

No. CWC/UGBO/EF/SR 3



**DoWR, RD & GR
Central Water Commission
Upper Ganga Basin Organization**

**IMPLEMENTATION OF MINIMUM ENVIRONMENTAL FLOWS IN
RIVER GANGA (Up to UNNAO)**



STATUS REPORT

(July - September, 2019)

Oct, 2019

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1.0 BACKGROUND

Ecological needs of the river have been recognized as one of the uses of water in the National Water Policy (2012). In the Preamble of the policy, it is mentioned that *'water is essential for sustenance of eco-system, and therefore, minimum ecological needs should be given due consideration'*. Clause 3.3 specifies that *"A portion of river flows should be kept aside to meet ecological needs ensuring that the low and high releases are proportional to the natural flow regime, including base flow contribution in the low flow season through regulated ground water uses"*.

Vide Gazette Notification dated 9th October, 2018, the Government of India has notified the minimum environmental flows for River Ganga that has to be maintained at various locations on the river. Environmental flows are the acceptable flow regimes that are required to maintain a river in the desired environmental state or predetermined state. The maintenance of minimum e-flow in the river would not only ensure sustenance of aquatic life but also go a long way in ensuring its *Aviralta* or continuous flow in the river. It will ensure that the river has at least the minimum required environmental flow of water even after the river flow gets diverted by projects and structures for purposes like irrigation, hydropower, domestic and industrial use etc.

The above order will apply to the upper Ganga River Basin starting from originating glaciers and through respective confluences of its head tributaries finally meeting at Devprayag up to Haridwar and the main stem of River Ganga up to Unnao district of Uttar Pradesh. The compliance of minimum environmental flow is applicable to all existing, under-construction and future projects. The existing projects which currently do not meet the norms will have to ensure that the desired environmental flow norms are complied with within a period of three years. The mini and micro projects which do not alter the flow characteristics of the river or stream significantly are exempted from these environmental flows.

The flow conditions in these river reaches shall be monitored at hourly intervals from time to time. The Central Water Commission has been entrusted the responsibility for supervision, monitoring, regulation of flows and reporting of necessary information to the appropriate authority as and when required and also take emergent decisions about the water storage norms in case of any emergency.

The concerned project developers or authorities will have to install automatic data acquisition and data transmission facilities at appropriate locations at project sites within six months. The Central Government through National Mission for Clean Ganga may direct release of additional water in the River Ganga to meet special demand as and when required.

2.0 GANGA PHYSIOGRAPHY

The Ganga river basin is the largest river basin in India in terms of catchment area, constituting 26% of the country's land mass (861,404 sq. km) and supporting about half a billion populations. The drainage area of the basin lies in 9 states covering Uttarakhand, Uttar Pradesh, Madhya Pradesh, Bihar, Rajasthan, West Bengal, Haryana, Himachal Pradesh and the Union Territory of Delhi. It traverses a course of 2525 km before flowing into the Bay of Bengal. It has a large number of tributaries joining it during this journey. The main physical sub-divisions are the Northern Mountains, the Gangetic Plains and the Central Highlands. Northern Mountains comprises the Himalayan ranges including their foot hills. The Gangetic plains, situated between the Himalayas and the Deccan plateau and covering most of the basin, are ideally suited for intensive cultivation. The culturable area of Ganga basin is about 57.96 M. ha which is about 29.5% of the total culturable area of the country.

In the monitoring reach of river Ganga up to Unnao, there are many manmade interventions utilizing the water for various developmental needs such as drinking water, irrigation, hydro power etc. These projects impact the natural flows in the river. In upper Ganga basin up to Haridwar, there are a number hydro-electric projects. The most of the projects are run-of-the river (ROR) projects except Tehri being a major storage project having gross storage of 3.54 BCM, live storage 2.615 BCM. At Haridwar, Ganga opens to the Gangetic Plains, where Bhimgoda barrage diverts a large quantity of its waters into the Upper Ganga Canal and Eastern Ganga Canal, to provide water for irrigation and other consumptive uses. Further, about 76 km downstream of Haridwar, at Bijnore, another barrage diverts water into the Madhya Ganga Canal but only during monsoon months. At Narora, there is further diversion of water into the Lower Ganga Canal from Narora barrage, about 155 km downstream of Bijnor barrage. From the barrage at Kanpur, Ganga water is being diverted to meet the drinking water requirements of Kanpur town.



Figure 1. Map Showing key Projects in Ganga Basin Up to Unnao

3.0 MINIMUM E-FLOWS NORMS

The e-flows notified by the Government of India Vide Gazette Notification dated 9th October, 2018 are as follows:

3.1 Upper Ganga River Basin Stretch starting from originating glaciers and through respective confluences finally meeting at Devprayag up to Haridwar:

Table 1- E-flow Norms for Projects in Upper Ganga Basin up to Haridwar

Sl No	Season	Months	(%) Percentage of Monthly Average Flow observed during each of preceding 10-daily period
1	Dry	November to March	20
2	Lean	October, April and May	25
3	High Flow	June to September	30*#

*# 30% of monthly flow of High flow season.

3.2 Stretch of main stem of River Ganga from Haridwar, Uttarakhand to Unnao, Uttar Pradesh

Table 2- E-flow Norms for Projects in Main Ganga Stem from Haridwar to Unnao

Sl. No.	Location of Barrage	Minimum flow releases immediately downstream of barrages (In Cumecs) Non-Monsoon (October to May)	Minimum flow releases immediately downstream of barrages (In Cumecs) Monsoon (June to September)
1	Bhimgoda (Haridwar)	36	57
2	Bijnor	24	48
3	Narora	24	48
4	Kanpur	24	48

The copy of the Gazette Notification dated 9th October, 2018 is enclosed at **Annex-I**

4.0 PROJECTS UNDER MONITORING

In upper Ganga river basin up to Hardwar, river valley projects are largely non-consumptive and are mainly used for hydro power generation. Few minor projects are also being used for irrigation and drinking water purposes. The list of existing, ongoing and contemplated projects is enclosed

at **Annex-II**. From Hardwar onwards beginning with Bhimgoda Barrage, projects are being used for water diversion for irrigation and domestic uses.

The key projects in Ganga up to Unnao are listed below:

Table 3: Key projects on River Ganga up to Unnao

SN	Name of Project	River/Tributary	Place/State	Status
Projects on Alaknanda and its tributaries				
1.	Vishnuprayag HEP (400 MW)	Alaknanda	Joshimath/Uttarakhand	
2.	Peepal Koti HEP (444 MW)	Alaknanda	Peepal Koti/Uttarakhand	Under construction
3.	Srinagar HEP (330 MW)	Alaknanda	Srinagar/Uttarakhand	
4.	Tapovan Vishnuprayag HEP (520 MW)	Dhawli Ganga	Uttarakhand	Under construction
5.	Kund HEP	Mandakini	Uttarakhand	Mini HEP
Projects on Bhagirathi and its tributaries				
1.	Maneri Bhali Phase-I HEP (90 MW)	Bhagirathi	Uttarakhand	
2.	Maneri Bhali Phase-I HEP (304 MW)	Bhagirathi	Uttarakhand	
3.	Tehri HEP (1000 MW)	Bhagirathi	Uttarakhand	
4.	Koteshwar HEP (400 MW)	Bhagirathi	Uttarakhand	
5.	Ghansali HEP (23 MW)	Bhilangana	Uttarakhand	Mini HEP
6.	Rech HEP (8 MW)	Bhilangana	Uttarakhand	Mini HEP
7.	Buda Kedar HEP (5 MW)	Bal Ganga	Uttarakhand	Mini HEP
Projects on Ganga Main Stream				
1.	Pashulok Barrage, Rishikesh (Chilla HEP, 143 MW)	Ganga	Uttarakhand	
2.	Bhimgoda Barrage (Irrigation)	Ganga	Uttarakhand	SCADA system installed
3.	Madhya Ganga Barrage (Chaudhary Charan Singh Barrage) (Irrigation)	Ganga	Uttar Pradesh	
4.	Narora Barrage (Irrigation & Industrial)	Ganga	Uttar Pradesh	SCADA system installed
5.	Kanpur Barrage (Drinking Water)	Ganga	Uttar Pradesh	

Considering the extent of modifications of flows by the projects, following projects are being monitored presently for implementation of E-flows w.e.f. 1st January, 2019.

Table 4: List of Projects being monitored presently

Sl. No.	Name of the Project	Agency
1.	Maneri Bhali Stage-I	UJVNL
2.	Maneri Bhali Stage -II	UJVNL
3.	Tehri Dam	THDC
4.	Koteshwar Dam	THDC
5.	Vishnuprayag HEP	JPVL
6.	Srinagar	GVK
7.	Pashulok Barrage/ Chilla HEP	UJVNL
8.	Bhimgoda Barrage	UP Irrigation &WRD
9.	Bijnor Barrage	UP Irrigation &WRD
10	Narora Barrage	UP Irrigation &WRD
11	Kanpur Barrage	UP Irrigation & WRD

Salient features of the above projects are enclosed at **Annex-III**.

5.0 DATA COLLECTION NETWORK AND TRANSMISSION STATUS

Status of data collection network and transmission system at above projects is as under:

Sl. No.	Name of the Project	Agency	Data Collection Network	Data Transmission system
1.	Maneri Bhali Stage-I	UJVNL	Manual	Through email
2.	Maneri Bhali Stage -II	UJVNL	Manual	Through email
3.	Tehri Dam	THDC	Automatic sensors	Through email/SMS
4.	Koteshwar Dam	THDC	Automatic sensors	Through email/SMS
5.	Vishnuprayag HEP	JPVL	Manual	Through email
6.	Pashulok Barrage/ Chilla HEP	UJVNL	Manual	Through email
7.	Bijnor Barrage	UP. Irrigation	Manual	Through email
8.	Srinagar	GVK	Manual	Through email
9.	Bhimgoda Barrage	UP. Irrigation	Automatic sensors	Through email. Also, the data is available in public domain
10	Narora Barrage	UP Irrigation	Automatic sensors	Through email Also, the data is also available in public domain
11	Kanpur Barrage	UP Irrigation	Manual	Through email

5.1 Data Transmission Status

The flow data is being received from all the 11 projects under monitoring. Few of projects are not sending the flow on hourly basis. The matrix showing the status of data transmission from the project authorities to CWC in the last week of June month is given below in Table 5.

Table 5. Data Transmission Status Matrix

S.No.	Project Name	15 Sep	16 Sep	17 Sep	18 Sep	19 Sep	20 Sep	21 Sep
1	Maneri Bhali-1	B	B	A	A	B	A	D
2	Maneri Bhali-2	A	A	A	A	A	D	D
3	Koteshwar Dam	A	A	B	A	A	D	D
4	Tehri Dam	C	C	C	C	C	C	C
5	Bhingoda Barrage	A	A	A	B	A	B	A
6	Vishnuprayag	A	B	A	A	A	A	D
7	Bijnor Barrage	A	B	B	B	B	B	B
8	Pashulok Barrage	A	A	A	A	A	A	A
9	GVK Srinagar	A	A	A	A	A	A	D

S.No.	Project Name	22 Sep	23 Sep	24 Sep	25 Sep	26 Sep	27 Sep	28 Sep
1	Maneri Bhali-1	A	A	A	A	B	A	D
2	Maneri Bhali-2	B	A	A	B	A	B	B
3	Koteshwar Dam	A	B	B	A	A	D	D
4	Tehri Dam	C	C	C	C	C	C	C
5	Bhingoda Barrage	A	A	B	A	A	A	B
6	Vishnuprayag	A	A	A	A	A	A	D
7	Bijnor Barrage	A	B	B	B	A	B	A
8	Pashulok Barrage	A	A	A	A	A	D	A
9	GVK Srinagar	A	A	A	A	A	A	D

A	Hourly flow data received timely
B	Hourly flow data received late
C	Data received but not in desired format
D	No data received

It can be seen from above matrix that flow data on hourly basis is being received regularly from all the projects except Tehri and Kanpur barrage. For Tehri average daily inflows and outflows are provided while for Kanpur barrage, flow data is measured on every two hours and transmitted accordingly. There are issues of data transmission on Saturday and Sundays also. The project authorities are being pursued to provide the data in desired format timely on regular basis.

5.2 Status of Installation of Automatic System for Data acquisition and Transmission

An expert team visited recently in the month of August, 2019 to see the existing arrangements for release of mandated e-flows and installations of automatic data acquisition and transmission system on the project on Bharathi river. Projects on Alanknanda and Ganga river were visited in the month of June, 2019. Tehri and Koteswar dam have installed automatic sensors for the outflow discharge. The project authorities have been requested to devise a system for automatic data transmission to CWC. Other projects have not installed the automatic data acquisition and transmission system till date. However, project authorities have promised the installation of the automatic monitoring system at the earliest possibly by December, 2019. The copy of Inspection Report of the team is enclosed at **Annexure-IV** for reference.

