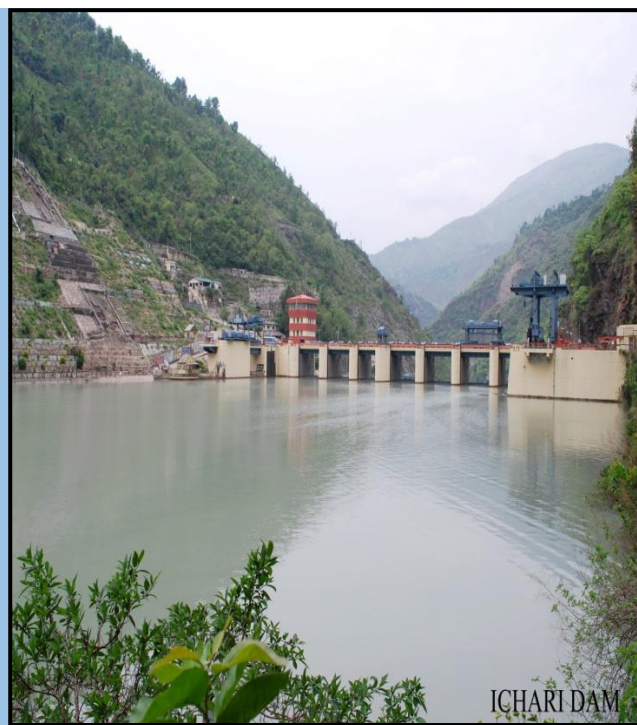


# EMERGENCY ACTION PLAN (TIER-1)

ICHARI DAM, DISTT.-DEHRADUN, UTTRAKHAND

PROJECT ID CODE:- UA25HH0006



Prepared by



**UJVN Limited**

(A Govt. of Uttarakhand Enterprise)

CIN NO : U40101UR2001SGC025866

**UJVN Ltd.**

(An Uttarakhand Govt. Enterprises)

(December 2020)

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**ICHARI DAM,**

**PROJECT ID CODE:- UA25HH0006  
DISTT.-DEHRADUN, UTTRAKHAND**

Emergency Action Plan for Ichari Dam is being published in January 2021.

**DISCLAIMER**

Every effort has been taken to estimate the severity of flooding and inundation areas likely to be affected by Ichari Dam in an emergency condition. These estimates have been provided by CWC, New Delhi, based on available primary and secondary data. Every effort has been made to foresee varied emergency possibility and develop appropriate notification procedures for timely rescue and relief operations. However, implementation of the Emergency Action Plan (EAP) involves many agencies, who are required to work in a coordinated manner to reduce the consequences of the emergency triggered by the dam site condition. Effectiveness of the rescue and relief operations depend on many factors including the adequacy and accuracy of the estimation of the severity of flooding, coordinated efforts of all the agencies involved in rescue and relief efforts and availability of facilities like power, telephones, road communications, etc. EAP Developer may therefore, not be held responsible for the efficacy of the EAP.

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## 1. APPROVAL AND IMPLEMENTATION

This Emergency Action Plan has been prepared by UJVN Limited in consultation with Central Project Management Unit (CPMU), Central Water Commission (CWC), Government of India. This document is hereby approved and is effective immediately and supersedes all previous editions.

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**Sh. Sandeep Singhal Managing Director, UJVN Ltd.**

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**Date**

I have received a copy of this Emergency Action Plan and concur with the notification procedures.

---

Director (Operation) UJVN Limited

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Date

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District Disaster Management Authority, Dehradun

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Date

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District Disaster Management Authority, Sirmaur

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Date

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District Disaster Management Authority, Yamuna Nagar

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Date

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District Disaster Management Authority, Shaharanpur

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Date

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District Disaster Management Authority, Karnal

---

Date

## 2. EAP DISTRIBUTION LIST

A copy of the EAP has been provided to the following people:

Authority	Name, Title, Phone	Acceptance
Director (Operations) UJVN Limited	Sh.Purushottam Singh, Director (Operations), UJVN Limited, M: 9837274922 Off: 0135-2763286	
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	Sh. Sanjeev Lohani, General Manager (Civil), UJVN Limited, Mobile No-9456590077 Email: gmujvn lcm@gmail.com	
	Sh. K.K Jaiswal, Deputy General manager (HGC), UJVN Limited, Mobile No : 9456590499 Phone No :01360221563 Email: dgmhgc dakpathar@gmail.com	
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	Sh. Pankaj Panwar Assistant Engineer (Civil) UJVN Limited, Mobile No : 9456590189	
Control Room, Ichari Dam	Control Room, Ichari Dam UJVN Limited, Ichari Phone No-088946829271	
Emergency Planning Manager	Sh. Ranjan Kumar, Executive Engineer (E&M), UJVN Limited, Mobile No : 9456590232 Email: emicharidam714@gmail.com	
National Disaster Management Authority	Joint Secretary (Mitigation, IT & Commn.) Off. NDMA Bhawan, A-1, Safdarjung Enclave, New Delhi - 110 029 Phone No.: 011-26701-718/864 Email: mitigation@ndma.gov.in  Brig. Ajay Gangwar Official No. 1: Title:Advi or (Ops) Office, Phone No.: 011-26701886 Email: advopscomm@ndma.gov.in	
Central Dam Safety Organization	Mr Gulshan Raj, Chief Engineer CWC ,New Delhi M: 9999277474 Ph.: 01126106848	
	Mr Pramod Narayan Director Dam Safety & Rehabilitation CWC Ph: 011-29583480 M.: 9958975921	
Dehradun District Disaster Management Authority	Dr. Ashish Kumar Shrivastava District Magistrate, Dehradun Ph: 0135-2622389	
	Sh Yogendra Singh Rawat, Senior Superintendent of Police, Dehradun Ph: 0135-2716203/2716209	
Sirmaur District Disaster Management Authority	Dr. Raj Krishan Pruthi, Deputy Commissioner, Sirmaur Ph: 01702-225025	
	Sh. Kisan Chand Sharma Superintendent Of Police, Sirmaur Ph:01702-225002	

