFRSN.	REPLACED "O" RING.
15	29/09/88	2.82	40	19.10	109	ROUTINE	TURBIDITY, RED PARTICLES.
16	09/12/88	5.70			83	ROUTINE	CHAIN NOT FREE, GREASED.
17	31/03/89	6.30	10	1.90	104	ROUTINE	NO PROBLEM.
18	26/04/89					ROUTINE	IRON TASTE. YELLOW PARTICLES REPORTED BY SEM.
19	08/05/89	6.41	20	2.0	91	ROUTINE	NO PROBLEM.
20	12/08/89	1.95	10	9.70		OTHER	
21	22/09/89	3.82	20	3.50	109	ROUTINE	NO PROBLEM.
22	08/11/89	5.81	10	3.00	69	ROUTINE	NO PROBLEM.
23	02/12/89	6.26				ROUTINE	NO WATER IS COMING

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	TANGI	WELL DEPTH (m)	36.60	TOTAL VISITS	10
VILLAGE	BHANSAR	DT. DRILL COMPL	29/03/86	ROUTINE VISITS	7
G.P.	SINGBEHRAMPUR	DT. PUMP INSTALL.	02/06/86	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	02/06/86	OTHER VISITS	3
PUMP NO	13122400801	DT. OTC REMOVED	05/07/87		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	29/03/86		10	2.65		OTHER	INITIAL WATER QUALITY
2	01/05/86		60	1.00		OTHER	
3	16/08/86	4.28			99	ROUTINE	NO PROBLEM.
4	25/09/86	3.63			102	ROUTINE	NO PROBLEM.
5	01/11/86		40	0.35		ROUTINE	
6	08/12/86	4.76			102	ROUTINE	TURBIDITY
7	29/01/87				104	ROUTINE	TURBIDITY
8	16/04/87	4.63			120	ROUTINE	TURBIDITY
9	30/05/87				117	ROUTINE	TURBIDITY
10	05/07/87					OTHER	PUMP REMOVED.

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	TANGI	WELL DEPTH (m)	38.30	TOTAL VISITS	21
VILLAGE	BHANSAR	DT. DRILL COMPL	02/05/86	ROUTINE VISITS	20
G.P.	SINGBERHAMPUR	DT. PUMP INSTALL.	29/05/86	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	29/05/86	OTHER VISITS	1
PUMP NO	13122400802	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	16/08/86	2.73	20	0.60	99	ROUTINE	NO PROBLEM.INITIAL WATER QUALITY.
2	25/09/86	3.08			104	ROUTINE	NO PROBLEM.
3	08/12/86	4.80	10	1.40	108	ROUTINE	TURBIDITY.
4	29/01/87		20	2.40	107	ROUTINE	TURBIDITY.
5	16/04/87	6.18			121	ROUTINE	TURBIDITY.
6	30/05/87				126	ROUTINE	TURBIDITY.
7	13/07/87	4.52			124	ROUTINE	TURBIDITY.IRON TASTE.
8	29/09/87	4.03			116	ROUTINE	TURBIDITY.
9	09/12/87	4.46			126	ROUTINE	TURBIDITY.IRON TASTE.
10	28/03/88	4.77			114	ROUTINE	TURBIDITY.REPLACED 1 NUT & BOLT.
11	26/05/88	7.28			109	ROUTINE	TURBIDITY.NOT USED FOR DRINKING.
12	26/07/88				110	ROUTINE	TURBIDITY.IRON TASTE.NOT USED FOR DRINKING.
13	29/09/88	2.80			118	ROUTINE	NOT USED FOR DRINKING.
14	08/12/88	4.82			120	ROUTINE	NOT USED FOR DRINKING.
15	31/03/89	5.60	20	1.90	117	ROUTINE	NOT USED FOR DRINKING.
16	26/04/89					OTHER	TURBIDITY REPORTED BY SEM.
17	05/05/89	5.84	10	5.80	106	ROUTINE	
18	12/08/89	2.39	20	3.80	109	ROUTINE	
19	22/09/89	3.41	20	2.80		ROUTINE	
20	08/11/89	5.25	10	2.60	101	ROUTINE	
21	02/12/89	5.68	10	2.5	107	ROUTINE	NO PROBLEM

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	NIMA BASANTA	WELL DEPTH (m)	26.50	TOTAL VISITS	22
VILLAGE	BHANSAR	DT. DRILL COMPL	05/05/86	ROUTINE VISITS	20
G.P.	SINGBERHAMPUR	DT. PUMP INSTALL.	25/06/86	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	25/06/86	OTHER VISITS	2
PUMP NO	13122400803	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	01/06/86		40	1.50		OTHER	INITIAL WATER QUALITY.
2	16/08/86	3.48			98	ROUTINE	NO PROBLEM.
3	25/09/86	3.61			102	ROUTINE	NO PROBLEM.
4	08/12/86	5.21	10	0.20	114	ROUTINE	NO PROBLEM.
5	29/01/87				100	ROUTINE	NO PROBLEM.
6	16/04/87	6.93			119	ROUTINE	NO PROBLEM.
7	30/05/87				104	ROUTINE	NO PROBLEM.
8	13/07/87	5.17			121	ROUTINE	NO PROBLEM.
9	29/09/87	4.73			116	ROUTINE	TURBIDITY.
10	09/12/87	5.48			132	ROUTINE	TURBIDITY.REPLACED 1 BOLT & 2 NUTS.
11	28/03/88	6.27			104	ROUTINE	RED PARTICLES IN WATER.
12	26/05/88	6.01			107	ROUTINE	NO PROBLEM.
13	26/07/88				116	ROUTINE	SLIGHT TURBIDITY.
14	29/09/88	2.90			116	ROUTINE	IRON TASTE. RED PARTICLES IN WATER.
15	08/12/88	6.35			112	ROUTINE	NO PROBLEM.
16	31/03/89	6.70	50	0.10	112	ROUTINE	NO PROBLEM.
17	26/04/89					OTHER	YELLOW PARTICLES IN WATER, REPORTED BY SEM.
18	05/05/89	7.46	10	1.90	106	ROUTINE	NO PROBLEM.
19	12/08/89	2.64	30	0.60	105	ROUTINE	NO PROBLEM.
20	22/09/89	4.11	20	0.40		ROUTINE	
21	08/11/89	6.15	10	0.20	101	ROUTINE	NO PROBLEM.
22	02/12/89	7.20	7.02	0.1	107	ROUTINE	NO PROBLEM