6.0 CURRENT STATUS OF IMPLEMENTATION OF MINIMUM E-FLOWS

Project wise status of fulfilling the requirement of releasing stipulated environmental flows is given below:

6.1 MANERI BHALI PHASE-I

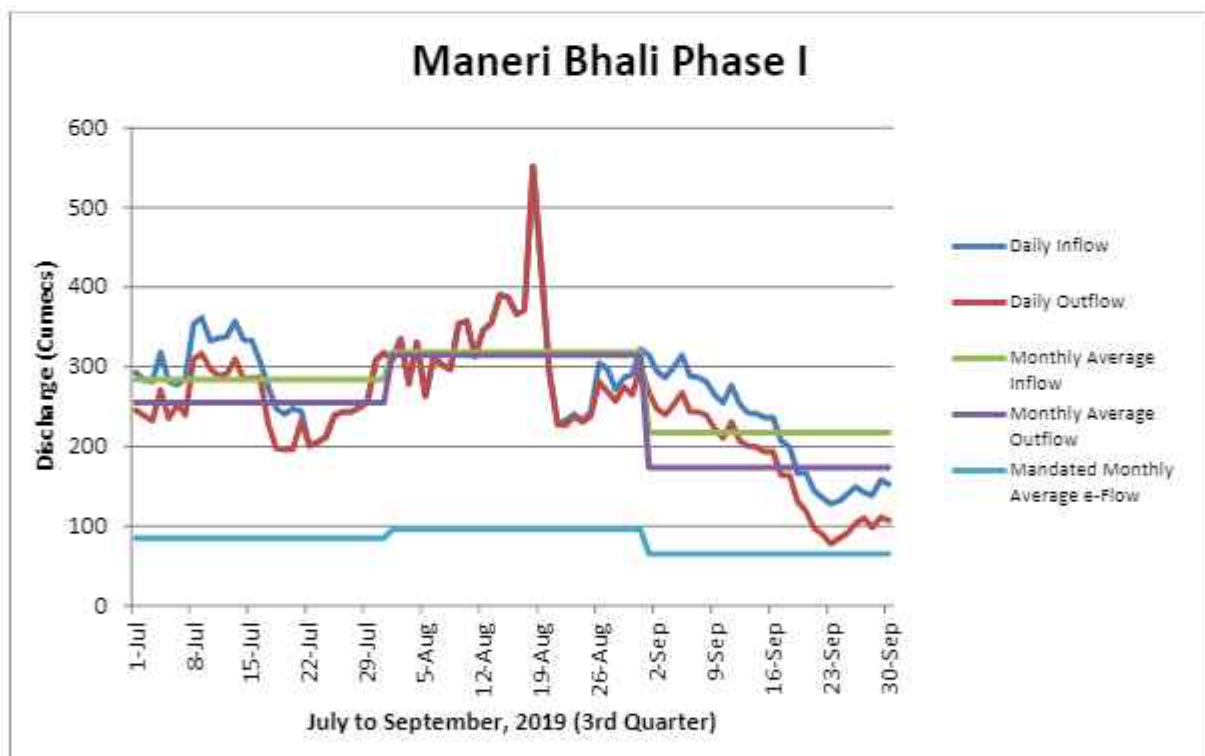


Figure 2: Graph showing status of implementation of e-flows at Maneri Bhali Phase I Project.

As seen from above plot, the project is meeting e-flow norms.

6.2 MANERI BHALI PHASE-II

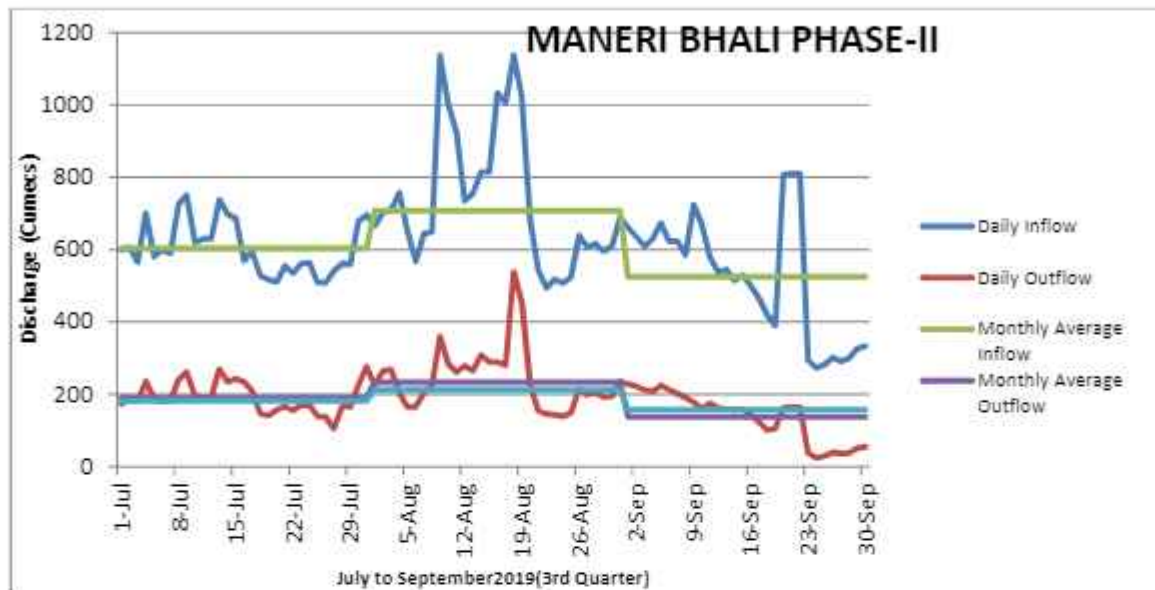


Figure 3: Graph showing status of implementation of e-flows at Maneri Bhali Phase II Project.

The project was broadly meeting the e-flow norms on average basis. However, on number days particularly in the end month of September, the project did not fulfil the e-flow norms.

6.3 TEHRI DAM

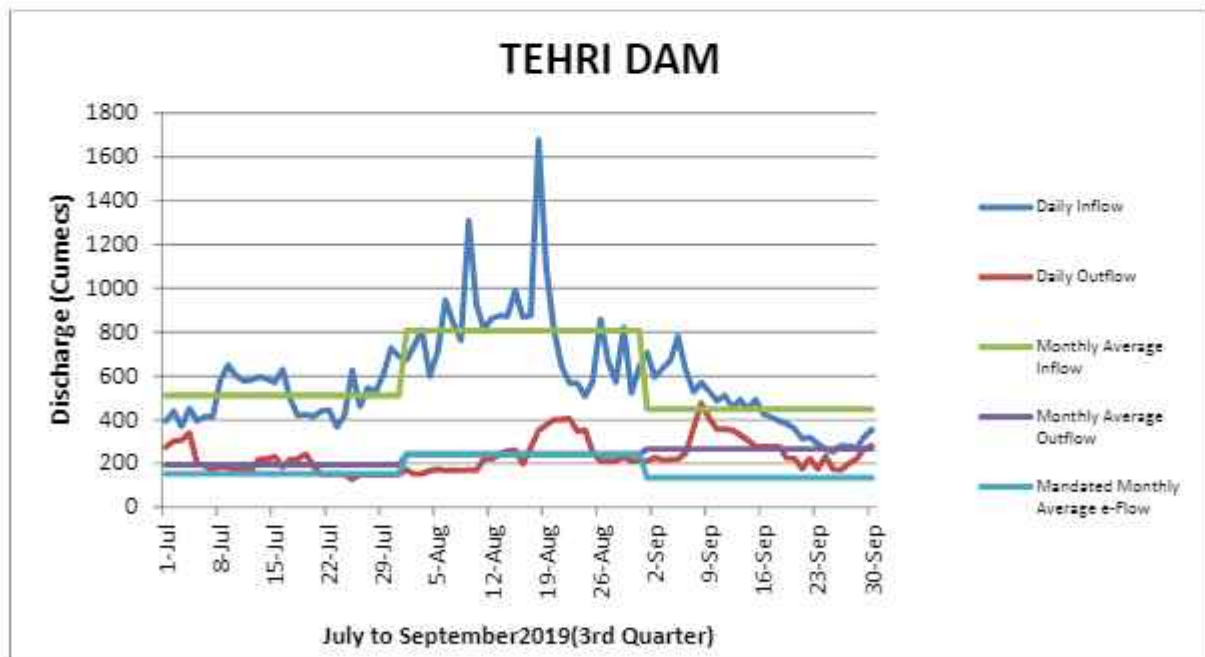


Figure 4: Graph showing status of implementation of e-flows at Tehri Dam Project.

The project is broadly meeting the e-flow norms.

6.4 KOTESHWAR DAM

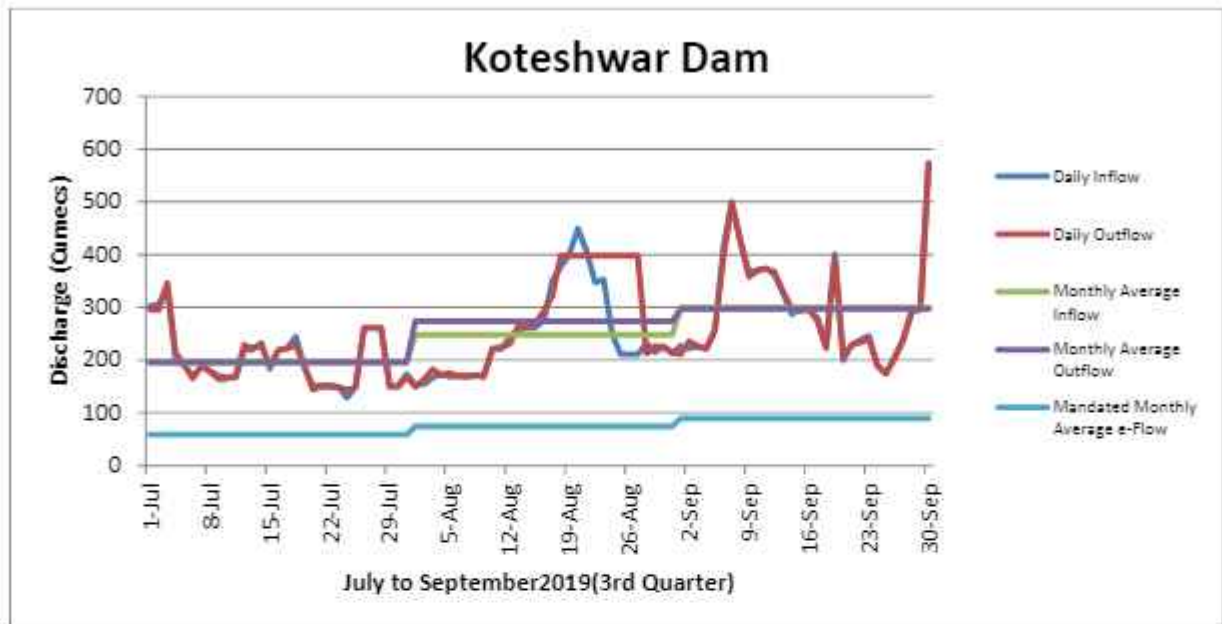


Figure 5: Graph showing status of implementation of e-flows at Koteshwar Dam Project.

The project is meeting the e-flow norms.

6.5 VISHNUPRAYAG HEP

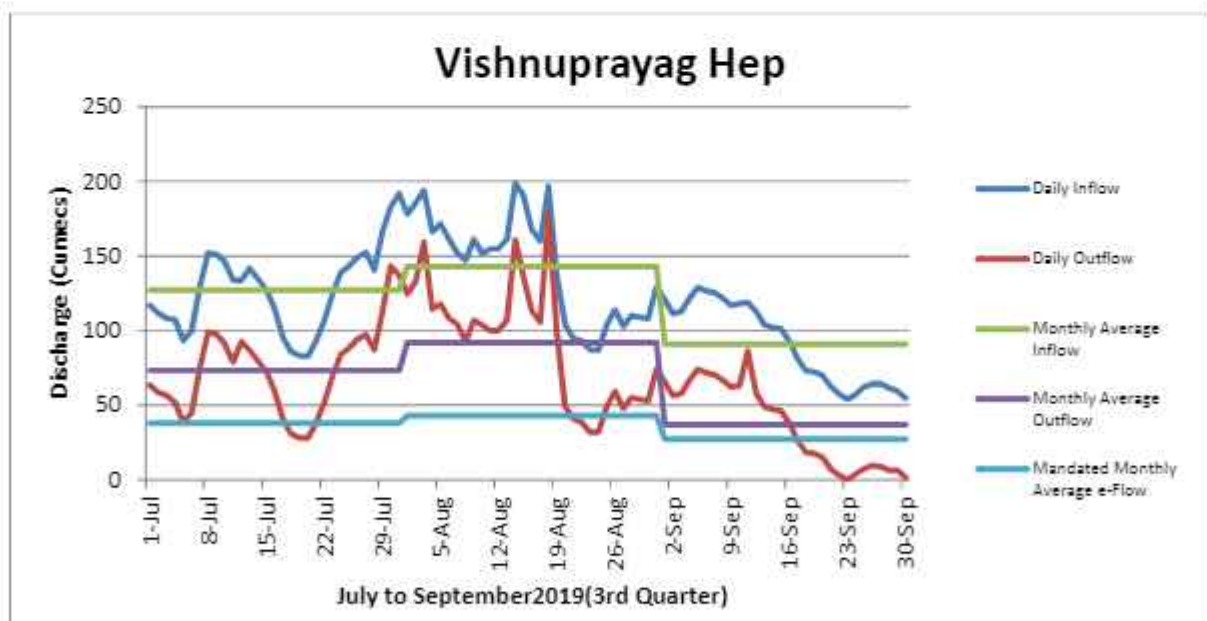


Figure 6: Graph showing status of implementation of e-flows at Vishnuprayag Project.

The project has broadly followed the e-flow norms during the period. However, the outflows have reduced significantly after mid September with reduction of inflows at the project location.

