

INSPECTION NOTE

INSPECTION OF MAHAN PROJECT BY THE E-IN-C, WRD, ON DATED 26.06.2016 AND 27.06.2016

OFFICERS PRESENT

1)	Chief Engineer	Shri Shrikant Dandekar
2)	Superintending Engineer	Shri S.P. Singh
3)	Executive Engineer	Shri Pawan Kumar Jain
4)	Executive Engineer E&M	Shri R.N. Mishra

MAIN AGENCIES WORKING

1)	For Spillway Gates (Rs. 19.97 Cr.)	M/S. INFAB INFRASTRUCTURE, Ahmedabad
2)	For Khaddi Lift Canal (Turnkey tender Rs. 30.07 Cr.)	M/s. Sarla Project works Pvt.Ltd.,
3)	For earthwork and lining of 0 to 22.91 KM of main canal, minors 1 to 9 & 105 structures. (Item Rate tender Rs. 31.40 Cr.)	M/s. Sarla Project works Pvt.Ltd.,
4)	Mahan canal 28.57 KM to 47.05 lining of main canal item rate tender (Rs. 11.47 Cr.)	M/s. Sarla Mantena Joint Venture.
5)	Mahan canal excavation, earthwork of main canal (28.56 KM to 57.05) and minor No. 10 to 32 with all structures (Turnkey tender) (Rs. 90.89 Cr.)	M/s. HES Infra Pvt.Ltd.

1. SPILLWAY GATES -

Mahan Project is a Major Project in Sidhi district. The catchment area upto the damsite is 422 sq.km. Live capacity of the reservoir is 100.13 MCM. Principal Levels are as under:-

- | | | |
|--------------------|---|-----------|
| i. River Bed Level | - | 294.40 m. |
| ii. L.S.L. | - | 307.00 m. |
| iii. Crest R.L. | - | 322.00 m. |

iv. FRL	-	326.50 m.
v. MWL	-	329.90 m.
vi. TBL	-	333.00 m.

The main dam is a masonry dam covered with concrete in spillway portion. Live capacity at crest is 100.13 MCM. On the day of inspection the water level in the reservoir was 317.34 m. having live capacity 45 MCM. The dam from hillock to hillock is masonry - concrete composite dam having no earthen flanks. On the right flank, there is a saddle dam, 182 m long having maximum height 12.10 m.

The Dam was completed upto crest level in the year 2009. Irrigation was started from the year 2011-12.

The construction of dam was proposed in two faces. The first phase was fixed for completion of the dam upto crest level. In 2nd phase it was proposed to divert the Banas River into Mahan River and storing this water by fixing the gates. Total designed CCA of the project is 16487 ha. (Stage-I) and ultimate 23811 ha. Khaddi Lift Canal CCA is 2152 ha.

Erection of Spillway Gates is in progress. Size of each gate is, Length - 14 m. and height 4.5 m. It is proposed to raise the water level 3 m above the crest level i.e. upto R.L. $322 + 3 = 325$ m., although gates have been built for RL 326 m. Construction of BANAS DIVERSION at present is not decided, as the scheme lies in SANJAY GANDHI TIGER RESERVE FOREST.

Performance of the reservoir since its storage i.e. year 2009 onwards, shows that the consumption of water was 35 MCM at the maximum. At present the command is not fully developed. If the consumption is even doubled i.e. 70 MCM at that stage also, there will be a saving of 30 MCM. By filling 3 m. above crest, the storage will be 146 MCM, which is sufficient for 23811 ha. CCA. As such primarily it appears that the reservoir will function well even without BANAS DIVERSION SCHEME. The CCA as worked out now is 27260 hectares. The details are given in onward paragraphs. The storage of 146 MCM is sufficient to serve this area.