DATA SUMMARY SHEET: IM II-OPEN TOP CYLINDER

HABITATION	NIMA BASANTA	WELL DEPTH (m)	26.30	TOTAL VISITS	21
VILLAGE	BHANSAR	DT. DRILL COMPL	25/05/86	ROUTINE VISITS	20
G.P.	SINGBERHAMPUR	DT. PUMP INSTALL.	18/07/86	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	18/07/86	OTHER VISITS	1
PUMP NO	13122400804	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS, REMARKS
1	01/06/86		10	1.40		OTHER	INITIAL WATER QUALITY.
2	16/08/86	3.00			101	ROUTINE	NO PROBLEM.
3	25/09/86	2.90			104	ROUTINE	NO PROBLEM.
4	08/12/86	3.77	50	0.4	116	ROUTINE	FINE SAND.
5	29/01/87		70	0.30	103	ROUTINE	FINE SAND.
6	16/04/87	5.48			115	ROUTINE	FINE SAND.
7	30/05/87				116	ROUTINE	FINE SAND.
8	13/07/87	3.63			125	ROUTINE	FINE SAND.
9	29/09/87	1.53			124	ROUTINE	FINE SAND.
10	09/12/87	3.83			124	ROUTINE	REPLACED 3 BOLTS & 2 NUTS.
11	28/03/88	4.27			112	ROUTINE	REPLACED 1 BEARING.
12	26/05/88	4.80			110	ROUTINE	NO PROBLEM.
13	26/07/88				109	ROUTINE	FINE SAND.
14	29/09/88	2.55			118	ROUTINE	FINE SAND.
15	08/12/88	4.33			114	ROUTINE	NO PROBLEM.
16	31/03/89	5.00	30	0.30	117	ROUTINE	NO PROBLEM.
17	05/05/89	5.94	50	0.20	114	ROUTINE	NO PROBLEM.
18	12/08/89	2.39	20	1.40	106	ROUTINE	NO PROBLEM.
19	22/09/89	3.12	60	0.40		ROUTINE	
20	08/11/89	5.37	40	0.10	108	ROUTINE	NO PROBLEM.
21	02/12/89	4.65	40	0.1	114	ROUTINE	NO PROBLEM

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	ICHHAPUR	WELL DEPTH (m)	49.65	TOTAL VISITS	7
VILLAGE	RENGAL	DT. DRILL COMPL	02/05/86	ROUTINE VISITS	5
G.P.	GODIPUT MATIAPADA	DT. PUMP INSTALL.	12/06/86	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	12/06/86	OTHER VISITS	2
PUMP NO	13122402602	DT. OTC REMOVED	28/03/87		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	02/05/86		20	0.95		OTHER	INITIAL WATER QUALITY
2	18/08/86	1.28			103	ROUTINE	NO PROBLEM.
3	30/09/86	3.68			109	ROUTINE	TURBIDITY.
4	01/11/86		20	13.0		ROUTINE	
5	09/12/86	4.58	10	1.15	103	ROUTINE	TURBIDITY
6	30/01/87		20	3.85	85	ROUTINE	TURBIDITY
7	28/03/87					OTHER	PUMP REMOVED.

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	TALASAHI	WELL DEPTH (m)	48.50	TOTAL VISITS	7
VILLAGE	RENGAL	DT. DRILL COMPL	/ /	ROUTINE VISITS	5
G.P.	GODIPUT MATIAPADA	DT. PUMP INSTALL.	18/07/86	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	18/07/86	OTHER VISITS	2
PUMP NO	13122402604	DT. OTC REMOVED	28/03/87		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	01/06/86		110	0.40		OTHER	INITIAL WATER QUALITY
2	18/08/86	2.82			97	ROUTINE	TURBIDITY. DEPLETION.
3	30/09/86	4.33			109	ROUTINE	NO PROBLEM.
4	01/11/86		30	1.80		ROUTINE	
5	09/12/86	5.00	30	1.05	106	ROUTINE	TURBIDITY
6	30/01/87		40	4.70	95	ROUTINE	TURBIDITY
7	28/03/87					OTHER	PUMP REMOVED.

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	BHOISAHI	WELL DEPTH (m)	32.00	TOTAL VISITS	19
VILLAGE	ARISOL	DT. DRILL COMPL	07/10/85	ROUTINE VISITS	16
G.P.	ARISOL	DT. PUMP INSTALL.	30/11/85	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	09/04/87	OTHER VISITS	3
PUMP NO	13122405501	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	01/11/85		30	2.80		OTHER	INTIAL WATER QUALITY.
2	01/12/86		50	0.70		OTHER	
3	10/04/87				128	ROUTINE	NO PROBLEM.
4	28/05/87				124	ROUTINE	NO PROBLEM.
5	14/07/87	1.29			138	ROUTINE	NO PROBLEM.
6	28/09/87	1.00			150	ROUTINE	NO PROBLEM.
7	03/12/87	1.28			137	ROUTINE	SALINE TASTE. REPLACED 3 BOLTS & 4 NUTS
8	24/03/88	1.92			125	ROUTINE	REPLACED 1 NUT AND BOLT.
9	27/05/88	1.88			120	ROUTINE	NO PROBLEM.
10	07/07/88				118	ROUTINE	NO PROBLEM.
11	28/09/88	1.05			148	ROUTINE	NO PROBLEM.
12	16/12/88				130	ROUTINE	NO PROBLEM.
13	16/03/89	3.15	30.0	0.40	99	ROUTINE	NO PROBLEM.
14	20/04/89					OTHER	PRESENCE OF WHITE PARTICLES/REPORTED BY SEM
15	09/05/89	3.23	30	1.70	120	ROUTINE	NO PROBLEM
16	14/08/89	1.15	40	2.70	104	ROUTINE	NO PROBLEM
17	12/09/89		30	2.60		ROUTINE	
18	09/11/89		40	1.60	124	ROUTINE	NO PROBLEM.
19	01/12/89		20	0.2	122	ROUTINE	NO PROBLEM

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	GATESWARPUR	WELL DEPTH (m)	36.00	TOTAL VISITS	15
VILLAGE	ARISOL	DT. DRILL COMPL	02/10/85	ROUTINE VISITS	13
G.P.	ARISOL	DT. PUMP INSTALL.	12/12/85	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	09/04/87	OTHER VISITS	2
PUMP NO	13122405502	DT. OTC REMOVED	17/07/89		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	03/12/85		40	1.50		OTHER	INTIAL WATER QUALITY.
2	01/12/86		30	0.8		ROUTINE	
3	10/04/87				135	ROUTINE	NO PROBLEM.
4	28/05/87				120	ROUTINE	NO PROBLEM.
5	14/07/87	1.59			139	ROUTINE	NO PROBLEM.
6	28/09/87	1.50			165	ROUTINE	NO PROBLEM.
7	03/12/87	1.83			135	ROUTINE	REPLACED 2 BOLTS, 3 NUTS.
8	24/03/88	2.28			127	ROUTINE	NO PROBLEM.
9	27/05/88	1.76			122	ROUTINE	NO PROBLEM.
10	07/07/88				119	ROUTINE	NO PROBLEM.
11	28/09/88	1.53			140	ROUTINE	NO PROBLEM.
12	10/12/88	2.00			109	ROUTINE	NO PROBLEM.
13	16/03/89	3.24	30	2.70	114	ROUTINE	NO PROBLEM.
14	08/05/89	4.35	40	2.40	117	ROUTINE	NO PROBLEM.
15	17/07/89					OTHER	WELL DEVELOPED,CLEANED FOR CONVERSION TO PVC RISER PIPES. OTC PUMP REMOVED.