6.6 SRINAGAR DAM

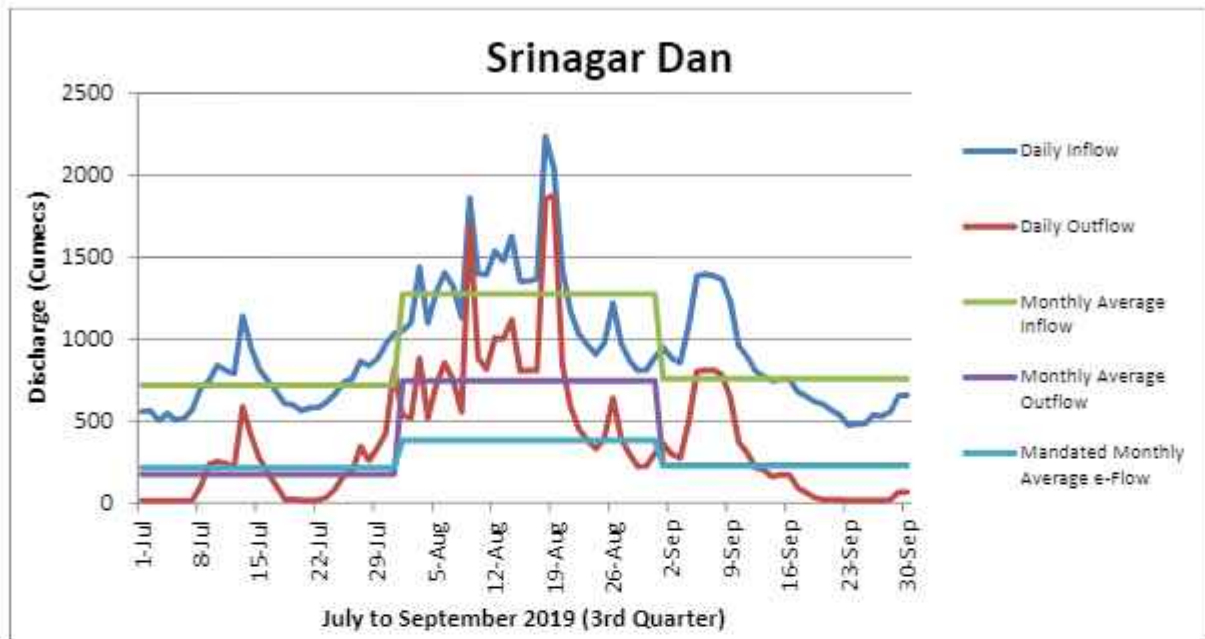


Figure 7: Graph showing status of implementation of e-flows at Srinagar Dam Project.

As seen from above, the project is not meeting the e-flow norms except in the month of August, 2019 when inflows were high.

6.7 PASHULOK BARRAGE

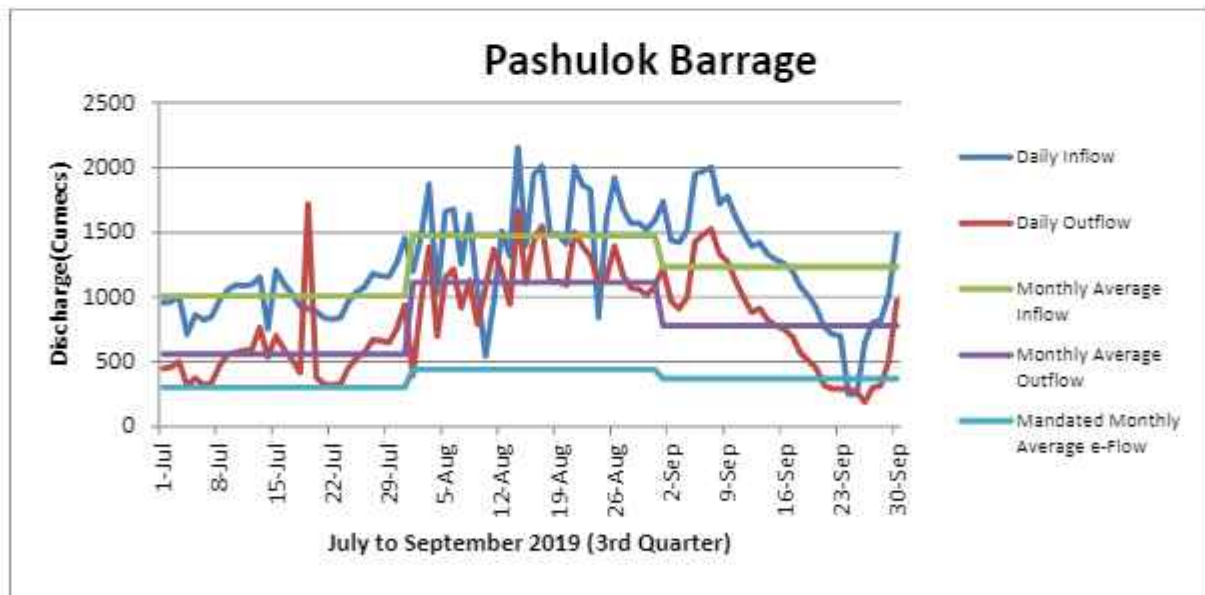


Figure 8: Graph showing status of implementation of e-flows at Pashulok Barrage Project.

The project is broadly meeting the e-flow norms for most of the period except few days.

6.8 BHIMGODA BARRAGE

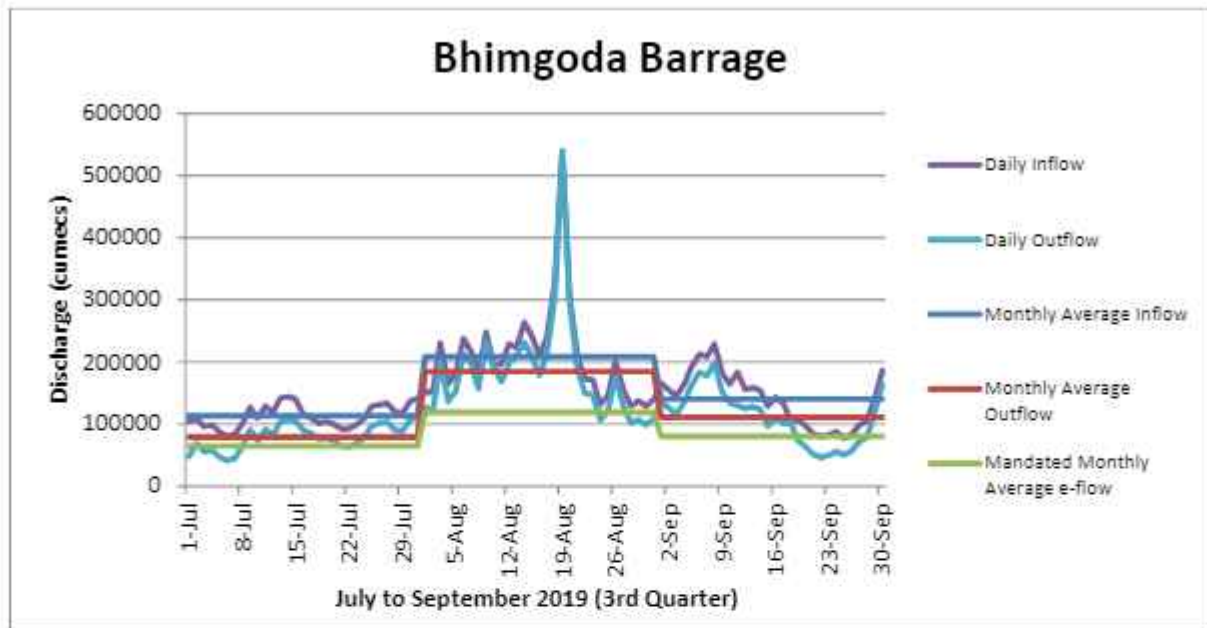


Figure 9: Graph showing status of implementation of e-flows at Bhimgoda Barrage Project.

The project is meeting the e-flow norms for most of the period except few days.

6.9 BIJNOR BARRAGE

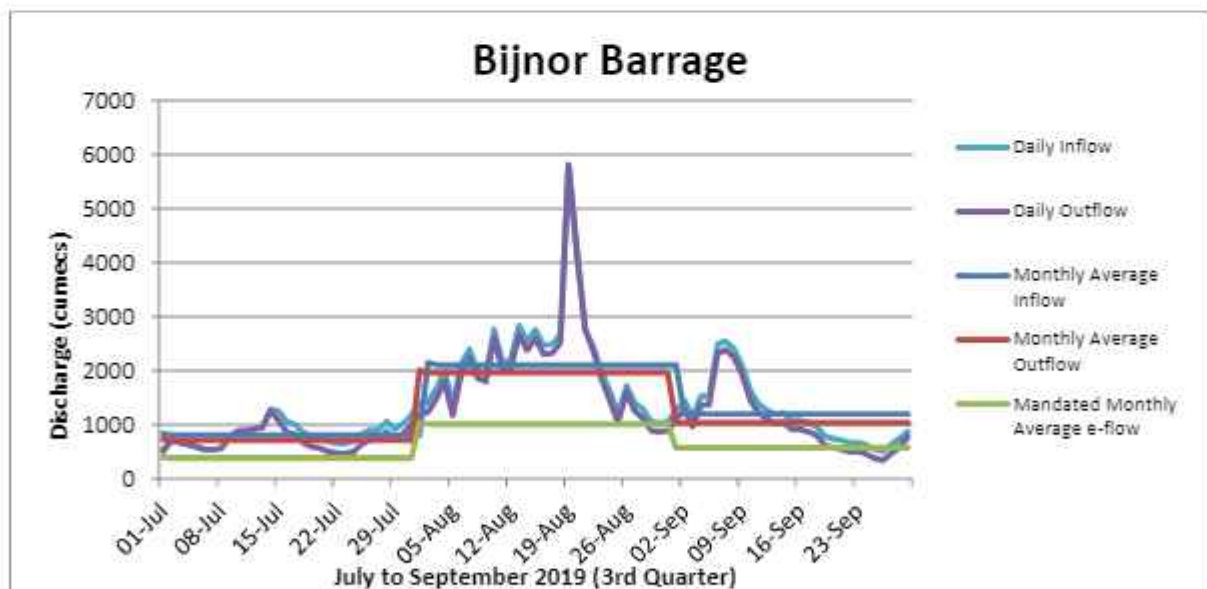


Figure 10: Graph showing status of implementation of e-flows at Bijnor Barrage Project.

The project is following the e-flow norms.

6.10 NARORA BARRAGE

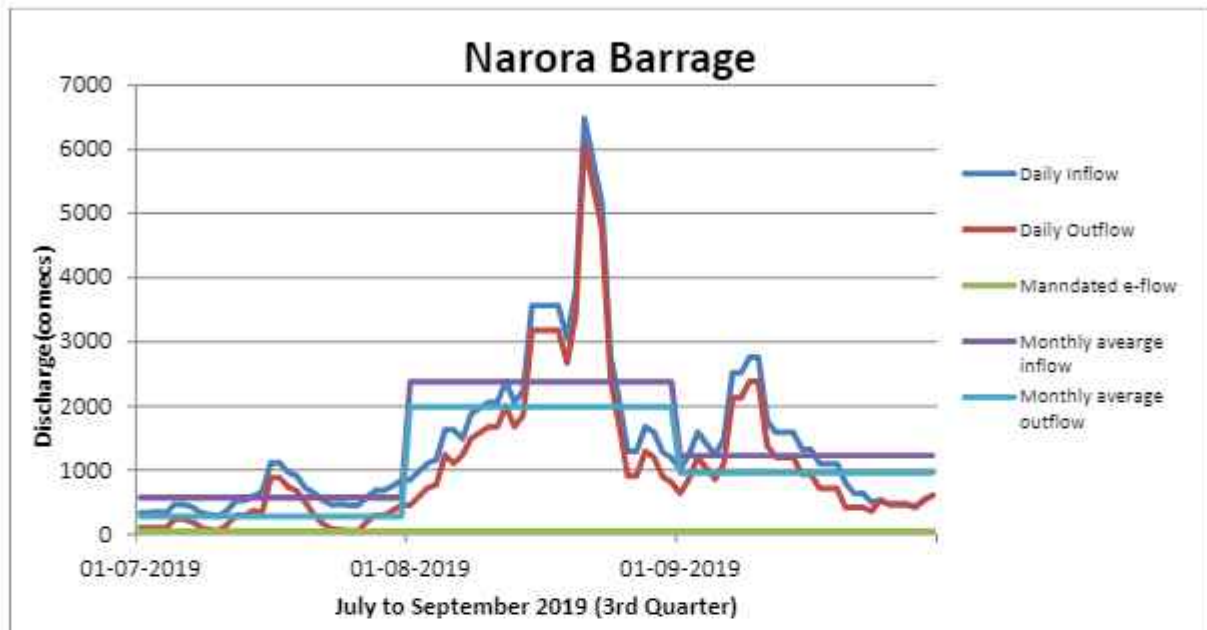


Figure 11: Graph showing status of implementation of e-flows at Narora Barrage Project.

The project is following the e-flow norms.