On the day of inspection, construction of spillway gates was in progress. 2 out of 6 gates (leaves) have been fixed. Deckbridge for spans 1, 2, 5 & 6 is complete. For span number 3 and 4, gates are to be fixed. Hoisting arrangement are to be fixed. Shri Dilip Patel of the company promised to complete the work upto 31 July 2016. Inspection gallery (upper) of the dam was also inspected. It is reported that the maximum seepage observed was on 5.10.2015 when the water level in the reservoir was 321 m. and the seepage was 357 LPM. At the time of first filling, it was about 1000 LPM. Due to calcination of joints, the discharge has reduced sufficiently. Seepage water is collected in a sump in foundation (Lower) gallery. From where it is pumped out by a POLDER PUMP. The Executive Engineer (E&M) reports that the open borewell submersible pumps 15 hp (2 Nos.) are required to pump out water efficiently from the sump. The Executive Engineer, E&M also wants to do following works: -

- (i) Double cabling from Generator Room to Control Room of Dam.
- (ii) Lighting on Hoist Bridge.
- (iii) Lighting on roads in the dam premises.

Estimates should be prepared for LED fittings. After approval of the competent authority, work should be done.

Distribution Control Panel near Left Training wall is located on slope and has no working space. The E.E. (E&M) has been asked to change the direction of the control panel just opposite to the present one. E.E., Mahan Project will construct a concrete platform to facilitate the working staff at this point. Both the training walls are flushed to the ground. There must be a 0.76 m high railing or parapet wall for safety. Approach road to the gallery is devoid of parapet wall. It should be provided, as built in other portion.

Dewatering channel water, drops directly on the ground and eroding it. A concrete chute to deliver water safely, should be constructed.

The dam should be protected from general public movement and other elements. This area has a bad history of thefts.

For this 40 mm steel pipe gates should be fixed on all four approach roads i.e. two for the dam top and two for the gallery. An electric pole on the left bank, should be shifted safely to the bridge top. Dam top should be well connected by stairs to the gallery on left bank for swift movement from dam top to the gallery and vice-versa.

A road from Jackwell to PMGSY road and then to dam having length about 1/2 KM, is required. This should be a concrete road. Proper drainage on both sides should be proposed.

2. KHADDI LIFT CANAL -

Khaddi Lift Canal offtakes from RD 1720 m of Mahan Main Canal. The designed discharge of the canal is 3 cumecs. The portion from main canal to the Jackwell, is an underground 1200 mm Ø 2 rows RCC pipe system. Upto the Jackwell, two shaft wells are there for inspection and emergency access. The pump house has 8 vertical turbine pumps of 400 hp each. Total head is 42 m. 800 KVA supply is available for Khaddi L.I.S.

Khaddi Lift Canal is a contour canal. Bed level at Ch. 0 is 341.78 m. There are 15 minors in this system, length of the main canal is 18.60 km. This canal was previously inspected by the Engineer-in-Chief on 2nd to 4th January 2016 and 27th January 2016 and 28th January 2016. Several shortcomings were pointed out. This inspection is mainly aimed to check the compliance of previous inspection points. Main points of the previous inspection were:-

- i. Most of the minors were not delivering water to the fields.
- ii. The falls were not designed as per E-in-C's publication.
- iii. Regulation gates were not fixed.
- iv. Drawings were not shown.

During today's inspection, it has been found that: -

- i. Minors are now in order. Water is reaching to the fields. Work in some minors is at the verge of completion.
- ii. Falls - Total 95 falls are there in the system. 63 falls rectified. In 7 falls, the work is in progress. Remaining 25 falls have

drop 0.5 m. or less, therefore they may be accepted as drop-falls being lined canal. Superintending Engineer will take final decision regarding drop falls or conventional fall in case of drop 0.50 m or less.

- iii. Regulation gates have been fixed in all the minors but the contractor has supplied only one handle to operate 18 gates (14 of Minors and 4 of Sub-minors). Each gate shall have one handle.
- iv. The drawings of main canal are available but the 'L' sections and structures' drawings are still unavailable as reported by the Executive Engineer.
- v. Other shortcomings as noticed in today's inspection are as under: -
 - (i) 2 wells between the offtake and Jackwell should have steel doors, which at present are open and may cause accident.
 - (ii) Khaddi nistar tank should be fed by Khaddi Lift pumps as there is acute water shortage in this area.
 - (iii) From KM 3.4 to KM 3.72, canal road is not through.
 - (iv) KM 4.95 to KM 5.00 (about 60 m.) closed barrel is required, this portion being in deep cutting.
 - (v) In Minor No. 11 at about 0.5 KM after offtake, canal is in filling for about 200 m. The banks are, steep and unstable. SDO Shri C.B. Ahirwar reported that the land width acquired is very less. If required, additional land shall be acquired and the banks should have minimum 2: 1 side slopes.
 - (vi) Khaddi Minor No. 12, is full of silt and debris. It should be cleaned.
 - (vii) Beyond 15.14 KM, Khaddi Main Canal has hypomia growth and silt. This should be cleaned properly.