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	MUDULI SAHI	WELL DEPTH (m)	36.00	TOTAL VISITS	21
VILLAGE	BRAHMANA TARABOI	DT. DRILL COMPL	11/10/85	ROUTINE VISITS	16
G.P.	ARISOL	DT. PUMP INSTALL.	09/11/85	UNFORESEEN VIS	1
BLOCK	DELANG	DT. CONV. TO OTC	10/04/87	OTHER VISITS	4
PUMP NO	13122405602	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	01/11/85		30	0.20		OTHER	INITIAL WATER QUALITY.
2	01/11/86		20.0	0.20		OTHER	
3	10/04/87	1.20			157	ROUTINE	NO PROBLEM.
4	19/04/87					UNFRSN.	REPLACED 1 BOLT ,8 NUTS.
5	28/05/87				120	ROUTINE	NO PROBLEM.
6	07/07/87	1.75			128	ROUTINE	NO PROBLEM.
7	28/09/87	1.80			142	ROUTINE	NO PROBLEM.
8	03/12/87				126	ROUTINE	RED PARTICLES IN WATER.
9	24/03/88				127	ROUTINE	NO PROBLEM.
10	27/05/88	1.37			115	ROUTINE	NO PROBLEM.
11	07/07/88				116	ROUTINE	RED PARTICLES IN WATER.
12	28/09/88	1.76			142	ROUTINE	NO PROBLEM.
13	25/11/88	1.13	40	2.2	122	ROUTINE	NO PROBLEM.
14	16/03/89	1.70	30	0.8	93	ROUTINE	NO PROBLEM.
15	21/04/89					OTHER	SLIGHT TURBIDITY REPORTED BY SEM.
16	09/05/89	3.04	500	1.6	113	ROUTINE	NO PROBLEM.
17	14/08/89	0.71	40	1.10	118	ROUTINE	NO PROBLEM.
18	24/10/89	1.05	30	1.30	124	ROUTINE	NO PROBLEM.
19	09/11/89	2.05	40	0.70	108	ROUTINE	NO PROBLEM.
20	22/11/89					OTHER	REPLACED 2 BOLTS & NUTS.
21	01/12/89	2.14	30	0.2	122	ROUTINE	NO PROBLEM

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	BHOISAEI	WELL DEPTH (m)	35.00	TOTAL VISITS	19
VILLAGE	BRAHMANA TARABOI	DT. DRILL COMPL	30/09/85	ROUTINE VISITS	16
G.P.	ARISOL	DT. PUMP INSTALL.	12/12/85	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	06/04/87	OTHER VISITS	3
PUMP NO	13122405604	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	01/10/85		80	1.2		OTHER	INTIAL WATER QUALITY.
2	01/11/86		200	0.85		OTHER	
3	01/12/86		30	0.10		OTHER	
4	10/04/87	1.28			163	ROUTINE	NO PROBLEM.
5	28/05/87				126	ROUTINE	NO PROBLEM.
6	07/07/87	1.08			156	ROUTINE	NO PROBLEM.
7	28/09/87	0.93			183	ROUTINE	NO PROBLEM.
8	03/12/87	0.77			134	ROUTINE	REPLACED 2 BOLTS,3 NUTS.
9	24/03/88	0.99			160	ROUTINE	NO PROBLEM.
10	27/05/88	0.73			121	ROUTINE	NO PROBLEM.
11	07/07/88				134	ROUTINE	NO PROBLEM.
12	28/09/88	0.89			164	ROUTINE	NO PROBLEM.
13	25/11/88	0.47	40	19.1	141	ROUTINE	NO PROBLEM.
14	16/03/89	2.37	30	0.3	103	ROUTINE	NO PROBLEM.
15	09/05/89	2.45	30	1.9	120	ROUTINE	NO PROBLEM.
16	14/08/89	0.20	40	3.0	124	ROUTINE	NO PROBLEM.
17	24/10/89	0.46	30.0	6.7	108	ROUTINE	NO PROBLEM.
18	09/11/89	1.01	30.0	1.7	124	ROUTINE	NO PROBLEM.
19	01/12/89	1.45	20	0.3	130	ROUTINE	NO PROBLEM

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	MALISAHI	WELL DEPTH (m)	36.00	TOTAL VISITS	18
VILLAGE	BRAHMANA TARABOI	DT. DRILL COMPL	02/10/85	ROUTINE VISITS	16
G.P.	ARISOL	DT. PUMP INSTALL.	22/12/85	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	06/04/87	OTHER VISITS	2
PUMP NO	13122405605	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	01/11/85		40.0	0.10		OTHER	INITIAL WATER QUALITY.
2	01/12/86		30.0	0.1		OTHER	
3	10/04/87	1.98			141	ROUTINE	NO PROBLEM
4	28/05/87				130	ROUTINE	NO PROBLEM
5	07/07/87	1.93			131	ROUTINE	NO PROBLEM
6	28/09/87	1.54			145	ROUTINE	FINE SAND IN WATER.
7	03/12/87	1.47			135	ROUTINE	REPLACED 2 BOLTS,3 NUTS.
8	24/03/88	1.57			127	ROUTINE	TURBIDITY
9	27/05/88	1.95			110	ROUTINE	NO PROBLEM
10	07/07/88				123	ROUTINE	NO PROBLEM
11	28/09/88	1.51			134	ROUTINE	FINE SAND IN WATER.
12	25/11/88	1.32	40	0.3	122	ROUTINE	NO PROBLEM.
13	18/03/89	2.82	110	0.1	108	ROUTINE	NO PROBLEM.
14	09/05/89	3.23	40	1.6	120	ROUTINE	NO PROBLEM.
15	14/08/89	0.97	40	0.2	114	ROUTINE	NO PROBLEM.
16	24/10/89	1.18	40	0.3	124	ROUTINE	NO PROBLEM.
17	09/11/89	1.86	30	0.1	108	ROUTINE	NO PROBLEM.
18	01/12/89	2.27	30	0.1	114	ROUTINE	NO PROBLEM

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	DOMOSAHI	WELL DEPTH (m)	32.30	TOTAL VISITS	8
VILLAGE	BOLAKANA	DT. DRILL COMPL	19/04/86	ROUTINE VISITS	7
G.P.	GUALIPADA	DT. PUMP INSTALL.	15/05/86	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	15/05/86	OTHER VISITS	1
POMP NO	13122408503	DT. OTC REMOVED	09/07/87		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	19/04/86		580	0.8		OTHER	INITIAL WATER QUALITY
2	11/08/86	0.98			119	ROUTINE	SALINE WATER
3	20/09/86	1.09			141	ROUTINE	SALINE WATER
4	04/12/86	1.67			140	ROUTINE	SALINE WATER
5	23/01/87				114	ROUTINE	SALINE WATER
6	09/04/87	2.37			140	ROUTINE	SALINE WATER
7	29/05/87				132	ROUTINE	SALINE WATER
8	09/07/87	2.22			133	ROUTINE	SALINE WATER.PUMP REMOVED.