6.11 KANPUR BARRAGE

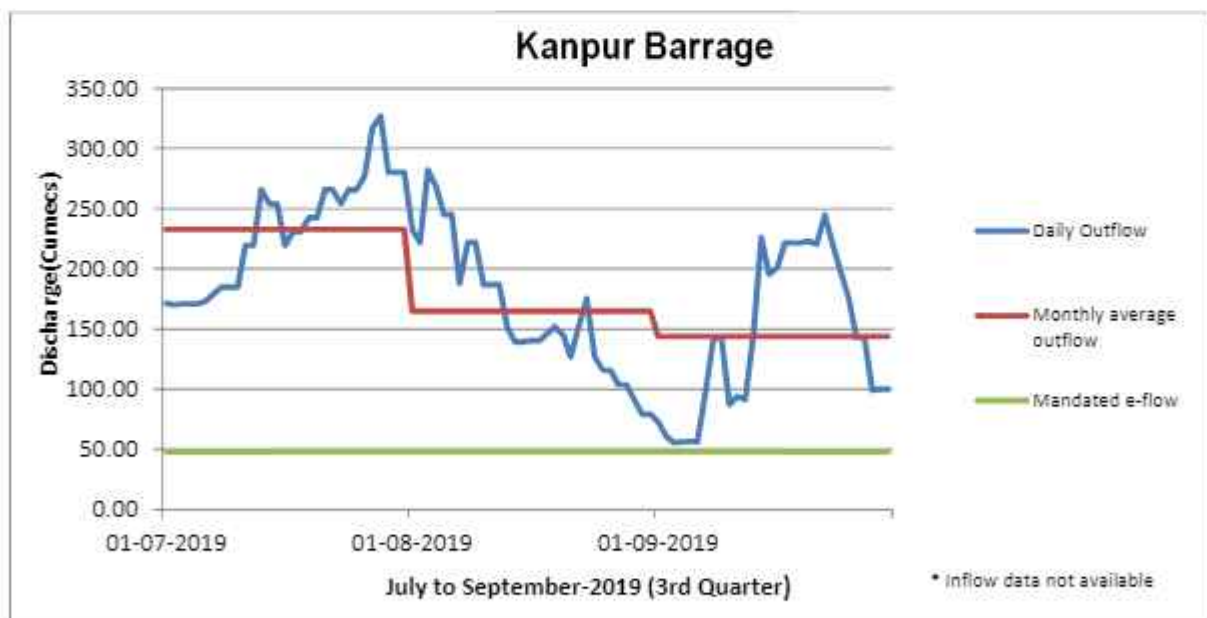


Figure 12: Graph showing status of implementation of e-flows at Kanpur Barrage Project.

The project is following the e-flow norms.

7.0 CONCLUSIONS

7.1 Most of the projects are providing the flow data on hourly basis regularly except Tehri, and Kanpur barrage. The data from Tehri project are being received regularly but on daily basis instead of hourly basis while Kanpur barrage authorities are measuring and providing flow data on two hourly basis. The project authorities are being pursued to provide the data in desired format on regular basis.

7.2 The automatic data acquisition and transmission system have not been installed on projects so far except at Tehri, Koteshwar dam, Bhimgoda barrage and Narora barrage. During the visit of expert team during June, 2019 and August, 2019, the project authorities were requested to install automatic system at the earliest positively by December, 2019.

7.3 Based on the data supplied by project authorities, most of the projects met the e-flow norms during the period as inflows are normally high in monsoon period. However, the following three projects are not meeting the mandated E-flow requirements after mid September after reduction in inflows

- Maneri Bhali Phase 2
- Vishnuprayag HEP
- Srinagar HEP



भारत का राजपत्र

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असाधारण

EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (ii)

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जल संसाधन, नदी विकास और गंगा संरक्षण मंत्रालय

(राष्ट्रीय स्वच्छ गंगा मिशन)

आदेश

नई दिल्ली, 9 अक्टूबर, 2018

का.आ. 5195(ब).—गंगा नदी अत्यधिक पवित्र और इस देश के लोगों द्वारा अत्यंत पूजनीय है तथा गंगा नदी बेसिन जल ग्रहण क्षेत्र के निबंधनानुसार भारत में बृहत्तम नदी बेसिन है, जिसमें संपूर्ण देश की छब्बीस प्रतिशत भूमि सम्मिलित है तथा जो लगभग पचास करोड़ जनसंख्या के लिए पोषणीय है;

और गंगा नदी विशेष गुणों, विशिष्टताओं तथा महत्व के रूप में अद्वितीय है जिसका महत्वपूर्ण लौकिक और स्थानिक प्रभाव भिन्नता के साथ जल-विज्ञान, भू-आकृतिविज्ञान, ऐतिहासिक, सामाजिक-सांस्कृतिक और आर्थिक कारण हैं;

और गंगा नदी को राष्ट्रीय नदी का दर्जा दिया गया है तथा नदी-प्रणाली में सिंचाई, घरेलू, औद्योगिक और अन्य प्रयोजनों के लिए बेसिन में सदैव पानी की बढ़ती मांग के साथ घरेलू अपशिष्ट और आद्योगिक अपशिष्ट सहित विभिन्न स्रोतों से प्रदूषण प्रवेश कर रहा है, जो नदी के स्वास्थ्य को लंबे समय से प्रभावित कर रहा है;

और भारत सरकार समुचित पर्यावरण प्रवाह तथा साथ ही नदी में प्रदूषण के प्रवेश के निवारण को सुनिश्चित करने के लिए नदियों की पौष्टिकता की बहाली करने और उसे बनाए रखने के लिए वचनबद्ध है;

और यह सुनिश्चित करना आवश्यक है कि गंगा नदी में हर समय पानी के निर्बाध प्रवाह को पूरी तरह से बनाए रखा जाए, जिससे मौसमी भिन्नताओं को बदले बिना नदी में प्रवाह की निरंतरता सुनिश्चित हो सके;

केंद्रीय सरकार ने पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का 29) के अधीन अधिसूचना का.आ. 3187 (अ), तारीख 7 अक्टूबर, 2016 द्वारा गंगा नदी जलक्षेत्र के संरक्षण, संरक्षा और प्रबंध तथा निम्नलिखित प्रयोजनों के लिए एक प्राधिकरण अर्थात् राष्ट्रीय स्वच्छ गंगा मिशन का गठन किया था, अर्थात्:-

(क) गंगा नदी और उसकी सहायक नदियों के जल की गुणवत्ता और पर्यावरणीय बहनीय संरक्षण, संरक्षा और प्रबंध को सुनिश्चित करने के उद्देश्य से सर्वत्र विभिन्न क्षेत्रों में विभिन्न बिंदुओं पर बनाए रखने के लिए अपेक्षित गंगा नदी और उसकी सहायक नदियों में पारिस्थितिक

प्रवाह के परिमाण को अवधारित करवाने तथा उसे अधिसूचित करवाने और पर्याप्त पारिस्थितिक प्रवाह को बनाए रखने के लिए ऐसे सभी आवश्यक कदम उठाना या निदेशित करना;

(ख) गंगा नदी के जलीय प्रेक्षण स्टेशनों के माध्यम से विनिर्दिष्ट बिंदुओं पर पानी के औसत प्रवाह को विनिर्दिष्ट करना;

(ग) गंगा नदी तथा उसकी सहायक नदियों में जल के प्रवाह की निरंतर मानीटरी के लिए तंत्र विकसित करना;

और केंद्रीय सरकार ने गंगा नदी और उसकी सहायक नदियों में कतिपय प्रवाहों को निर्धारित करने का विनिश्चय किया है।

2. अतः केंद्रीय सरकार, गंगा नदी (संरक्षण, सुरक्षा एवं प्रबंधन) प्राधिकरण आदेश, 2016 के पैरा 39 के उपपैरा (3) और पैरा 41 के उपपैरा (2) की मद (ज) के साथ पठित पर्यावरण संरक्षण अधिनियम, 1986 की धारा 3 की उपधारा (3) द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए, सिंचाई, जल विद्युत्, घरेलू और औद्योगिक प्रयोजनों तथा अन्य अपेक्षाओं के लिए नदी प्रवाह को परिवर्तित करने के लिए संरचनाओं या परियोजनाओं के निम्न प्रवाह अवस्थानों पर न्यूनतम पर्यावरणीय प्रवाहों को बनाए रखने के लिए अधिसूचित करती है, अर्थात्:-

I. देवप्रयाग से हरिद्वार तक अंत में मिलने वाले क्रमवर्तीय सम्मिलनों के माध्यम से और उद्भव वाले ग्लेशियरों से आरंभ होने वाला **उपरी गंगा नदी बेसिन विस्तार:**

क्रम सं.	ऋतु	मास	प्रत्येक पूर्ववर्ती 10 दैनिक अवधि के दौरान प्रेषित मासिक औसत प्रवाह का प्रतिशत(%)
1.	शुष्क	नवंबर से मार्च	20
2.	क्षीण	अक्तूबर, अप्रैल और मई	25
3.	उच्च प्रवाह ऋतु	जून से सितंबर	30*#

*#उच्च प्रवाह ऋतु के मासिक प्रवाह का 30%

II. **हरिद्वार, उत्तराखंड से उन्नाव, उत्तर प्रदेश तक गंगा नदी के मुख्य मार्ग का विस्तार:**

क्रम सं.	बैराज की अवस्थिति	बैराजों के सन्निकट निम्न धारा को निर्मुक्त करने वाला न्यूनतम प्रवाह (क्यूमीक्स में) (अक्तूबर से मई)	बैराजों के सन्निकट निम्न धारा को निर्मुक्त करने वाला न्यूनतम प्रवाह (क्यूमीक में) (जून से सितंबर)
(1)	भीमगौडा (हरिद्वार)	36	57
(2)	विजनौर	24	48
(3)	नरौरा	24	48
(4)	कानपुर	24	48

क्यूमीक घनमीटर प्रतिसेकंड।

III. उपरोक्त उक्त पारिस्थितिकी प्रवाह निम्न के अध्वधीन हैं, अर्थात्:-

(i) न्यूनतम पर्यावरणीय प्रवाह का अनुपालन सभी विद्यमान, निर्माणाधीन और भविष्य की परियोजनाओं को लागू होता है;

(ii) विद्यमान परियोजनाएं जो वर्तमान में इन पर्यावरणीय प्रवाहों के मानदंडों के अनुरूप नहीं हैं, इनका पालन करेंगी और यह सुनिश्चित करेंगी कि वांछित पर्यावरणीय प्रवाह मानदंडों का पालन इस अधिसूचना के जारी करने की तारीख से तीन वर्ष की अवधि के भीतर किया जाए;

(iii) परियोजना जो सन्निर्माण की विभिन्न प्रक्रम पर हैं, जहां जमीनी भौतिक प्रगति आरंभ हो चुकी है और समुचित प्राधिकारी को रिपोर्ट की गई है, परियोजना को आरंभ करने के पूर्व और उसके पश्चात् अनुबद्ध पर्यावरणीय प्रवाह को बनाए रखने के लिए भी आवश्यक उपबंध करेंगी;

(iv) लघु और सूक्ष्म परियोजनाएं जो सारवान रूप से नदी या धारा की प्रवाही विशेषताओं को परिवर्तित नहीं करती हैं, इन परियावरणीय प्रवाहों से छूट प्राप्त हैं;

(v) परिवारवर्णीय प्रवाहों को बनाए रखने के लिए जल की वांछनीय मात्राओं की निम्नलिखित को सुनिश्चित करने के लिए, इन नदी आगमों में प्रवाह की दशाएं समय-समय पर कालिक अंतरालों पर मानीटर की जाएंगी;

(vi) केंद्रीय जल आयोग अभिहित प्राधिकारी तथा डाटा का संरक्षक होगा तथा प्रवाहों के पर्यवेक्षण, मानीटरिंग, विनियमन तथा जब कभी अपेक्षित हो, समुचित प्राधिकारी को आवश्यक जानकारी रिपोर्ट करने के लिए उत्तरदायी होगा। यह किसी आपात स्थिति की दशा में जल मंडारण मानदंडों के बारे में तत्काल निर्णय लेने के लिए भी प्राधिकृत है। केंद्रीय जल आयोग त्रैमासिक आधार पर राष्ट्रीय स्वच्छ गंगा मिशन को प्रवाह मानीटरी सह अनुपालन रिपोर्ट प्रस्तुत करेगा;

(vii) संबंधित परियोजना विकासकर्ता या प्राधिकारी इस अधिसूचना की तारीख से छह मास के भीतर केंद्रीय जल आयोग विनिर्दिष्ट उचित अवस्थानों पर परियोजना स्थलों पर स्वचालित डाटा अर्जन और डाटा प्रेषण प्रसुविधाएं या अपेक्षित आवश्यक अवसंरचना लगाएगा। प्रवाह मानीटरी प्रसुविधा को लगाने, अंशांकन करने, उसे बनाए रखने का उत्तरदायित्व परियोजना विकासकर्ताओं या प्राधिकारियों का होगा और वे समय-समय पर केंद्रीय जल आयोग को डाटा प्रस्तुत करेंगे;

(viii) केंद्रीय सरकार, राष्ट्रीय स्वच्छ गंगा मिशन के माध्यम से, जब कभी अपेक्षित हो, गंगा नदी में विशेष मांग को पूरा करने के लिए अतिरिक्त जल को निर्मुक्त करने का निदेश दे सकेगी।

IV. संबंधित केंद्रीय और राज्य प्राधिकरण, सिंचाई का प्रभावी ढंग, जल का पुनः उपयोग और पुनः चक्रण, जिसके अंतर्गत विभिन्न प्रयोजनों के लिए भूजल निकालने की मानीटरिंग और विनियमन भी है, जैसे अच्युत और वैज्ञानिक व्यवहारों को अपना कर गंगा नदी के जल निकालने में कमी करने के लिए मांग पत्र प्रबंध योजना कार्यान्वित करेंगे।

3. यह आदेश इसके राजपत्र में प्रकाशन की तारीख से प्रवृत्त होगा।

4. यह आदेश उद्भव वाले ग्लेशियरों से आरंभ होने वाले उपरी गंगा नदी बेसिन तथा देवप्रयाग से हरिद्वार तक और उत्तर प्रदेश के उन्नाव जिले तक गंगा नदी की मुख्य धारा को तथा अंत में मिलने वाली इसकी मुख्य सहायक नदियों के क्रमवर्ती सम्मिलनों पर लागू होगा।

[फा. सं. - Estt.01/2016-17/111/NMCG (Vol III)]

राजीव किशोर, कार्यकारी निदेशक (प्रशा.)