At the tail end of Khaddi Lift Canal the department has a Sub Divisional colony at Village Chunguna. This should be properly maintained. Amin headquarter should be fixed by Chief Engineer at this place. This place is well connected with Khaddi Command villages.

On the way coming to Sidhi, a small but useful minor scheme was seen. BAMHNI ANICUT covers about 145 ha. of command which is high patch and not covered by Mahan Project. Shri B.B.S. Parmar, Executive Engineer, Sidhi has been asked to submit a Special Repair case for lining of this canal. The cultivators at site, have told that the scheme is very useful. EE, Sidhi has informed that this anicut is designed for CCA 145 ha. and at present is irrigating on an average 100 hectares.

DATE OF INSPECTION - 27/06/2016.

Inspected Deep cutting portion from KM 46.60 to KM 53. Maximum cutting in this portion is 21 m., on Sidhi - Shahdol road. About 1.02 Lakh cum excavation in this portion is balance. Out of this quantity, about 40000 cum hard rock excavation is balance. As of now about 1000 cum per day hard rock excavation, is the progress. Total excavation per day is 4000 cum. Seen drawing of DRB at KM 49.05 of Mahan Canal on KM 4/4 to 4/6 of Sidhi - Beohari Road. The size of RCC barrel is 2.5 m x 3 m. (twin barrel). Length of the barrel is about 100 m. The contractor promised to start the work by 15 July 2016. Beyond this point on an average 5 m. cutting is to be done. From KM 53 to KM 57.05 (tail) about 95% work is complete in the main canal. After deep cut, Minor No. 25 and Tail minor is there. Minor No. 25 is to be revised as reported by the department. It is proposed to convert offtake of Minor No. 25 at KM 57.05 (Tail) as offtake of BEHARI CANAL.

3. MAHAN CANAL MINOR No. 24 -

Mahan canal minor No. 24 has been constructed upto 9 KM. Shri Arun Raju, Contractor's representative, ensured that this minor or minor No. 25 will cover all the villages upto Sone River. Prominent villages are Demha, Devghata, Mohania and Pipraha.

Village Bhelki should be covered with minor No. 24. Bargawan should be covered with Minor No. 12 or 13 as economical.

Revised drawing of tail minor should be prepared. At KM 3.75 of tail minor Road Development Corporation has constructed. KM 82.30 bypass. At this point the land was acquired by WRD; but the RDC staff built this road without taking proper permission. This site is situated in village Jogipur, which is about 4 KM from Sidhi town. It is about 5 m embankment. Now the only alternative left is to cross this road by "PUSHING METHOD" or by ISMB ribs 150 x 150 putting precast beams in between. About 6 cumecs discharge is to be passed from this portion.

4. COMMAND OF BAHRI SYSTEM -

Bahri canal is the extension of Mahan Canal. Site inspection reveals that the command of Bahri system has command of several tanks, mainly BISENDHA TANK, BAMRAHA TANK, SATAHI TANK, NIBUHA TANK etc. While designing the canal of BAHRI SYSTEM, this fact should be kept in mind.

5. REMOVAL OF FALL AT RD 35500 OF MAHAN MAIN CANAL -

There is a canal fall at RD 35500 m. of Mahan Main Canal. The Superintending Engineer suggested to shift this fall to RD 37400 m, so that minor canal No. 18 at RD 37350 m. may have sufficient driving head.