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	TALABANIA	WELL DEPTH (m)	32.40	TOTAL VISITS	20
VILLAGE	BOLAKANA	DT. DRILL COMPL	24/04/86	ROUTINE VISITS	18
G.P.	GUALIPADA	DT. PUMP INSTALL.	02/05/86	UNFORESEEN VIS	1
BLOCK	DELANG	DT. CONV. TO OTC	02/05/86	OTHER VISITS	1
PUMP NO	13122408504	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	02/05/86		370	0.90		OTHER	INITIAL WATER QUALITY.
2	11/08/86	1.58			107	ROUTINE	NO PROBLEM.
3	20/09/86	1.52			124	ROUTINE	NO PROBLEM.
4	04/12/86	1.50			126	ROUTINE	NO PROBLEM.
5	23/01/87		210	0.20	114	ROUTINE	WHITE PARTICLES.
6	09/04/87	2.98			134	ROUTINE	WHITE PARTICLES.
7	29/05/87				125	ROUTINE	NO PROBLEM.
8	09/07/87	2.92			120	ROUTINE	SALINITY,WASTE WATER DISPOSAL PROBLEM.
9	28/09/87	1.49			150	ROUTINE	
10	05/12/87	1.73			142	ROUTINE	REPLACED 3 NUTS & BOLTS.
11	23/03/88	2.51			115	ROUTINE	NO PROBLEM.
12	21/05/88	2.07			121	ROUTINE	NO PROBLEM.
13	07/07/88				121	ROUTINE	NO PROBLEM.
14	17/08/88					UNFRSN.	REPLACED INSPECTION COVER, 4 WASHER.
15	17/09/88	1.40			134	ROUTINE	NO PROBLEM.
16	10/12/88	1.95			114	ROUTINE	
17	18/03/89	3.04	330	0.4	120	ROUTINE	NO PROBLEM.
18	23/09/89	1.53	340	0.3		ROUTINE	
19	07/11/89	2.06			124	ROUTINE	NO PROBLEM.
20	22/12/89	2.30	330	0.6	107	ROUTINE	NO PROBLEM

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	PARIDA SAHI	WELL DEPTH (m)	32.31	TOTAL VISITS	22
VILLAGE	BOLARANA	DT. DRILL COMPL	07/05/86	ROUTINE VISITS	17
G.P.	GDALIPADA	DT. PUMP INSTALL.	31/05/86	UNFORESEEN VIS	4
BLOCK	DELANG	DT. CONV. TO OTC	31/05/86	OTHER VISITS	1
PUMP NO	13122408505	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	01/06/86		540	0.20		OTHER	INITIAL WATER QUALITY.
2	11/08/86	2.50			101	ROUTINE	NO PROBLEM.
3	20/09/86	2.60			110	ROUTINE	NO PROBLEM.
4	04/12/86	2.76			110	ROUTINE	NO PROBLEM.
5	23/01/87		570	0.6	106	ROUTINE	NO PROBLEM.
6	09/04/87	3.95			125	ROUTINE	NO PROBLEM.
7	29/05/87					ROUTINE	TURBID WATER.
8	09/07/87	3.80				ROUTINE	NO PROBLEM.
9	28/09/87	2.34			126	ROUTINE	NO PROBLEM.
10	05/12/87	2.56			127	ROUTINE	REPLACED 2 BOLTS & AND 3 NUTS.
11	19/12/87					UNFRSN.	REPLACED INSPECTION COVER.
12	23/03/88	3.33			118	ROUTINE	NO PROBLEM.
13	21/05/88	2.50			107	ROUTINE	NO PROBLEM.
14	07/07/88				108	ROUTINE	TURBIDITY.
15	19/08/88					UNFRSN.	REPLACED 2 CONNECTING RODS.
16	17/09/88	2.10			118	ROUTINE	TURBID WATER.
17	10/12/88	2.86			109	ROUTINE	NO PROBLEM.
18	17/03/89	3.82	590	0.90	106	ROUTINE	NO PROBLEM.
19	16/08/89	2.05	920	0.30		UNFRSN.	BREAK DOWN.
20	17/08/89					UNFRSN.	BELOW GROUND ASSY. REMOVED.STONE AT LOWER VALVE DAMAGED 'O'RING. BOTTOM RISER PIPE CORRODED. REPLACED 1 RISER PIPE,SS PLUNGER ROD, 2 LEATHER CUP WASHERS, 'O' RING, 1 CONNECTING ROD, 2 BOLTS, 3 NUTS.
21	23/09/89		990	0.4		ROUTINE	
22	07/11/89	2.81			93	ROUTINE	NO PROBLEM.

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	MALIKSAHI	WELL DEPTH (m)	34.00	TOTAL VISITS	19
VILLAGE	ODATARABOI	DT. DRILL COMPL	30/11/85	ROUTINE VISITS	16
G.P.	BERBOI	DT. PUMP INSTALL.	22/12/85	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	07/04/87	OTHER VISITS	3
PUMP NO	13122409102	DT. OTC REMOVED	07/11/89		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	01/12/85		60	0.50		OTHER	INITIAL WATER QUALITY.
2	01/05/86		40	0.10		OTHER	
3	10/04/87	1.31			145	ROUTINE	NO PROBLEM
4	28/05/87				128	ROUTINE	SLIGHT TURBIDITY.
5	07/07/87	1.48			132	ROUTINE	SLIGHT TURBIDITY.
6	28/09/87	1.94			145	ROUTINE	SLIGHT TURBIDITY.
7	03/12/87	1.02			139	ROUTINE	SLIGHT TURBIDITY.REPLACED 3 BOLTS, 2 NUTS.
8	24/03/88	1.57			134	ROUTINE	IRON TASTE.
9	27/05/88	1.08			121	ROUTINE	SLIGHT TURBIDITY.
10	07/07/88				129	ROUTINE	SLIGHT TURBIDITY.
11	28/09/88	1.9			136	ROUTINE	NO PROBLEM.
12	25/11/88	0.42	50	2.1	114	ROUTINE	NO PROBLEM.
13	01/01/89		50	1.7		ROUTINE	
14	02/03/89	2.20	40	2.60	100	ROUTINE	NO PROBLEM
15	24/04/89					OTHER	FINE SAND IN WATER.REPORTED BY SEM.
16	08/05/89	2.76	30	1.2	113	ROUTINE	NO PROBLEM.
17	14/08/89	0.51	50	7.5	117	ROUTINE	NO PROBLEM.
18	29/10/89	0.66	40	1.4	124	ROUTINE	NO PROBLEM.
19	07/11/89					ROUTINE	WELL DEVELOPED AND CLEANED FOR PVC RISER INSTALLATION .OTC PUMP REMOVED.