**MINISTRY OF WATER RESOURCES, RIVER DEVELOPMENT AND GANGA REJUVENATION
(NATIONAL MISSION FOR CLEAN GANGA)**

ORDER

New Delhi, the 9th October, 2018

S.O.5195(E).—Whereas, the River Ganga is the most sacred and deeply revered by the people of this country and the Ganga river basin is the largest river basin in India in terms of catchment area, constituting twenty six per cent of the country's land mass and supporting about half a billion population;

And whereas, River Ganga is unique as having special properties, features and importance, holding reasons that are hydrological, geomorphological, historical, socio-cultural and economical with significant temporal and spatial flow variation;

And whereas, River Ganga has been given status of a National river and the ever increasing demand for water in the basin for irrigation, domestic, industrial and other purposes coupled with pollution ingress from different sources including domestic waste, industrial waste, into river system is affecting the health of the said river for long;

And whereas, the Central Government is committed to restore and maintain the wholesomeness of the rivers ensuring appropriate environment flows and simultaneously preventing the pollution ingress into the said river;

And whereas, it is considered necessary to ensure that uninterrupted flows of water are maintained throughout its length at all times in River Ganga to ensure continuity of flows in the river without altering the seasonal variations;

And whereas the Central Government *vide* notification S.O. 3187(E), dated the 7th October, 2016 under the Environment (Protection) Act, 1986 (29 of 1986) has constituted an authority, namely, the National Mission for Clean Ganga for Rejuvenation, Protection and Management of River Ganga basin for the following purposes, namely:-

(a) to determine the magnitude of ecological flow in the River Ganga and its tributaries required to be maintained at different points in different areas at all times with the aim of ensuring water quality and environmentally

sustainable rejuvenation, protection and management of River Ganga and its tributaries and notifying the same and take or direct all such measures necessary to maintain adequate ecological flows;

- (b) to specify the average flow of water at specified points through Hydrological Observation Stations of the River Ganga;
- (c) to devise a system for continuous monitoring of flow of water in the River Ganga and its tributaries;

And whereas the Central Government has decided to determine certain flows in the River Ganga and its tributaries;

2. Now, therefore, in exercise of the powers conferred by sub-section (3) of section 3 of the Environment (Protection) Act 1986 and read with sub paragraph (3) of paragraph 39 and item(h) of sub-paragraph(2) of paragraph 41 of the River Ganga (Rejuvenation, Protection and Management) Authorities Order, 2016, the Central Government hereby notifies the following minimum environmental flows to be maintained at locations downstream of structures or projects meant for diversion of river flows for purposes like irrigation, hydropower, domestic and industrial and other requirements, namely:-

- I. **Upper Ganga River Basin Stretch** starting from originating glaciers and through respective confluences finally meeting at Devaprayag up to Haridwar:

Sl. No.	Season	Months	(%) Percentage of Monthly Average Flow observed during each of preceding 10-daily period
1	Dry	November to March	20
2	Lean	October, April and May	25
3	High Flow season	June to September	30 ^{*#}

*# 30% of monthly flow of High flow season.

- II. **Stretch of main stem of River Ganga from Haridwar, Uttarakhand to Unnao, Uttar Pradesh**

S. No.	Location of Barrage	Minimum flow releases immediately downstream of barrages (In Cumecs) Non-Monsoon (October to May)	Minimum flow releases immediately downstream of barrages (In Cumecs) Monsoon (June to September)
(1)	Bhimgoda (Haridwar)	36	57
(2)	Bijnor	24	48
(3)	Narora	24	48
(4)	Kanpur	24	48

Cumec – Cubic Meter per second.

- III. The above said ecological flows are subject to the following, namely:-

- (i) the compliance of minimum environmental flow is applicable to all existing, under-construction and future projects;
- (ii) the existing projects, which currently do not meet the norms of these environmental flows, shall comply and ensure that the desired environmental flow norms are complied within a period of three years from the date of issue of this order;

- (iii) the project which is at different stages of construction, where physical progress on ground has been initiated and made and reported to appropriate authority shall also make necessary provisions to maintain the stipulated environmental flow before and after commissioning of the project;
 - (iv) the mini and micro projects which do not alter the flow characteristics of the river or stream significantly are exempted from these environmental flows;
 - (v) to ensure the release of desired quantities of water to maintain environmental flows, flow conditions in these river reaches shall be monitored at hourly intervals from time to time;
 - (vi) the Central Water Commission shall be the designated authority and the custodian of the data and shall be responsible for supervision, monitoring, regulation of flows and reporting of necessary information to the appropriate authority as and when required and also authorised to take emergent decisions about the water storage norms in case of any emergency. The Central Water Commission shall submit flow monitoring-cum-compliance report on quarterly basis to National Mission for Clean Ganga;
 - (vii) the concerned project developers or authorities shall install automatic data acquisition and data transmission facilities or required necessary infrastructure at project sites at appropriate locations specified by the Central Water Commission within six months from the date of this order. The installation, calibration, maintenance of flow monitoring facility shall be the responsibility of the project developers or authorities and they shall submit the data to the Central Water Commission from time to time;
 - (viii) the Central Government through National Mission for Clean Ganga may direct release of additional water in the River Ganga to meet special demand as and when required.
- IV. The concerned Central and State authorities shall implement demand side management plans to reduce water withdrawal from River Ganga by adopting good and scientific practices such as efficient method of irrigation, reuse and recycle of water including monitoring and regulation of ground water withdrawals for various purposes.
3. This Order shall come into force on the date of its publication in the Official Gazette.
4. This Order shall apply to the upper Ganga River Basin starting from originating glaciers and through respective confluences of its head tributaries finally meeting at Devaprayag up to Haridwar and the main stem of River Ganga up to Unnao district of Uttar Pradesh

[F. No. - Estt.01/2016-17/111/NMCG(Vol III)]

RAJIV KISHORE, Executive Director(Admn)



भारत का राजपत्र The Gazette of India

असाधारण

EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (ii)

PART II—Section 3—Sub-section (ii)

प्राधिकार से प्रकाशित

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जल शक्ति मंत्रालय

(जल संसाधन, नदी विकास और गंगा संरक्षण विभाग)

(राष्ट्रीय स्वच्छ गंगा मिशन)

आदेश

नई दिल्ली, 14 सितम्बर, 2019

का.आ. 3186(अ).—गंगा नदी अत्यधिक पवित्र और इस देश के लोगों द्वारा अत्यन्त पूजनीय है तथा उसकी बेसिन जल ग्रहण क्षेत्र के निबंधनानुसार भारत में बृहत्तम नदी बेसिन है तथा नदी प्रणाली में सिंचाई, घरेलू, औद्योगिकी और अन्य प्रयोजनों के लिए बेसिन में सदैव पानी की बढ़ती मांग के साथ घरेलू अपशिष्ट और औद्योगिक अपशिष्ट सहित विभिन्न स्रोतों से प्रदूषण प्रवेश कर रहा है, जो नदी की स्वच्छता को लंबे समय से प्रभावित कर रहा है;

और, केंद्रीय सरकार को यह सुनिश्चित करना आवश्यक है कि गंगा नदी में हर समय पानी के निर्बाध प्रवाह को पूरी तरह से बनाए रखा जाए, जिससे मौसमी विभिन्नताओं के बदले बिना नदी में प्रवाह की निरंतरता सुनिश्चित हो सके;

और, भारत सरकार के तत्कालीन जल संसाधन, नदी विकास और गंगा संरक्षण मंत्रालय ने भारत के राजपत्र में प्रकाशित अधिसूचना सं. का.आ. 3187(अ) तारीख 7 अक्टूबर 2016 के भाग II, खंड 3, उप-खंड (ii) द्वारा गंगा नदी (संरक्षण, सुरक्षा एवं प्रबंधन) प्राधिकरण आदेश, 2016 जारी करने के साथ-साथ एक प्राधिकरण अर्थात् उक्त अधिसूचना में विनिर्दिष्ट विभिन्न प्रयोजनों के लिए गंगा नदी बेसिन के संरक्षण, सुरक्षा एवं प्रबंधन के लिए राष्ट्रीय स्वच्छ गंगा मिशन गठित किया है;

और, केंद्रीय सरकार ने गंगा नदी में उसके चिन्हित हिस्सों को सुरक्षित रखने के लिए न्यूनतम पर्यावरणीय प्रवाह विनिर्दिष्ट करते हुए अधिसूचना सं. का. आ. 5195 (अ) तारीख 9 अक्टूबर, 2018 को एक आदेश (उक्त आदेश) जारी किया था;

और, केंद्रीय जल आयोग ने प्रवाह के पर्यवेक्षण, विनियम और तिमाही रिपोर्ट के आधार पर राष्ट्रीय स्वच्छ गंगा मिशन के लिए नामनिर्दिष्ट प्राधिकरण के रूप में अपनी क्षमता के आधार पर 11 जुलाई, 2019 को अपनी रिपोर्ट प्रस्तुत की थी, जिसमें सिफारिश की गयी थी कि सभी विद्यमान परियोजनाओं में नियंत्रित गेट लगे स्थलवे या जल मार्गों के माध्यम से निर्धारित ई-प्रवाह छोड़ने की व्यवस्था है और इसके लिए परियोजना के ढांचे में ढांचागत परिवर्तन की आवश्यकता नहीं है;

और केंद्रीय सरकार ने केंद्रीय जल आयोग की उक्त सिफारिशों पर विचार कर लिया है;

और केंद्रीय सरकार का यह विचार है कि विद्यमान परियोजनाओं को उक्त आदेश में विनिर्दिष्ट अनिवार्य पर्यावरणीय प्रवाह का समुचित अनुपालन सुनिश्चित करने के लिए विद्यमान परियोजनाओं को तीन वर्ष की अवधि की अनुमति अत्यधिक है और आवश्यक नहीं है।

अतः अब, गंगा नदी (संरक्षण, सुरक्षा एवं प्रबंधन) प्राधिकरण आदेश, 2016 के पैरा 39 के उप-पैरा (3) और पैरा 41 के उप-पैरा (2) की मद (ज) के साथ पठित पर्यावरण (संरक्षण) अधिनियम, 1986 की धारा 3 की उपधारा (3) द्वारा शक्तियों का प्रयोग करते हुए केंद्रीय सरकार उक्त आदेश संख्या का. आ. 5195 (अ) तारीख 09 अक्तूबर 2018 में निम्नलिखित संशोधन करती है अर्थात् –

उक्त आदेश के पैरा 2 में, उप-पैरा III में, मद (ii) में "तीन वर्ष की अवधि के भीतर" शब्दों के स्थान पर "15 दिसंबर 2019 से पहले" शब्द और अंक रखे जाएंगे।

[फा. सं. 05/46/2017-हाईड(एनई)]

राजीव किशोर, कार्यकारी निदेशक (प्रशासन)

टिप्पण: मूल आदेश, भारत के राजपत्र, असाधारण, भाग II, खंड 3, उप-खंड (ii), तारीख 10 अक्तूबर, 2018 में अधिसूचना सं. का.आ. 5195(अ), तारीख 9 अक्तूबर, 2018 द्वारा प्रकाशित किया गया था।

MINISTRY OF JAL SHAKTI

(Department of Water Resources, River Development and Ganga Rejuvenation)

(NATIONAL MISSION FOR CLEAN GANGA)

ORDER

New Delhi, the 14th September, 2019

S.O. 3286(E).—Whereas, the river Ganga is the most sacred and deeply revered by the people of this country and its river basin is the largest river basin in India in terms of catchment area and the ever increasing demand for water in the basin for irrigation, domestic, industrial and other purposes coupled with pollution ingress from different sources including domestic waste, industrial waste, into river system is affecting the health of the said river for long;

And whereas, the Central Government is considered necessary to ensure that uninterrupted flows of water are maintained throughout its length at all times in river Ganga to ensure continuity of flows in the river without altering the seasonal variations;

And whereas, *vide* notification number S.O. 3187(E), dated the 7th October, 2016 published in the Gazette of India, Part II, Section 3, Sub-section (ii), the Government of India in the erstwhile Ministry of Water Resources, River Development and Ganga Rejuvenation made the River Ganga (Rejuvenation, Protection and Management) Authorities Order, 2016, *inter alia*, constituting an authority, namely, the National Mission for Clean Ganga for Rejuvenation, Protection and Management of River Ganga basin for various purposes specified therein in the said notification;

And whereas the Central Government issued an Order *vide* notification number S.O. 5195(E), dated the 9th October, 2018 (the said Order) specifying the minimum environmental flows to be maintained in river Ganga in the identified stretches;

And whereas, the Central Water Commission in its capacity as the designated Authority for supervision, regulation of flows and reporting on quarterly basis to the National Mission for Clean Ganga, submitted a report dated 11th July, 2019 recommending that all the existing projects have provision for releasing the mandated e-flow through controlled gated spillways or water ways, and structural modifications in the body of the project may not be required for the same;

And whereas, the said recommendations of the Central Water Commission have been considered by the Central Government;

And whereas, the Central Government is of the view that the time period of three years allowed to the existing projects to ensure proper compliance of the mandated environmental flows specified in the said Order, is excessive and not necessary;

Now, therefore, in exercise of the powers conferred by sub-section (3) of section 3 of the Environment (Protection) Act, 1986 read with sub-paragraph (3) of paragraph 39 and item (h) of sub-paragraph (2) of paragraph 41 of the River Ganga (Rejuvenation, Protection and Management)

Authorities Order, 2016, the Central Government hereby makes the following amendments in the said Order number S.O. 5195(E), dated the 9th October, 2018, namely:—

2. In the said Order, in paragraph 2, in sub-paragraph III, in item (ii), for the words “within a period of three years from the date of issue of this Order”, the words, letters and figures “before 15th December, 2019” shall be substituted.