6. CHULHI L.I.S. COMMAND -

Mahan Canal minor No. 18 is very near to the canal of Chulhi Lift Irrigation canal. Minor No. 18 should be joined with Chulhi L.I.S. canal. Chulhi L.I.S. is on Ganjas nalla and at present is "defunct". CCA of Chulhi L.I.S. is 196 ha. The canal of Chulhi L.I.S. will need reversal of bed grade. As this canal will now run towards the Jackwell of the Chulhi L.I.S. Command of Deonar L.I.S. canal has been included in Minor No. 18, Canals have been renovated accordingly. Area of Ganjas Anicut should be included in Minor No. 16 and Minor No. 18. In minor No. 16 village Deochha, Jakharwar

will be connected and in Minor No. 18 Chulhi and Badaura villages should be included.

7. COMMAND AREA VERIFICATION -

Details of Command Area of Mahan Project is summarised as under: -

(1)	Area developed prior to turnkey contract of HES Minor No. 1 to Minor No. 9 of Mahan Canal.	-	3252 ha.
(2)	Area of Khaddi L.I.S.	-	2152 ha.
(3)	Area as per Turnkey Agreement of HES (Rs. 90.89 Cr.)	-	14356 ha.
(4)	Area of BAHRI SYSTEM	-	7500 ha.
	TOTAL		<u>27260 ha.</u>

As stated by Shri Pawan Kumar Jain, Executive Engineer, Mahan Project, Sidhi, area of S.No. (1) is verified and correct and may increase by 500 hectares. Area of Khaddi Lift Canal may increase by about 100 hectares. Regarding S.No. 3 turnkey agreement, Minor No. 10, RD 16020 in Village Khaira is the first minor and Minor No. 25 in village Vijaipur is the last minor. The Executive Engineer has verified minor-wise area which is enclosed as annexure-I. The S.E. states that in minor-wise CCA from Minor No. 10 to 18 there is no, major variation. Area from Minor No. 10 to Minor No. 23 is 3710 ha., except minor No. 12 which is a Sub-minor. Area of minor No. 24 is 654 ha. Minor No. 25 - 572 ha. Adding this total area works out to 4936 ha.

The command area between minor No. 18 to Minor No. 25 is confined by physical boundaries as under: -

On East	-	Path Nalla
On West	-	Deonar Nalla
North	-	River Sone
South	-	Hillocks.

The Superintending Engineer has been asked to work out GCA in this area and work out CCA accordingly. As per agreement, these physical boundaries i.e. PATH NALLA, DEONAR NALLA, RIVER SONE AND MAIN CANAL should be the boundaries of

command. Every field which can be commanded by flow canal should be covered by flow. Discrepancy in CCA if any as mentioned in the agreement should be corrected. About 2000 hectares by lift by the cultivators in this portion should also be added. The Superintending Engineer said that the CCA of Shiv Purva Minor (shown as minor No. 32 in the agreement) is wrongly mentioned as 4181 ha. which is in fact about 700 ha. only. The contractor may be asked to build on an average 3 wells per KM to cover high command by lift by cultivators own device to meet up the gap as far as possible between agreement area and actual command.



(M.G. Choubey)
Engineer in Chief,
Water Resources Department,
Bhopal (M.P.)

Endt. No. 349119/कार्य / प्र. अ.

Bhopal, Dated: 04 June, 2016

Copy is forwarded to:

1. The Additional Chief Secretary, GOMP, Water Resources Department, Bhopal.
2. Chief Engineer, Ganga Basin, WRD, Rewa.
3. Superintending Engineer, Water Resources Circle, Shahdol
4. Superintending Engineer, Major / Admn., E-in-C office.
5. Executive Engineer, Water Resources Division, Sidhi
6. Executive Engineer, L.M. Lift & Gate Division, Rewa
7. Web Manager, WRD for ONLINE feeding.



(M.G. Choubey)
Engineer in Chief,
Water Resources Department,
Bhopal (M.P.)

ANNEXURE - I

**Mahan (Gulab Sagar) Project
Minor wise Command Verification**

(Area in Ha.)