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	JENASAHI	WELL DEPTH (m)	34.00	TOTAL VISITS	18
VILLAGE	ODATARABOI	DT. DRILL COMPL	05/11/85	ROUTINE VISITS	16
G.P.	BERBOI	DT. PUMP INSTALL.	11/03/86	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	07/04/87	OTHER VISITS	2
PUMP NO	13122409103	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M.	WATER QUALITY mg/lit Cl	WATER QUALITY mg/lit Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	01/04/86		30	0.3		OTHER	INITIAL WATER QUALITY.
2	01/05/86		30	1.85		OTHER	
3	10/04/87	1.92			136	ROUTINE	SLIGHT TURBIDITY.
4	28/05/87				131	ROUTINE	SLIGHT TURBIDITY.
5	07/07/87	2.15			132	ROUTINE	SLIGHT TURBIDITY.
6	28/09/87	1.70			138	ROUTINE	SLIGHT TURBIDITY.
7	03/12/87	1.49			126	ROUTINE	SLIGHT TURBIDITY.
8	24/03/88	1.74			127	ROUTINE	NO PROBLEM.
9	27/05/88	1.61			108	ROUTINE	NO PROBLEM.
10	07/07/88				108	ROUTINE	NO PROBLEM.
11	28/09/88	1.67			123	ROUTINE	NO PROBLEM.
12	25/11/88	1.29	50	0.6	112	ROUTINE	NO PROBLEM.
13	02/03/89	2.57	40	0.8	106	ROUTINE	NO PROBLEM.
14	09/05/89	3.20	40	2.6	114	ROUTINE	NO PROBLEM.
15	16/09/89	1.08	60	0.8	117	ROUTINE	NO PROBLEM.
16	24/10/89	1.13	40	0.9	108	ROUTINE	NO PROBLEM.
17	09/11/89	1.87	40	1.2	108	ROUTINE	NO PROBLEM.
18	01/12/89	2.29	30	0.2	114	ROUTINE	NO PROBLEM

DATA SUMMARY SHEET: IM II-OPEN TOP CYLINDER

HABITATION	MOHANTYSAHI	WELL DEPTH (m)	40.00	TOTAL VISITS	19
VILLAGE	RENCHA	DT. DRILL COMPL	18/11/85	ROUTINE VISITS	14
G.P.	BERBOI	DT. PUMP INSTALL.	15/12/85	UNFORESEEN VIS	3
BLOCK	DELANG	DT. CONV. TO OTC	06/07/87	OTHER VISITS	2
PUMP NO	13122409301	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS, REMARKS
1	15/12/85		400.	0.1		OTHER	INITIAL WATER QUALITY.
2	15/07/87	1.60			128	ROUTINE	NO PROBLEM.
3	29/09/87	2.08			160	ROUTINE	NO PROBLEM.
4	02/12/87	1.60			144	ROUTINE	REPLACED 3 BOLTS & NUTS.
5	29/03/88	1.55			134	ROUTINE	REPLACED 6 NUTS.
6	25/05/88	1.92			128	ROUTINE	NO PROBLEM
7	04/07/88				129	ROUTINE	NO PROBLEM
8	21/08/88					UNFRSN.	WASHED WELL WITH BLEACHING POWDER.
9	14/09/88	1.98	30	0.4	148	ROUTINE	NO PROBLEM.
10	08/11/88		310	0.20		UNFRSN.	RISER PIPE CLEANED.
11	24/11/88	1.67			122	ROUTINE	NO PROBLEM.
12	02/03/89	2.82	300	2.7	112	ROUTINE	NO PROBLEM.
13	04/05/89	3.37	320	2.30	114	ROUTINE	NO PROBLEM.
14	02/08/89					UNFRSN.	BELOW GROUND ASSEMBLY REMOVED. RISER PIPES, CONNECTING RODS, CYLINDER CLEANED. REPLACED 2 LEATHER SEALING RINGS, SS PLUNGER ROD, 4 NUTS & BOLTS. UNSATISFACTORY TASTE IN WATER.
15	10/08/89	1.42	300	3.3	108	ROUTINE	NO PROBLEM
16	12/09/89	1.32	310	4.6		ROUTINE	
17	22/09/89					OTHER	WATER TURNS YELLOW DURING STORAGE, REPORTED BY SEM.
18	07/11/89	1.57			108	ROUTINE	NO PROBLEM.
19	06/12/89	2.61	310	1.9	107	ROUTINE	NO PROBLEM

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	KASIABINDHA	WELL DEPTH (m)	36.00	TOTAL VISITS	15
VILLAGE	RENCHA	DT. DRILL COMPL	26/11/85	ROUTINE VISITS	11
G.P.	BERBOI	DT. PUMP INSTALL.	02/01/86	UNFORESEEN VIS	1
BLOCK	DELANG	DT. CONV. TO OTC	06/07/87	OTHER VISITS	3
PUMP NO	13122409304	DT. OTC REMOVED	15/07/89		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	01/12/85		320	0.80		OTHER	INITIAL WATER QUALITY.
2	01/01/87		300	0.20		OTHER	
3	14/07/87	1.41			129	ROUTINE	REPLACED "O" RING.
4	29/09/87	1.23			134	ROUTINE	NO PROBLEM.
5	02/12/87	1.10			150	ROUTINE	NO PROBLEM.
6	21/03/88	1.40			140	ROUTINE	NO PROBLEM.
7	25/05/88	1.40			142	ROUTINE	NO PROBLEM.
8	04/07/88	1.40			142	ROUTINE	NO PROBLEM.
9	04/07/88				132	ROUTINE	NO PROBLEM.
10	31/07/88					UNFRSN.	WASHED THE CONNECTING ROD AND PLUNGER ASSEMBLY.
11	14/09/88	0.88			142	ROUTINE	NO PROBLEM.
12	24/11/88		300	2.30	117	ROUTINE	NO PROBLEM.
13	02/03/89	2.23	300	2.60	105	ROUTINE	NO PROBLEM.
14	04/05/89	2.84	300	2.80	114	ROUTINE	NO PROBLEM.
15	15/07/89					OTHER	WELL DEVELOPED, CLEANED FOR CONVERSION TO PVC RISER PIPES,OTC PUMP REMOVED.