[F. No. 05/46/2017-Hyd (NE)]

RAJIV KISHORE, Executive Director (Admn.)

Note : The principal Order was published *vide* notification number S.O. 5195(E), dated the 9th October, 2018 in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii), dated 10th October, 2018.



भारत का राजपत्र The Gazette of India

असाधारण

EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (ii)

PART II—Section 3—Sub-section (ii)

प्राधिकार से प्रकाशित

PUBLISHED BY AUTHORITY

सं. 3006]

नई दिल्ली, शनिवार, सितम्बर 14, 2019/भाद्र 23, 1941

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NEW DELHI, SATURDAY, SEPTEMBER 14, 2019/BHADRA 23, 1941

जल शक्ति मंत्रालय

(जल संसाधन, नदी विकास और गंगा संरक्षण विभाग)

(राष्ट्रीय स्वच्छ गंगा मिशन)

आदेश

नई दिल्ली, 14 सितम्बर, 2019

का.आ. 3186(अ).—गंगा नदी अत्यधिक पवित्र और इस देश के लोगों द्वारा अत्यन्त पूजनीय है तथा उसकी बेसिन जल ग्रहण क्षेत्र के निबंधनानुसार भारत में बृहत्तम नदी बेसिन है तथा नदी प्रणाली में सिंचाई, घरेलू, औद्योगिकी और अन्य प्रयोजनों के लिए बेसिन में सदैव पानी की बढ़ती मांग के साथ घरेलू अपशिष्ट और औद्योगिक अपशिष्ट सहित विभिन्न स्रोतों से प्रदूषण प्रवेश कर रहा है, जो नदी की स्वच्छता को लंबे समय से प्रभावित कर रहा है;

और, केंद्रीय सरकार को यह सुनिश्चित करना आवश्यक है कि गंगा नदी में हर समय पानी के निर्बाध प्रवाह को पूरी तरह से बनाए रखा जाए, जिससे मौसमी विभिन्नताओं के बदले बिना नदी में प्रवाह की निरंतरता सुनिश्चित हो सके;

और, भारत सरकार के तत्कालीन जल संसाधन, नदी विकास और गंगा संरक्षण मंत्रालय ने भारत के राजपत्र में प्रकाशित अधिसूचना सं. का.आ. 3187(अ) तारीख 7 अक्तूबर 2016 के भाग II, खंड 3, उप-खंड (ii) द्वारा गंगा नदी (संरक्षण, सुरक्षा एवं प्रबंधन) प्राधिकरण आदेश, 2016 जारी करने के साथ-साथ एक प्राधिकरण अर्थात् उक्त अधिसूचना में विनिर्दिष्ट विभिन्न प्रयोजनों के लिए गंगा नदी बेसिन के संरक्षण, सुरक्षा एवं प्रबंधन के लिए राष्ट्रीय स्वच्छ गंगा मिशन गठित किया है;

और, केंद्रीय सरकार ने गंगा नदी में उसके चिन्हित हिस्सों को सुरक्षित रखने के लिए न्यूनतम पर्यावरणीय प्रवाह विनिर्दिष्ट करते हुए अधिसूचना सं. का. आ. 5195 (अ) तारीख 9 अक्तूबर, 2018 को एक आदेश (उक्त आदेश) जारी किया था;

और, केंद्रीय जल आयोग ने प्रवाह के पर्यवेक्षण, विनियम और तिमाही रिपोर्ट के आधार पर राष्ट्रीय स्वच्छ गंगा मिशन के लिए नामनिर्दिष्ट प्राधिकरण के रूप में अपनी क्षमता के आधार पर 11 जुलाई, 2019 को अपनी रिपोर्ट प्रस्तुत की थी, जिसमें सिफारिश की गयी थी कि सभी विद्यमान परियोजनाओं में नियंत्रित गेट लगे स्थलवे या जल मार्गों के माध्यम से निर्धारित ई-प्रवाह छोड़ने की व्यवस्था है और इसके लिए परियोजना के ढांचे में ढांचागत परिवर्तन की आवश्यकता नहीं है;

और केंद्रीय सरकार ने केंद्रीय जल आयोग की उक्त सिफारिशों पर विचार कर लिया है;

और केंद्रीय सरकार का यह विचार है कि विद्यमान परियोजनाओं को उक्त आदेश में विनिर्दिष्ट अनिवार्य पर्यावरणीय प्रवाह का समुचित अनुपालन सुनिश्चित करने के लिए विद्यमान परियोजनाओं को तीन वर्ष की अवधि की अनुमति अत्यधिक है और आवश्यक नहीं है।

अतः अब, गंगा नदी (संरक्षण, सुरक्षा एवं प्रबंधन) प्राधिकरण आदेश, 2016 के पैरा 39 के उप-पैरा (3) और पैरा 41 के उप-पैरा (2) की मद (ज) के साथ पठित पर्यावरण (संरक्षण) अधिनियम, 1986 की धारा 3 की उपधारा (3) द्वारा शक्तियों का प्रयोग करते हुए केंद्रीय सरकार उक्त आदेश संख्या का. आ. 5195 (अ) तारीख 09 अक्तूबर 2018 में निम्नलिखित संशोधन करती है अर्थात् –

उक्त आदेश के पैरा 2 में, उप-पैरा III में, मद (ii) में "तीन वर्ष की अवधि के भीतर" शब्दों के स्थान पर "15 दिसंबर 2019 से पहले" शब्द और अंक रखे जाएंगे।

[फा. सं. 05/46/2017-हाईड(एनई)]

राजीव किशोर, कार्यकारी निदेशक (प्रशासन)

टिप्पण: मूल आदेश, भारत के राजपत्र, असाधारण, भाग II, खंड 3, उप-खंड (ii), तारीख 10 अक्तूबर, 2018 में अधिसूचना सं. का.आ. 5195(अ), तारीख 9 अक्तूबर, 2018 द्वारा प्रकाशित किया गया था।

MINISTRY OF JAL SHAKTI

(Department of Water Resources, River Development and Ganga Rejuvenation)

(NATIONAL MISSION FOR CLEAN GANGA)

ORDER

New Delhi, the 14th September, 2019

S.O. 3286(E).—Whereas, the river Ganga is the most sacred and deeply revered by the people of this country and its river basin is the largest river basin in India in terms of catchment area and the ever increasing demand for water in the basin for irrigation, domestic, industrial and other purposes coupled with pollution ingress from different sources including domestic waste, industrial waste, into river system is affecting the health of the said river for long;

And whereas, the Central Government is considered necessary to ensure that uninterrupted flows of water are maintained throughout its length at all times in river Ganga to ensure continuity of flows in the river without altering the seasonal variations;

And whereas, *vide* notification number S.O. 3187(E), dated the 7th October, 2016 published in the Gazette of India, Part II, Section 3, Sub-section (ii), the Government of India in the erstwhile Ministry of Water Resources, River Development and Ganga Rejuvenation made the River Ganga (Rejuvenation, Protection and Management) Authorities Order, 2016, *inter alia*, constituting an authority, namely, the National Mission for Clean Ganga for Rejuvenation, Protection and Management of River Ganga basin for various purposes specified therein in the said notification;

And whereas the Central Government issued an Order *vide* notification number S.O. 5195(E), dated the 9th October, 2018 (the said Order) specifying the minimum environmental flows to be maintained in river Ganga in the identified stretches;

And whereas, the Central Water Commission in its capacity as the designated Authority for supervision, regulation of flows and reporting on quarterly basis to the National Mission for Clean Ganga, submitted a report dated 11th July, 2019 recommending that all the existing projects have provision for releasing the mandated e-flow through controlled gated spillways or water ways, and structural modifications in the body of the project may not be required for the same;

And whereas, the said recommendations of the Central Water Commission have been considered by the Central Government;

And whereas, the Central Government is of the view that the time period of three years allowed to the existing projects to ensure proper compliance of the mandated environmental flows specified in the said Order, is excessive and not necessary;

Now, therefore, in exercise of the powers conferred by sub-section (3) of section 3 of the Environment (Protection) Act, 1986 read with sub-paragraph (3) of paragraph 39 and item (h) of sub-paragraph (2) of paragraph 41 of the River Ganga (Rejuvenation, Protection and Management)

Authorities Order, 2016, the Central Government hereby makes the following amendments in the said Order number S.O. 5195(E), dated the 9th October, 2018, namely:—

2. In the said Order, in paragraph 2, in sub-paragraph III, in item (ii), for the words “within a period of three years from the date of issue of this Order”, the words, letters and figures “before 15th December, 2019” shall be substituted.

[F. No. 05/46/2017-Hyd (NE)]

RAJIV KISHORE, Executive Director (Admn.)

Note : The principal Order was published *vide* notification number S.O. 5195(E), dated the 9th October, 2018 in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii), dated 10th October, 2018.

Annexure II

Hydro Projects being Developed by CPSUs in Uttarakhand State

SR. NO.	NAME OF THE PROJECT	CAPACITY IN MW	DISTRICT	RIVER VALLEY	TRIBUTARY	NAME OF AGENCY
1	Tehri PSP	1000.00	Tehri	Bhagirathi	Bhagirathi	THDC
2	Tapovan Vishnugad	520.00	Chamoli	Alaknanda	Dhauliganga	NTPC
3	Vishnugad Pipalkoti	444.00	Chamoli	Alaknanda	Alaknanda	THDC
4	Lata Tapovan	171.00	Chamoli	Alaknanda	Dhauliganga	NTPC
5	Naitwar mori	60.00	Uttarkashi	Yamuna	Tons	SJVNL
6	Devsari Dam	252.00	Chamoli	Alaknanda	Pindar	SJVNL
7	Kothi Bhel - IA	195.00	Tehri	Bhagirathi	Bhagirathi	NHPC
8	Rusrya Bagar Khasiyabara	260.00	Pithoragarh	Gauriganga	Gauriganga	NTPC
9	Kothi Bhel - IB	320.00	Pauri (G)	Alaknanda	Alaknanda	NHPC
10	Kothi Bhel - II	530	Pauri (G)	Ganga	Ganga	NHPC
11	Jakhol Sankri	51.00	Uttarkashi	Yamuna	Tons	SJVNL
12	Jhelam Tamak	108.00	Chamoli	Alaknanda	Dhauliganga	THDC
13	Maleri Jhelam	65.00	Chamoli	Alaknanda	Dhauliganga	THDC
14	Gohana Tal	50.00	Chamoli	Alaknanda	Birehiganga	THDC
15	Gauriganga III A	120.00	Pithoragarh	Gauriganga	Gauriganga	NHPC
16	Dhauliganga Intermediate Stage	210.00	Pithoragarh	Dhauli Ganga	Dhauliganga	NHPC
17	Karmoli Lumti Talli	55.00	Pithoragarh	Gauriganga	Gauriganga	NHPC
18	Chungar Chal	240.00	Pithoragarh	Dhauli Ganga	Dhauliganga	NHPC
19	Garba Tawaghat	630.00	Pithoragarh	Sharda	Sharda	NHPC
20	Karmoli	140.00	UttarKashi	Bhagirathi	Jadhganga	THDC
21	Jadhganga	50.00	UttarKashi	Bhagirathi	Jadhganga	THDC
22	Bokang Bailing	330.00	Pithoragarh	Dhauli Ganga	Dhauliganga	THDC
	Total	5801.00	MW			

Hydro Projects being Developed by IPPs in Uttarakhand State

S.N.	Name of Project	Estimated Potential (MW)	District	River/ Tributary	Developer
1	Rayat	6	Tehri	Aglar gad	Aglar Pvt Ltd.
2	Bgyunder Ganga	24.3	Chamoli	Bgyunder Ganga	Super Hydro Pvt Ltd
3	Phata- Byung	76	Rudraprayag	Mandakini	Lanco Kondapalli
4	Singoli-Bhatwari	99	Rudraprayag	Mandakini	L&T Power
5	Hanuman Ganga Ext. II	1.9	Uttarkashi	Hanuman ganga	Regency Aqua
6	Lagrasu	3	Tehri	Aglar	Aglar Pvt.Ltd.
7	Burthing	6.5	Pithoragarh	Eastern Ramganga	M/S Energy Development Company
8	Phuliabagar	5	Pithoragarh	Eastern Ramganga	M/S Energy Development Company
9	Balighat	5.5	Bageshwar	Sarju	M/S Energy Development Company
10	Barnigad	22.8	Uttarkashi	Yamuna	K Ramchandra Rao
11	Kot-Buda Kedar	6	Tehri	Bhilangana	Gunsola Hydro
12	Jhala Koti	12.5	Tehri	Dharam Ganga	Gunsola Hydro
13	Khiraoganga	4	Uttarkashi	khiraoganga	Super Hydro Pvt. Ltd.
14	Devali	13	Chamoli	Nandakini	Hima Urja Pvt Ltd.
15	Kailganga	5	Chamoli	Pinder	Chamoli Hydro Pvt Ltd.
16	Hanol Tuni	60	Uttarkashi	Tons	Sunflag Power
17	Kakora Gad	12.5	Uttarkashi	Bhagirathi	Harsil Hydro
18	Jalandhari Gad	24	Uttarkashi	Bhagirathi	Harsil Hydro
19	Siyangad	11.5	Uttarkashi	Bhagirathi	Harsil Hydro
20	Alaknanda	300	Chamoli	Alaknanda	GMR Energy
21	Melkhet	24	Chamoli	Pinder	Melkhet Power
22	Sarju Stage-I	7.5	Bageshwar	Sarju	Uttar Bharat Power Pvt. Ltd
23	Khutani	21	Bageshwar	Sarju	Shayama Power
24	Rambara	76	Rudraprayag	Mandakini	Lanco Kondapalli
25	Birahi Ganga-I	24	Chamoli	Birahiganga	PES Engineering
26	Balgad	19.80	Pithoragarh	Eastern Ramganga	Balgad Power Company Ltd.
27	Madkini	21	Pithoragarh	Madkini	Madkini hydro Power Ltd.
28	Mori-Hanol	63	Uttarkashi	Tons	Krisna Knitwear
29	Rupin Stage III	8	Uttarkashi	Rupin	Tons Hydro
30	Rupin Stage IV	10	Uttarkashi	Rupin	Tons Hydro
31	Rupin Stage V	24	Uttarkashi	Tons	Tons Hydro
32	Birahi Ganga-II	24	Chamoli	Birahiganga	PES Engineering
33	Urthing Sobla	340	Pithoragarh	Dhauliganga	Reliance Energy
	Total	1360.8	MW		