S.N o.	Minor No./Sub Minor	GCA	CCA	Remark
1	10 L	119	110	-
2	10 L (a)	110	107	-
3	10 (b)	100	90	-
4	11 (c)	96	89	-
5	11	49	40	-
6	12	654	591	-
7	12 SM-1	-	-	Contractor reported 650 Ha CCA. In SM-1 of Minor No. 12 but not submitted command map for verification so for.
8	13	512	472	-
9	14	332.00	283	-
10	15	140.00	106	-
11	16	417.00	376	-
12	17	120	40	-
13	18	817	657	Contractor agreed to extend Minor No. 18 in village Badhora which will cover CCA of 120 Ha. extra.
14	19	346	293	-
15	20	337	250	-
16	21-L	36	27	-
17	21-R	88.00	20	-
18	22-L	52.00	30	-
19	22-R	32.00	3	-
20	23	319.00	126	Contractor agreed to extend Minor No. 23 In village Sonvarsha which will cover CCA of 71 Ha. extra.
	Total	4676.00	3710.00	

Note:-

- 1- There are few locations from where command can be covered through direct outlet from main canal which will cover 281 Ha CCA extra.
- 2- The total CCA covered between Minor No. 10 to Minor No. 23 shall be 4832 Ha. after considering CCA of SM-1 Minor No. 12, extension proposed in Minor No. 18, Minor No. 23 and area proposed for irrigation from direct outlet from main canal.

(S.M. Tiwari)

Sub Divisional Officer
Mahan Canal Sub Division Semariya

Executive Engineer
Mahan Canal Division Sidhi

महान परियोजना
भूमि का ब्यौरा (क्षेत्रफल हेक्टेयर में)

स.क्र.	गाँव का नाम	माइनर नहर	निराबोया क्षेत्रफल	कुल क्षेत्रफल	रिमांक
1	2	3	4	5	6
1	खैरा	माइनर नम्बर 10 B, 10 C	180.000	215.000	-
2	बोकरो	माइनर नम्बर 10 L, 10 LA	128.365	351.440	-
3	धानिगवां	माइनर नम्बर 11	30.089	75.136	-
4	नौसा	माइनर नम्बर 11	87.520	110.490	-
5	बेल्दह	माइनर नम्बर 12	192.340	307.925	-
6	भोलगढ	माइनर नम्बर 12	237.690	386.554	-
7	अकौरी	माइनर नम्बर 12	289.880	456.730	-
8	हनुमानगढ़	माइनर नम्बर 12	474.444	1098.802	-
9	करनपुर	माइनर नम्बर 12	117.710	157.770	-
10	नौगवा	माइनर नम्बर 13	88.650	111.648	-
11	ठकुरदेवा	माइनर नम्बर 13	94.800	120.565	-
12	पुरुषोत्तमगढ़	माइनर नम्बर 13	71.110	78.960	-
13	मिर्चवार	माइनर नम्बर 13	200.979	236.650	-
14	कोल्हुआ	माइनर नम्बर 14	47.240	62.880	-
15	पोड़ी - 096	माइनर नम्बर 14	85.990	109.380	-
16	भमरहा-006	माइनर नम्बर 14	36.625	40.390	-
17	झगरहा	माइनर नम्बर 14	625.373	645.468	-
18	सेमरिया	माइनर नम्बर 14	55.736	77.110	-
19	कथरिहा	माइनर नम्बर 15	52.920	73.480	-
20	गोदुरा	माइनर नम्बर 15	155.060	268.300	-
21	मनकीसर	माइनर नम्बर 16	288.293	339.245	-
22	मनकीसर कोठार	माइनर नम्बर 16	30.930	35.340	-
23	रामगढ़ - 008	माइनर नम्बर 16	64.496	79.167	-
24	देवछा	माइनर नम्बर 16	24.805	38.100	-
25	झोखरवार	माइनर नम्बर 16	105.298	112.500	-
26	देवगढ	माइनर नम्बर 17	251.318	282.540	-
27	ओवरहा	माइनर नम्बर 17	205.888	221.070	-
28	बढौरा	माइनर नम्बर 18	415.062	467.230	-
29	कुबरी	माइनर नम्बर 18	505.417	600.674	-
30	चूल्ही	माइनर नम्बर 18	103.454	112.434	-
31	तेन्दुआ	माइनर नम्बर 19	342.754	419.55	-
32	बम्हनी	माइनर नम्बर 20	602.19	663.548	-
33	धनखोरी	माइनर नम्बर 20	227.681	279.88	-
34	पड़खुरी-029	माइनर नम्बर 21	386.929	453.07	-
35	सोनवर्षा	माइनर नम्बर 23	139.823	155.81	-
		योग	6946.859	9244.836	-
36	पनवार चौहानन	माइनर नम्बर 24	385.073	505.07	-
37	नौगवां दर्शन सिंह	माइनर नम्बर 24	257.08	350.73	-
38	नौगवां धीर सिंह	माइनर नम्बर 24	328.531	361.259	-