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	TELISAHI	WELL DEPTH (m)	36.00	TOTAL VISITS	17
VILLAGE	JOKANADDA	DT. DRILL COMPL	25/11/85	ROUTINE VISITS	14
G.P.	BERBOI	DT. PUMP INSTALL.	10/02/86	UNFORESEEN VIS	1
BLOCK	DELANG	DT. CONV. TO OTC	08/07/87	OTHER VISITS	2
PUMP NO	13122409402	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	01/12/85		30	0.8		OTHER	INITIAL WATER QUALITY.
2	01/01/87		30	0.1		ROUTINE	
3	15/07/87	1.20			140	ROUTINE	NO PROBLEM.
4	29/09/87	0.68			139	ROUTINE	NO PROBLEM.
5	02/12/87	0.90			165	ROUTINE	NO PROBLEM.
6	21/03/88	1.33			158	ROUTINE	NO PROBLEM.
7	25/05/88	1.08			145	ROUTINE	NO PROBLEM.
8	04/07/88				151	ROUTINE	NO PROBLEM.
9	14/09/88	0.55			163	ROUTINE	NO PROBLEM.
10	24/11/88	0.68	70	2.6	131	ROUTINE	NO PROBLEM.
11	21/02/89					UNPRSN.	REPLACED INSPECTION COVERBOLT & WASHER.
12	02/03/89	2.03	30	1.1	105	ROUTINE	NO PROBLEM.
13	04/05/89	2.53	40	1.0	120	ROUTINE	NO PROBLEM.
14	10/08/89	0.51	40	0.3	114	ROUTINE	NO PROBLEM.
15	12/09/89		30	1.20		OTHER	
16	02/12/89				107	ROUTINE	NO PROBLEM
17	23/12/89		30	0.2		ROUTINE	

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	DIANKASAHI	WELL DEPTH (m)	17.98	TOTAL VISITS	23
VILLAGE	HUMARA	DT. DRILL COMPL	13/01/86	ROUTINE VISITS	21
G.P.	GUALIPADA	DT. PUMP INSTALL.	26/05/86	UNFORESEEN VIS	1
BLOCK	DELANG	DT. CONV. TO OTC	26/05/86	OTHER VISITS	1
PUMP NO	13122410401	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	13/01/86		50	0.15		OTHER	INITIAL WATER QUALITY.
2	06/08/86	0.6			112	ROUTINE	NO PROBLEM.
3	22/09/86	0.36			125	ROUTINE	NO PROBLEM.
4	04/10/86					UNFRSN.	REPLACED 1 BOLT & NUT.
5	04/12/86	1.26			123	ROUTINE	NO PROBLEM.
6	23/01/87				108	ROUTINE	NO PROBLEM.
7	13/04/87	1.96			125	ROUTINE	REPLACED 1 BEARING.
8	29/05/87				114	ROUTINE	NO PROBLEM.
9	07/07/87	2.60			111	ROUTINE	NO PROBLEM.
10	28/09/87	0.39			141	ROUTINE	NO PROBLEM.
11	02/12/87	0.32			142	ROUTINE	REPLACED 2 BOLTS & NUTS.
12	01/01/88		50	0.20		ROUTINE	
13	21/03/88	1.30			127	ROUTINE	FINE SAND.
14	21/05/88	1.78	50	0.15	122	ROUTINE	NO PROBLEM.
15	04/07/88				108	ROUTINE	NO PROBLEM.
16	14/09/88	1.50			132	ROUTINE	NO PROBLEM.
17	24/11/88	0.63			121	ROUTINE	NO PROBLEM.
18	29/01/89	1.15			114	ROUTINE	NO PROBLEM.
19	03/04/89	2.10	50	0.10	106	ROUTINE	NO PROBLEM.
20	15/08/89	0.40	40	1.30	116	ROUTINE	NO PROBLEM.
21	23/09/89	1.54	40	1.54		ROUTINE	
22	07/11/89	1.13			116	ROUTINE	NO PROBLEM.
	22/12/89	1.26	40	0.1	99	ROUTINE	NO PROBLEM

DATA SUMMARY SHEET:IN II-OPEN TOP CYLINDER

HABITATION	MOJHISAHI	WELL DEPTH (m)	16.10	TOTAL VISITS	25
VILLAGE	HUMARA	DT. DRILL COMPL	11/01/86	ROUTINE VISITS	19
G.P.	GUALIPADA	DT. PUMP INSTALL.	26/05/86	UNFORESEEN VIS	3
BLOCK	DELANG	DT. CONV. TO OTC	26/05/86	OTHER VISITS	3
PUMP NO	13122410402	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	01/01/86		150	3.20		OTHER	INITIAL WATER QUALITY.
2	01/05/86		40	0.60		OTHER	
3	06/08/86	1.60			101	ROUTINE	NO PROBLEM.
4	22/09/86	1.61			101	ROUTINE	NO PROBLEM.
5	04/12/86	1.93			105	ROUTINE	REPLACED 1 NUT.
6	23/01/87				102	ROUTINE	NO PROBLEM.
7	13/04/87	2.66			127	ROUTINE	NO PROBLEM.
8	29/05/87				122	ROUTINE	NO PROBLEM.
9	07/07/87	1.58			125	ROUTINE	NO PROBLEM.
10	28/09/87	1.72			131	ROUTINE	NO PROBLEM.
11	09/12/87	1.83			140	ROUTINE	NO PROBLEM.
12	21/03/88	1.22			141	ROUTINE	NO PROBLEM.
13	21/05/88	0.81			113	ROUTINE	NO PROBLEM.
14	04/07/88				123	ROUTINE	NO PROBLEM.
15	14/09/88	0.70			135	ROUTINE	NO PROBLEM.
16	30/09/88					UNFRSN.	BREAK DOWN. CHAIN DISCONNECTED. REPAIRED.
17	24/11/88	1.71			121	ROUTINE	NO PROBLEM.
18	29/01/89	2.40			109	ROUTINE	NO PROBLEM.
19	03/04/89	3.20			106	ROUTINE	NO PROBLEM.
20	15/08/89	1.41			109	ROUTINE	NO PROBLEM.
21	28/08/89					UNFRSN.	POOR PERFORMANCE. BELOW-GROUND ASSY.REMOVED. REPLACED SS PLUNGER ROD,2 LEATHER CUP WASHERS,'O'RING.
22	22/09/89					UNFRSN.	BREAKDOWN.CONNECTING ROD DISCONNECTED. BELOW-GROUND ASSY.REMOVED. RISER PIPES CLEANED. REPLACED 3 CONNECTING RODS.
23	27/10/89					OTHER	REPLACED INSPECTION COVER BOLT.
24	07/11/89	2.62			85	ROUTINE	NO PROBLEM.
25	22/12/89	2.32	30	0.1	99	ROUTINE	NO PROBLEM

DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	TALASAHI	WELL DEPTH (m)	35.95	TOTAL VISITS	23
VILLAGE	HUMARA	DT. DRILL COMPL	08/01/86	ROUTINE VISITS	21
G.P.	GUALIPADA	DT. PUMP INSTALL.	26/05/86	UNFORESEEN VIS	0
BLOCK	DELANG	DT. CONV. TO OTC	26/05/86	OTHER VISITS	2
PUMP NO	13122410404	DT. OTC REMOVED	Not removed		

SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	01/01/86		170	2.00		OTHER	INITIAL WATER QUALITY.
2	01/05/86		50	0.90		OTHER	
3	06/08/86	1.83			135	ROUTINE	NO PROBLEM.
4	22/09/86	0.55			158	ROUTINE	NO PROBLEM.
5	04/12/86	0.57			163	ROUTINE	NO PROBLEM.
6	23/01/87				143	ROUTINE	NO PROBLEM.
7	13/04/87				151	ROUTINE	NO PROBLEM.
8	29/05/87				137	ROUTINE	NO PROBLEM.
9	07/07/87	1.20			148	ROUTINE	NO PROBLEM.
10	28/09/87	0.36			189	ROUTINE	NO PROBLEM.
11	02/12/87	0.47			171	ROUTINE	REPLACED 3 BOLTS,2 NUTS.
12	21/03/88	1.33			143	ROUTINE	NO PROBLEM.
13	21/05/88	0.86			144	ROUTINE	NO PROBLEM.
14	04/07/88				127	ROUTINE	NO PROBLEM.
15	14/09/88	0.10			183	ROUTINE	NO PROBLEM.
16	24/11/88	0.38			163	ROUTINE	NO PROBLEM.
17	29/01/89	0.30			160	ROUTINE	NO PROBLEM.
18	03/04/89	1.80	40	0.10	106	ROUTINE	NO PROBLEM.
19	15/08/89	0.40	50	0.10	113	ROUTINE	NO PROBLEM.
20	23/09/89		30	0.20		ROUTINE	NO PROBLEM.
21	24/10/89	2.13			116	ROUTINE	NO PROBLEM.
22	07/11/89	0.39			132	ROUTINE	NO PROBLEM.
23	22/12/89	0.94	40	0.1	114	ROUTINE	NO PROBLEM

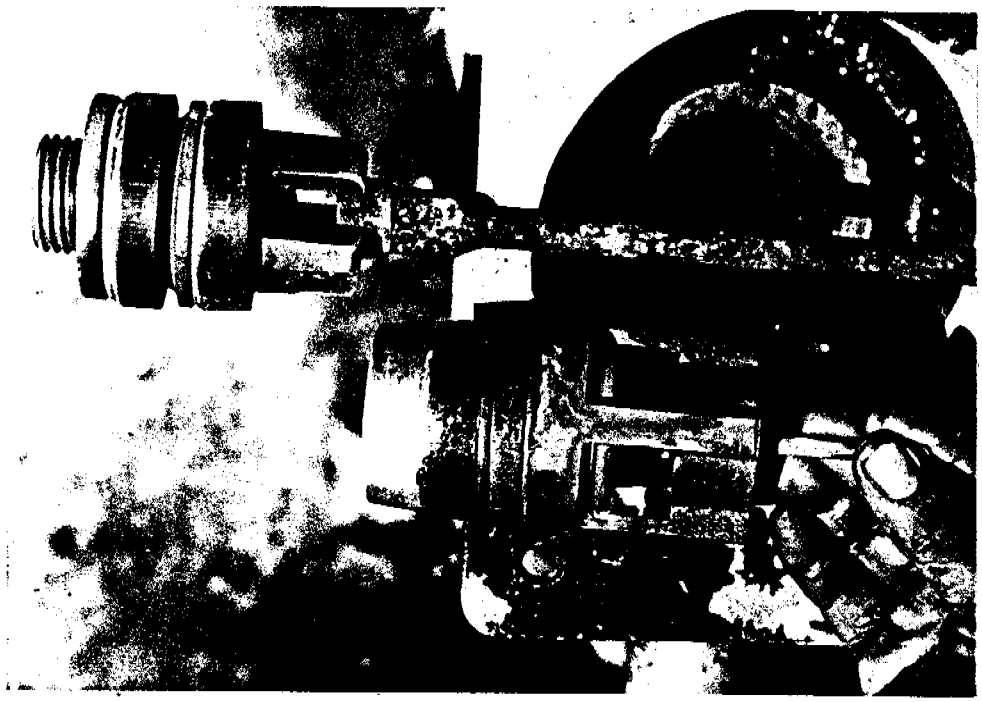
DATA SUMMARY SHEET:IM II-OPEN TOP CYLINDER

HABITATION	WARD. 7	WELL DEPTH (m)	17.90	TOTAL VISITS	24
VILLAGE	MACHHAPADA	DT. DRILL COMPL	06/05/86	ROUTINE VISITS	19
G.P.	GUALIPADA	DT. PUMP INSTALL.	31/05/86	UNFORESEEN VIS	4
BLOCK	DELANG	DT. CONV. TO OTC	31/05/86	OTHER VISITS	1
PUMP NO	13122411003	DT. OTC REMOVED	Not removed		