Hydro Projects Under Operation in Uttarakhand State

S.No.	Name of Project	Estimated Potential (MW)	District	River/Tributory	Agency
1	Maneri Bhali Stage - II	304	Uttarkashi	Bhagirathi	UJVNL
2	Chibro	240	Dehradun	Tons	UJVNL
3	Ramganga	198	Pauri	Ramganga	UJVNL
4	Chilla	144	Pauri	Ganga	UJVNL
5	Khodri	120	Dehradun	Tons	UJVNL
6	Tiloth	90	Uttarkashi	Bhagirathi	UJVNL
7	Dhalipur	51	Dehradun	Yamuna	UJVNL
8	Khatima	41.4	U.S. Nagar	Sarda	UJVNL
9	Dhakrani	33.75	Dehradun	Yamuna	UJVNL
10	Kulhal	30	Dehradun	Yamuna	UJVNL
11	Pathari	20.4	Hardwar	Upper ganga Canal	UJVNL
12	Mohmadpur	9.3	Hardwar	Upper ganga Canal	UJVNL
13	Galogi	3	Dehradun	Bhattafall	UJVNL
14	Urgam	3	Chamoli	Kalpoganga	UJVNL
15	Dunao	1.5	Pauri	Eastern Nayar	UJVNL
16	Tanakpur	120.00	Champawat	Sharda	NHPC
17	Dhaulti Ganga	280.00	Pithoragarh	Dhaulti Ganga	NHPC
18	Tehri Dam	1000.00	Tehri	Bhagirathi	THDC
19	Koteshwar Dam	400.00	Tehri	Bhagirathi	THDC
20	Rajwakti	3.6	Chamoli	Nandakini	Him Urja Pvt Ltd
21	Hanuman Ganga	4.95	Uttarkashi	Hanuman ganga	Regency Aqua
22	Vishnuprayag	400	Chamoli	Alaknanda	JPVL
23	Deval	5	Chamoli	Pinder	Chamoli Hydro Pvt Ltd.
24	Loharkhet	4.8	Bageshwar	Lohar Khet	Parvatiya Power Pvt Ltd.
25	Agunda Thati	3	Tehri	Balganga	Gunsola Hydro
26	Vanala	15	Chamoli	Banala	Hima Urja Pvt Ltd.
27	Bhilangana	22.5	Tehri	Bhilangana	Swasti Power
28	Motighat	5	Pithoragarh	Sheraghat	Himalaya Hydro (P) Ltd.
29	Birahiganga	7.2	Chamoli	Birahiganga	Birahignaga Hydro
30	Rishiganga	13.2	Chamoli	Rishiganga	Rishiganga Power
31	Bhilangna III	24	Uttarkashi	Bhilangana	Bhilangana Hydro Power Ltd
32	Gangani	8	Uttarkashi	Gangani	Regency Gangani Energy
33	Sarju Stage-III	10.5	Bageshwar	Sarju	Uttar Bharat Power Pvt. Ltd
34	Badyar	4.9	Uttarkashi	Badyar gad	Regency Yamuna Energy
35	Srinagar	330	Pauri	Alaknanda	GVK
36	Sarju Stage-II	15	Bageshwar	Sarju	Uttar Bharat Power Pvt. Ltd
37	Tanga	5	Pithoragarh	Sheraghat	Himalaya Hydro (P) Ltd.
Total		3971			

Hydro Projects Being Developed by UJVNL

S.No.	Name of Project	Estimated Potential (MW)	District	River/Tributary
1	Vyasi	120	Dehradun	Yamuna
2	Lakhtar	300	Dehradun	Yamuna
3	Pala Maneri	480	Uttarkashi	Bhagirathi
4	Bharon Ghati	381	Uttarkashi	Bhagirathi
5	Bowla Nandprayag	300	Chamoli	Alaknanda
6	Nand Pyayag Langasu	100	Chamoli	Alaknanda
7	Tamak lata	280	Chamoli	Dhauliganga
8	Sarkari Bhyol Rupsiabagar	120	Pithoragarh	Goriganga
9	Sela Urthing	230	Pithoragarh	Dhauliganga
10	Taluka Sankri	140	Uttarkashi	Tons
11	Rishiganga I	70	Chamoli	Rishiganga
12	Rishiganga II	35	Chamoli	Rishiganga
13	Madhmaheshwar	15	Rudrprayag	Madhmaheshwar
14	Kaldigad	9	Uttarkashi	Kaldigad
15	Kaliganga-II	6	Rudrprayag	Kaliganga
16	Asiganga-I	4.5	Uttarkashi	Asiganga
17	Kaliganga-I	4	Rudrprayag	Kaliganga
18	Sobla I	8	Pithoragarh	Sobla
19	Asiganga-II	4.5	Uttarkashi	Asiganga
20	Dunao	1.5	Pauri	Eastern Nayar
21	Suwarigad	2	Uttarkashi	Bhagirathi
22	Limchagad	3.5	Uttarkashi	Bhagirathi
23	Tankul	12	Pithoragarh	Shyamkholigad
24	Painagad	4	Pithoragarh	Painagad
25	Pilangad-II	4	Uttarkashi	Pilangad
26	Urgam-II	3.8	Chamoli	Kalpganga
27	Asiganga-III	7.5	Uttarkashi	Asiganga
28	Suringad-II	5	Pithoragarh	Suringad
29	Songad	3	Pithoragarh	Songad
30	Bhilangana II - A	24	Tehri	Bhilangana
31	Bhilangana II - B	24	Tehri	Bhilangana
32	Bhilangana II - C	24	Tehri	Bhilangana
	Total	2725.3		

Salient Features of Maneri Bhali Phase I		
	Attribute	Value
1	Name of Barrage/ Weir/ Anicut	Joshiyara Barrage
2	River	Bhagirathi
3	Basin	Ganga
4	Nearest City	Bhatwari
5	District	Uttarkashi
6	State	Uttarakhand
7	Status	Completed
8	Year of Completion (YYYY)	2007
9	Barrage/ Weir/ Anicut as per Parliamentary Constituency	Tehri Garhwal
10	Seismic Zone	Seismic Zone-IV
11	Length of Barrage & Anicut (m)	81
12	Height upto Crest (m)	39
13	Pond Level (m)	1108
14	Type of Spillway Gate	Vertical Lift
15	No. of Spillway Gates	5
16	Latitude	30°43'35.76"N
17	Longitude	78°26'44.88"E

Salient Features of Maneri Bhali Phase II

	Attribute	Value
1	Hydroelectric Project Name	Maneri Bhali Stage - II Hydroelectric Project
2	State	Uttarakhand
3	Districts	Uttarkashi
4	River	Bhagirathi
5	Basin	Ganga
6	Hydroelectric Region	North HE Region
7	Total Installed Capacity (MW)	304
8	Type of Project	Major (> 25 MW)
9	Hydroelectric Project Status	Completed
10	Purpose	Hydroelectric
11	Owner	State
12	Owner Name	UJVNL
13	Interbasin	No
14	Project Sharing	None
15	Interstate Aggrements	
16	Intercountry	None
17	Latitude	30°36'25.92"N

Salient Features of Tehri Dam

	Attribute	Value
1	Name of Dam	Tehri Dam
2	Dam Name Alias	
3	River	Bhagirathi
4	Nearest City	Pratapnagar
5	District	Tehri Garhwal
6	State	Uttarakhand
7	Basin	Ganga
8	Status	Completed
9	Purpose of Dam	Hydroelectric,Irrigation
10	Year of Commencement (YYYY)	
11	Year of Completion (YYYY)	2005
12	Operating & Maintainance Agency	THDC
13	Dam as per Parliamentary Constituency	Tehri Garhwal
14	Seismic Zone	Seismic Zone-IV
15	Type of Dam	Earthen/ Gravity & Masonry
16	Length of Dam (m)	575
17	Max Height above Foundation (m)	260.5
18		
19	Design Flood (cumec)	15540
20	Type of Spillway	Chute
21	Length of Spillway (m)	592
22	Crest Level of Spillway (m)	815
23	Spillway Capacity (cumec)	13040
24	Type of Spillway Gates	Radial
25	No. of Spillway Gates	3
26	Size of Spillway Gates (m x m)	18 x 14
27	NRLD No.	UA34VH0012
28	Latitude	30°22'41.16"N
29	Longitude	78°28'49.44"E

Salient Features of Koteswar Dam

	Attribute	Value
1	Name of Dam	Koteswar Dam
2	River	Bhagirathi
3	Nearest City	Pratapnagar
4	District	Tehri Garhwal
5	State	Uttarakhand
6	Basin	Ganga
7	Status	Completed
8	Purpose of Dam	Hydroelectric
9	Operating & Maintenance Agency	THDC
10	Dam as per Parliamentary Constituency	Garhwal
11	Seismic Zone	Seismic Zone-IV
12	Type of Dam	Gravity & Masonry
13	Length of Dam (m)	300.5
14	Max Height above Foundation (m)	97.5
15	Total Volume Content of Dam (TCM)	560
16	Design Flood (cumec)	13240
17	Type of Spillway	Ogee
18		
19	Crest Level of Spillway (m)	618.5
20	Spillway Capacity (cumec)	13240
21	Type of Spillway Gates	Radial
22	No. of Spillway Gates	4
23	Size of Spillway Gates (m x m)	18 x 16
24	Remarks	Height- 103.50 m
25	NRLD No.	UA34HH0015
26	Latitude	30°15'37.08"N
27	Longitude	78°29'53.16"E

Salient Features of Vishnuprayag HEP

	Attribute	Value
1	Hydroelectric Project Name	Vishnuprayag Hydroelectric Project
2	State	Uttarakhand
3	Districts	Chamoli
4	River	Alaknanda
5	Basin	Ganga
6	Hydroelectric Region	North HE Region
7	Total Installed Capacity (MW)	400
8	Type of Project	Major (> 25 MW)
9	Hydroelectric Project Status	Completed
10	Purpose	Hydroelectric
11	Owner	Private
12	Owner Name	JPVL
13	Interbasin	No
14	Project Sharing	None
15	Intercountry	None
16	Latitude	30°34'0.84"N
17	Longitude	79°32'48.48"E

Salient Features of Srinagar Dam

	Attribute	Value
1	Hydroelectric Project Name	AHPCL Srinagar
2	State	Uttarakhand
4	Districts	Pauri Garhwal
5	River	Alaknanda
6	Basin	Ganga
7	Hydroelectric Region	North HE Region
8	Total Installed Capacity (MW)	330
9	Type of Project	Major (> 25 MW)
10	Hydroelectric Project Status	Completed
11	Purpose	Hydroelectric
12	Owner	AHPCL
13	Owner Name	AHPCL
14	Latitude	30°13'50.88"N
15	Longitude	78°47'28.32"E

Salient Features of Pashulok Barrage

	Attribute	Value
1	Name of Barrage/ Weir/ Anicut	RishiKesh Barrage
2	Name of Barrage/ Weir/ Anicut Alias	Pashulok Barrage
3	River	Ganga
4	Basin	Ganga
5	Nearest City	Dehra Dun
6	District	Dehradun
7	State	Uttarakhand
8	Status	Completed
9	Year of Completion (YYYY)	1980
10	Barrage/ Weir/ Anicut as per Parliamentary Constituency	Hardwar
11	Seismic Zone	Seismic Zone-IV
12	Length of Barrage & Anicut (m)	312
13	No. of Bays	11
14	Width of Bay (m)	18
15	Crest Level of Spillway (m)	325.5
16	Pond Level (m)	337
17	Design Flood Discharge (cumec)	13200
18	Means for Dissipating Energy (Hydraulic)	Stilling Basin with baffle blocks
19	Sediment Excluding Devices	Silt excluder tunnel
20	Type of Spillway Gate	Vertical Lift
21	No. of Spillway Gates	11
22	Size of Spillway Gates (m x m)	18x8.5
23	No. of Under Sluice Bay	4
24	Size of Under Sluice Bay (m x m)	18
25	No. of Under Sluice Gate	4
26	Width of Head Regulators	11
27	Latitude	30° 4'27.12"N
28	Longitude	78°17'17.88"E