भूमि का ब्यौरा (क्षेत्रफल हेक्टेयर में)

स.क्र.	गाँव का नाम	माइनर नहर	निराबोया क्षेत्रफल	कुल क्षेत्रफल	टिप्पणी
39	करागोल	माइनर नम्बर 24	249.328	282.245	-
40	अमरवाह	माइनर नम्बर 24	388.159	431.319	-
41	जमाड़ा कला	माइनर नम्बर 24	226.48	286.698	-
42	जनोडी सेंगरान	माइनर नम्बर 24	84.337	103.894	-
43	मधुरी कोठार	माइनर नम्बर 24	124.993	162.672	-
44	मधुरी पवाई	माइनर नम्बर 24	126.515	137.231	-
45	डेम्हा	माइनर नम्बर 24	437.09	518.56	-
46	भेलकी कला	माइनर नम्बर 24	248.577	266.61	-
47	भेलकी खुर्द	माइनर नम्बर 24	301.046	354.55	-
48	कुरवाह	माइनर नम्बर 24	357.871	428.11	-
49	नीढिया	माइनर नम्बर 24	367.371	469.528	-
		योग	3882.451	4658.476	-
50	विजयपुर	टेल माइनर नं. 25	49.078	64.880	-
51	बटाली	टेल माइनर नं. 25	67.065	88.570	-
52	पडैनिया कला --	टेल माइनर नं. 25	14.470	18.740	-
53	पडैनिया खुर्द	टेल माइनर नं. 25	108.627	129.724	-
54	पडैनिया पवाई --	टेल माइनर नं. 25	49.173	57.347	-
55	महशजपुर	टेल माइनर नं. 25	-	-	नहर पूर्ण कटिंग में है।
56	कुकुडीहर	टेल माइनर नं. 25	-	-	
57	जोगीपुर उत्तर	टेल माइनर नं. 25	-	-	
58	जोगीपुर दक्षिण	टेल माइनर नं. 25	-	-	
59	गाडा लालर सिंह	टेल माइनर नं. 25	347.800	424.260	-
60	गाडा यवन सिंह	टेल माइनर नं. 25	445.707	507.359	-
61	मझरेटी खुर्द	टेल माइनर नं. 25	74.397	86.820	-
62	मझरेटी कोठार	टेल माइनर नं. 25	62.940	66.580	-
63	कुचवाही	टेल माइनर नं. 25	269.245	289.081	-
64	सजहा कला	टेल माइनर नं. 25	56.840	65.210	-
65	सजहा खुर्द	टेल माइनर नं. 25	15.180	15.460	-
66	खैरा	टेल माइनर नं. 25	155.944	165.259	-
67	मऊ	टेल माइनर नं. 25	53.240	59.120	-
68	रजाडिहा	टेल माइनर नं. 25	69.050	89.170	-
69	कुडैनिया	टेल माइनर नं. 25	61.150	64.210	-
70	अकौरी	टेल माइनर नं. 25	110.240	122.280	-
71	महुगढ	टेल माइनर नं. 25	66.965	72.300	-
72	बेलहा	टेल माइनर नं. 25	224.339	237.489	-
73	सरपुर	टेल माइनर नं. 25	300.190	345.820	-
74	हडबडौ	टेल माइनर नं. 25	875.906	1098.829	-
		योग	3477.546	4068.508	-
		महायोग	14306.855	17971.829	-