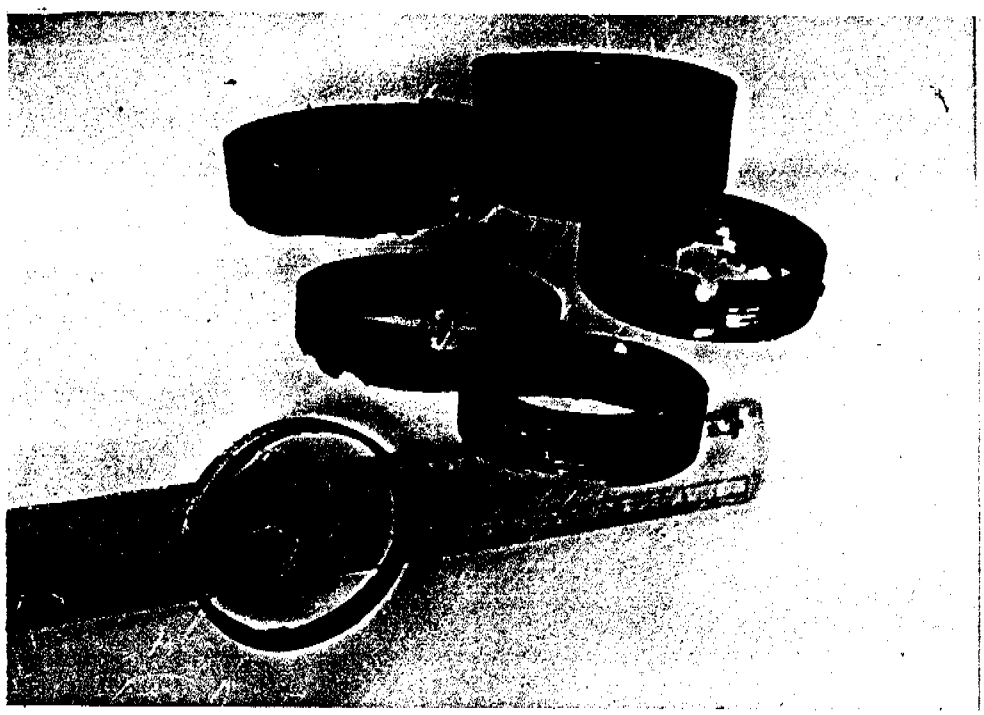
SL NO.	DATE OF VISIT	S.W.L. M	WATER QUALITY mg/lit Cl	Fe	VOLUMETRIC EFFICIENCY (%)	VISIT CLASSIF.	MAINTENANCE DETAILS, OBSERVATIONS,REMARKS
1	06/05/86		390	0.70		OTHER	INITIAL WATER QUALITY.
2	08/08/86	1.80			97	ROUTINE	NO PROBLEM.
3	22/09/86	1.84			105	ROUTINE	SLIGHT TASTE OF IRON.
4	03/12/86	2.04			102	ROUTINE	NO PROBLEM.
5	24/01/87		410	0.90	107	ROUTINE	IRON TASTE.
6	13/04/87	3.25			146	ROUTINE	REPLACED 1 BEARING.
7	29/05/87				113	ROUTINE	NO PROBLEM.
8	09/07/87	3.20	380	0.6	104	ROUTINE	IRON TASTE. REPLACED 'O' RING.
9	28/09/87	1.74			134	ROUTINE	NO PROBLEM.
10	01/12/87	1.93			126	ROUTINE	IRON TASTE. REPLACED 2 BOLTS AND 3 NUTS.
11	24/03/88	2.86			126	ROUTINE	SLIGHT SALINE TASTE.
12	21/05/88	2.93			103	ROUTINE	NO PROBLEM.
13	04/07/88				116	ROUTINE	NO PROBLEM.
14	31/07/88					UNFRSN.	BREAK DOWN. CONNECTING ROD DISCONNECTED.1 CONNECTING ROD,1 RISER PIPE REPLACED.
15	01/09/88					ROUTINE	REPLACED INSPECTION COVER.
16	17/09/88	1.70			95	ROUTINE	NO PROBLEM.
17	10/10/88					UNFRSN.	REPLACED 'O' RING.
18	10/12/88	2.33			72	ROUTINE	
19	10/02/89					UNFRSN.	POOR PERFORMANCE. REPLACED UPPER VALVE GUIDE & SEATING.
20	17/03/89	2.72	380	1.5	101	ROUTINE	NO PROBLEM.
21	12/04/89					UNFRSN.	POOR PERFORMANCE, LEAKAGE. REMOVED BELOW-GROUND ASSY. RISER PIPE ENDS CORREDED AND PERFORATED.RETHREADED ALL PIPE ENDS. REPLACED 'O' RING SS PLUNGER ROD, 3 CONNECTING RODS, 2 PIPE SOCKETS.
22	15/08/89	0.30			125	ROUTINE	NO PROBLEM.
23	11/11/89	3.65			108	ROUTINE	NO PROBLEM.
24	13/12/89	2.55	390	1.9	107	ROUTINE	NO PROBLEM

ANNEXURE 4

PHOTOGRAPHS



Excellent condition of Nitrile Cup Washers
Site : Nuagaon, Dihasahi, 13122311302, 7th. May 89

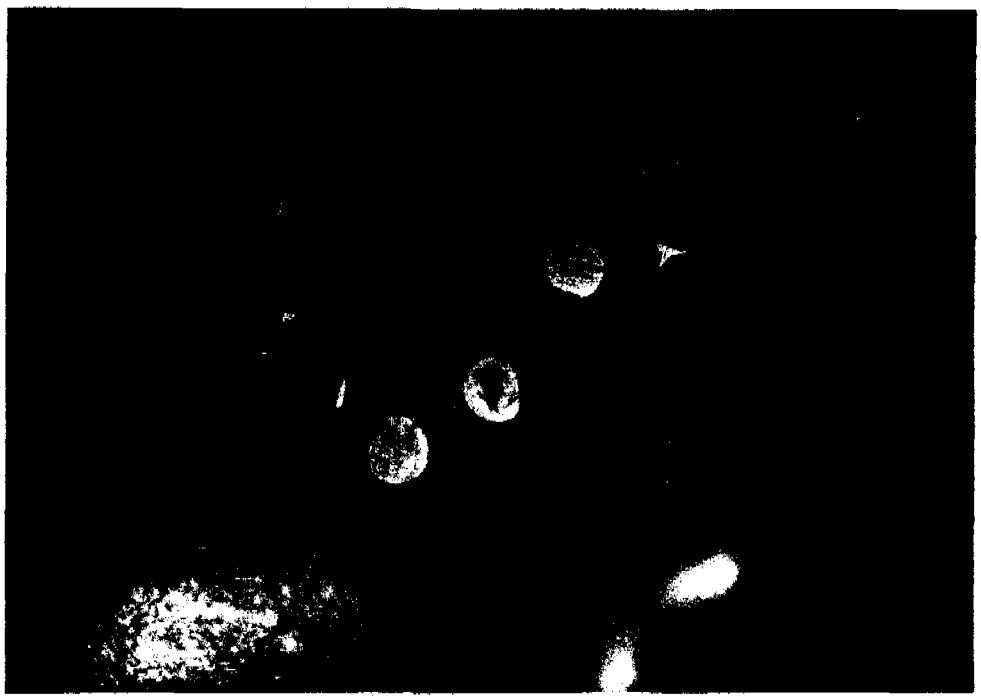


Corroded Riser Pipe ends
Site : Machhapada, Ward No.7, 13122411003,
12th. April 89

Leather Cup Washers that fouled in a pipe joint

Scaling & encrustation on cylinder

Site : Jamuna Jharpada, Gudiasahi, 13122400108, 2nd. Dec. 88



Corrosion & Wear of pump Rods
Site : Humara, Mojhisahi, 13122410402, January 90

Scoring inside cylinder
Site : Humara, Mojhisahi, 13122410402, January 90

Corrosion on Riser Pipes

Slime & Scaling material on Rods

Site : Humara, Mojhisahi, 13122410402, January 90