Salient Features of Bhimgoda Barrage

	Attribute	Value
1	Name of Barrage/ Weir/ Anicut	Bhimgoda Barrage
2	River	Ganga
3	Basin	Ganga
4	District	Hardwar
5	State	Uttarakhand
6	Status	Completed
7	Year of Commencement (YYYY)	1982
8	Year of Completion (YYYY)	1986
9	Barrage/ Weir/ Anicut as per Parliamentary Constituency	Hardwar
10	Seismic Zone	Seismic Zone-IV
11	Width of River (m)	675
12	Length of Barrage & Anicut (m)	453.5
13	No. of Bays	15
14	Width of Bay (m)	18
15	Pond Level (m)	293.7
16	Highest Flood Level (m)	296.3
17	Design Flood Discharge (cumec)	193000
18	Means for Dissipating Energy (Hydraulic)	BASIN BLOCKS AND DENTATED SILS
19	Sediment Excluding Devices	SILT EXCLUDER AND SILT EJECTOR
20	Type of Spillway Gate	Vertical Lift
21	No. of Spillway Gates	15
22	Size of Spillway Gates (m x m)	18x7.8
23	No. of Under Sluice Bay	7
24	Size of Under Sluice Bay (m x m)	18
25	No. of Under Sluice Gate	7
26	Size of Under Sluice Gate (m x m)	18x8.4
27	Type of Under Sluice Gate	VL
28	Orientation of Head Regulator with respect to Barrage axis (Angular Unit)	107
30	Maximum Discharge of Canal	164 CUMEC LEFT AND 410 CUMEC RIGHT
31	Latitude	29°57'22.68"N
32	Longitude	78°10'49.44"E

Salient Features of Bijnor Barrage

	Attribute	Value
1	Name of Barrage/ Weir/ Anicut	Madhya Ganga Barrage (Chaudhary Charan Singh Barrage)
2	River	Ganga
3	Basin	Ganga
4	Nearest City	Jansath
5	District	Muzaffarnagar
6	State	Uttar Pradesh
7	Status	Completed
8	Year of Commencement (YYYY)	1978
9	Seismic Zone	Seismic Zone-IV
10	Length of Barrage & Anicut (m)	621
11	No. of Bays	22
12	Width of Bay (m)	18
13	Pond Level (m)	221.8
14	Design Flood Discharge (cumec)	17600
15		
16	No. of Under Sluice Bay	6
17	Size of Under Sluice Bay (m x m)	18
18	Size of Under Sluice Gate (m x m)	18x7.5
19	Latitude	29°22'24.72"N
20	Longitude	78° 2'25.60"E



पत्रांक: ज.वि.प्रे.परि./दे.दून/e-flow/DB/2018/1533-45

दिनांक: 22/08/2019

विषय : Inspection Report of Expert Team of e-flow in Ganga Basin reg:

उपरोक्त विषय के संबंध में अवगत कराना है की Expert Team द्वारा e-flow के संबंध में दिनांक 07.08.2019 से 09.08.2019 तक निम्नलिखित परियोजनाओं का निरीक्षण किया गया:

1. Tehri Dam Project, Tehri
2. Koteshwar HEP, Tehri
3. Maneri Bhali I, HEP, Uttarakashi
4. Maneri Bhali II, HEP, Uttarakashi

Inspection Report of Expert Team अवलोकन एवं उचित कार्यवाही के लिए अग्रसारित है।

भवदीय,

(सुधीर कुमार)

अधीक्षण अभियंता

सेवा में,

1. Member (Hydro), Central Electricity Authority, New Delhi
2. Chief Engineer, UGBO, CWC, Lucknow
3. Chief Engineer (P&D), Central Water Commission, R.K Puram, New Delhi
4. Director (NIH), Roorkee
5. Executive Director (T), NMCG, New Delhi
6. Director, BCD (N&W), Central Water Commission, R.K Puram, New Delhi
7. Executive Engineer, HGD, CWC, Dehradun
8. Project Head, Tehri Dam Project, Tehri
9. Project Head, Koteshwar HEP, Tehri
10. Project Head, Maneri Bhali I, HEP, Uttarakashi
11. Project Head, Maneri Bhali II, HEP, Uttarakashi

Copy for information to:

- I. PS to Member (D&R), CWC, New Delhi
- II. PS to Member (RM), CWC



No. CWC/UGBO/EF/VR 2

DoWR, RD&GR
Central Water Commission
Upper Ganga Basin Organization

**IMPLEMENTATION OF MINIMUM ENVIREMENTAL FLOWS IN
RIVER GANGA (Upto UNNAO)**



Inspection Report
of
Expert Team to Various Projects/sites in Ganga Basin

August, 2019

Background

Vide Gazette Notification dated 10th October, 2018, the Government of India has notified the minimum environmental flows for River Ganga that has to be maintained at various locations on the river. Environmental flows are the acceptable flow regimes that are required to maintain a river in the desired environmental state or predetermined state. The existing projects, which currently do not meet the norms of these environmental flows, shall comply and ensure that the desired environmental flow norms are complied within a period of three years from the date of issues of this order.

During the review meeting taken by Secretary, DoWR, RD & GR on 10.05.2019 in New Delhi, it was seen that some of the existing projects are not complying the mandated e-flow releases. Though three years time window has been given to the existing projects for complying the e-flow norms, Secretary, DoWR, RD & GR stressed that the time period of three years was meant for required structural modifications in the body of dam/barrage for releasing mandated e-flows, revising PPA, improving water use efficiency etc. If these modifications/changes are not needed, the project authorities should not wait for three years for complying the norms. Accordingly, it was decided during the meeting that a team may visit various projects under monitoring and examine the existing arrangements for release of e-flows and structural modifications required, if any, for the release of stipulated e-flows on continuous basis.

Accordingly, the projects on Alanknada and Ganga were visited during 12-16 June, 2019. The 2nd phase of visit for 4 nos of projects on Bhagirathi river was made by Expert Team during 7-9 August, 2019 with following purpose:

- a. To see the existing arrangement in the dam/ barrage/ diversion for release of stipulated e-flow on continuous basis.
- b. Structural Modifications required, if any, for the release of stipulated e-flow and timeline for the same.
- c. Existing/ proposed arrangement for automatic data acquisition and transmission system in the project.
- d. Timeline for adhering to stipulated release of e-flows.
- e. Suggestions of project authorities, if any

The Expert Team consisted of the following

- i. Sh. Bhopal Singh, Chief Engineer, UGBO, CWC, Lucknow
- ii. Sh. Ravi Shankar, Chief Engineer, P&D O, CWC, New Delhi
- iii. Dr. Sh. Manohar Arora, Scientist-D, NIH, Roorkee
- iv. Sh. Sudhir Kumar, SE, HOC, CWC, Dehradun
- v. Sh. Balwan Kumar, Deputy Director, CEA, New Delhi

The team visited the Dams/ barrages/ diversion systems/ canals/ powerhouses and held a detailed discussions with project authorities. Project wise findings and suggestions of the team during the visit are as follows:

1. Tehri Dam Project

Tehri Dam and Hydro Power Project comprises a 260.5 m high Earth & Rockfill dam which is one of the highest of its type in the world. Spillway system designed for PMF of 15540 cumecs is having one chute spillway and four shaft spillway. The underground power house is having four turbines/ generators sets of 250 MW each. Besides power, irrigation benefits are availed in the command area and drinking water is being supplied to Delhi and UP.

The Gross storage of the project is 3540 MCM and live storage is 2615 MCM. The Project generates 1000 MW (4x250 MW). The crest elevation of intake works is at EL 720 m and the invert level of outlet of Tail Race works is at EL 598.0 m. The crest of the chute spillway is at EL 815 m.

The project is being used for generating power during peak demand and as such is not running continuously. **Accordingly, the project is though meeting the e-flow requirement as far as the flow volume on daily basis is concerned, but not on hourly basis as water is not released continuously throughout the day. Daily average outflow data is passed to CWC.** The project authorities stressed that the pond level (between 609 m to 612 m) of Koteshwar dam extends to toe level of Tehri dam and as such the whole river reach between Tehri and Koteshwar remains under pool of water. As such intermittent release of water from Tehri reservoir does not lead to drying up of any portion of river between Tehri and Koteshwar. They suggested that whole system of Tehri and Koteshwar should be considered as one single system for e-flow monitoring with inflows in Tehri reservoir and outflows from Koteshwar dam. The team appreciated the view point of project authorities but stressed to provide the inflows and outflows actual data on hourly basis. The project authorities agreed for the same.

The diversion of water to HRT/Penstock / each turbine is being measured by automatic flow meters and transmitted to the Control Room of the project. However, data

to CWC is being passed manually through email/WhatsApp. There is need to develop a linkage for automatic data transmission to CWC on hourly basis. The project authorities promised to make arrangement for the same.

For validation of inflow data, CWC shall be installing radar based Water Level Sensor to get the water level of the dam and consequently the hourly inflow data from Elevation-Area-Capacity curve. However, the flow monitoring d/s of Tehri dam will not be feasible as the whole reach between Tehri dam and Koteshwar dam forms a pool of water.

2. Koteshwar HEP

The project is located on Bhagirathi River, 22 km downstream of Tehri Dam site. The project have a 97.5 m (from deepest foundation level), 497 m long concrete gravity dam. The project have a 400 MW (4 x 100 MW) dam toe power house. The water is diverted through 4 nos of 6.2 m dia penstock.

The flows including mandated e-flows are being released through the penstock. At least one machine is running continuously with minimum discharge of 150 cumecs. Thus, the project is meeting E-flow norms continuously.

There are automatic flowmeters across each of the penstock to measure the discharge automatically on real time and data transmission is limited to its own Control Room. However, the data to CWC is passed manually through email/WhatsApp. The project authorities were requested to develop a linkage for automatic data transmission to CWC on real time. The project authorities promised to address the same.

For validation of outflow data from the dam/ tail race of dam toe power the existing CWC site on downstream at around 100 m is being utilized. The site shall be modernised by installation of velocity sensor based automatic discharge measuring device shortly.

For measuring of inflow to the project, the system at Tehri dam shall be utilized since the discharge of Tehri dam is the inflow of the Koteshwar dam.

3. Maneri Bhali-I HEP

The project have a 39 m high concrete gravity dam, with a 90 MW (3x30 MW) power house. The dam is constructed across Bhagirathi river at Maneri, 15 km upstream of town of Uttarkashi. The water from dam is diverted to head race tunnel of 8.6 km length to 90

MW power house at Tiloth. The dam have a gated spillway having 5 nos of radial gates of size 13.00 m(W) X 14.55m(H) each. The design discharge of spillway is 5000 cumecs

The mandated e-flow are being released through opening of spillway gates. Many a times requisite e-flows are not being released by the project authorities. The Project authorities informed that now it has been decided by the higher authorities to meet the mandated e-flow as per Gazette Notification dated 10th October, 2018, Govt. of India.

Presently, flow data is being observed manually in project. The project authorities were advised to install automatic data acquisition, transmission and management system. The project authorities promised to initiate necessary action for automatic data acquisition and transmission to be completed by Dec, 2019.

For validation of inflow data, supplied by project authorities, the existing CWC site, which is approximately 9 km U/s shall be used and the option to install velocity sensor based automatic discharge measuring device under the bridge shall be explored.

Further for validation of e-flow, the automatic discharge measuring device shall be installed by CWC at approximately 2.5 km d/s of dam on a bridge.

4. Maneri Bhali- II HEP

The project have a 81 m long barrage having 5 radial gates of 130 m x 15.55 m size each with live storage of 0.755 MCM at Uttarkashi. The water is diverted through a head race tunnel of 16 km length to generate 304 MW (4x76 MW) power at Dharasu

In the barrage the mandated e-flow are being release through opening of gates. The design discharge of barrage is 5000 cumecs. As per data observed the project is not following the mandated e-flows on may occasion. However, the Project authorities informed that now it has been decided by the higher authorities to meet the mandated e-flow as per Gazette Notification dated 10th October, 2018, Govt. of India

Presently, flow data a being observed manually in the project. The project authorities were advised to install automatic data acquisition, transmission and management system. The project authorities ensured the completion of installation by Dec, 2019.

For validation of inflow data, supplied by project authorities, the existing CWC site at Uttarkashi, which is approximately 3 km u/s shall be used and modernized by installation of velocity sensor based automatic discharge measuring device.

Further for validation of e-flow, the automatic discharge measuring device shall be installed by CWC at approximately 2.5 km d/s of dam on a bridge.

Conclusions

Based on the monitoring visit to the above projects, the following conclusions may be drawn broadly:

1. All the existing projects have provisions for releasing the mandated E-flows through controlled gated spillway/ HRT and any structural modifications in the body of projects may not be required for the same. The release of mandated E-flows are not being maintained by some of the projects, mainly HEP, due to commercial considerations.
2. The data acquisition system of the projects is limited to their control rooms and the real time transmission to CWC need to be implemented. Project authorities have promised to explore the installation of automatic monitoring system at the earliest possibly by December, 2019.
3. Existing monitoring network of CWC can be utilized for checking/ validating the flow data supplied by project authorities. The network may be strengthened at following locations by opening additional sites to bridge the gaps.
 - a. Installation of Automatic water level sensor at Tehri Reservoir
 - b. Modernizing the existing Koteshwar G&D site by installing velocity sensor based automatic discharge measuring device
 - c. Modernizing the existing Maneri G&D site by installing velocity sensor based automatic discharge measuring device
 - d. Modernizing the existing Uttarkashi G&D site by installing velocity sensor based automatic discharge measuring device
 - e. Installing an automatic discharge measuring device at approximately 2.5 km d/s of Maneri dam on a bridge.
 - f. Installing an automatic discharge measuring device at approximately 2.5 km d/s of barrage at Uttarkashi on a bridge.

VISIT TO TEHRI DAM





VISIT TO KOTESHWAR DAM





VISIT TO MANERI BHALI PHASE 1





VISIT TO MANERI BHALI PHASE 2