Yamuna Nagar District Disaster Management Authority	Sh. Mukul Kumar, Deputy Commissioner, Yamuna Nagar. Ph: 01732-237800	
	Sh. Kamaldeep Goyal Superintendent Of Police , Yamuna Nagar. Ph: 01732-268203	
Saharanpur District Disaster Management Authority	Dr. Akhilesh Kumar Singh, District Magistrate, Saharanpur. Ph: 0132-2726838	
	Sh.S. Chandrpa, Senior Superintendent Of Police Ph:0 132-2727143	
Karnal District Disaster Management Authority	Sh. Nishant Kumar Yadav, Deputy Commissioner, Karnal. Ph: 0184-2667500	
	Sh . Ganga Puniya Superintendent Of Police , Karnal. Ph: 0184- 4091002	
Uttarakhand State Disaster Management Authority	Principal Secretary, Disaster Management Disaster Mitigation and Management Centre Dehardun. Ph. 01352712094/2721599/2712113	
Dam Safety cell, Uttrakhand Irrigation Department	Sh PC Gaur Chief Engineer Mob: 9412057874	



3. LOG SHEET OF CHANGES

The following changes have been made to the EAP and revisions have been provided to the people shown on the EAP Distribution List.

Date	Change Made	Signature

## 4. PURPOSE

The purpose of this Emergency Action Plan (EAP) is to identify emergency situations that could threaten Ichari Dam and to plan for an expedited, effective response to prevent failure of the dam and warn downstream residents of impending danger. This plan defines the notification procedures to be followed in the event of a potentially hazardous situation. The procedures are intended to protect lives and prevent property damage from an excessive release of water from the dam spillways or an uncontrolled outflow of water from the breached portion of dam.

## 5. DAM DESCRIPTION

Ichari Dam and Reservoir is owned and operated by UJVN LTD (Formerly known as Uttarakhand Jal Vidyut Nigam Ltd). It is located on Tons river in Dehradun District, approximately 85 kilometres West of Dehradun, Uttarakhand. Tons river is a tributary of the river Yamuna, located in the Yamuna River Basin. The dam was completed in 1975 and was constructed under Project No. UA25HH0006 granted to Owner in 1975. The reservoir was constructed to serve as run-off-river scheme with pondage for daily peaking for generation. It has an intake in right bank & underground sediment exclusion arrangement to exclude harmful sediments entering into the tunnel.

Dam was being operated by Irrigation Department, Uttarakhand upto 30/04/2010. Since 01/05/2010, the dam is being operated and maintained by UJVN Limited.

**TABLE - 1 DAM DESCRIPTION**

Name of Stream	Tons River
Dam Location	Koti, Block Kalsi, District Dehradun, State-Uttarakhand.
Latitude/Longitude	29° 08' / 79° 20'
Seismic Zone	IV
Year of First Impoundment	1975,
Year of Commissioning of Dam Project	1975
Name of Immediate Upstream Dam	UJVNL under proposal Kishau Dam
Name of Immediate Downstream Barrage	Dakpathar Barrage
Dam Owner	UJVN LTD. Uttarakhand
Dam Owner's Address	UJJAWAL, Maharani Bagh, GMS Road, District-Dehradun
<b>Dam features</b>	
Dam mobile Number	+91-8894682927
Type	Concrete straight gravity dam
Year of Construction	1975
Length	155 m
Maximum Height	59 m
Top Width	6.5 m
Elevation of the top of the Dam	652.00 metre
Deepest foundation elevation	592.75 m
<b>Main Spillway</b>	

Type	Ogee spillway
Location	Center spillway
Crest Length	66.5 m
Crest Elevation	628.25 m
No of bays	7
Capacity	13,500 cumecs.
<b>Reservoir</b>	
Elev. Top of Conservation Pool	644.75 metre
Capacity at Top of Dam (Maximum)	4.687 millions of cubic metres
Surface Area	81.00 hectares

## 6. RESERVOIR OPERATIONS:

### 6.1 General:

**Full Reservoir Level EL 644.75**

**MDDL - EL 639.00**

**Capacity of Ichari dam (By IRI Roorkee, 2018 - 4.687 MCM)**

The top of the Ichari Dam is at EL. 652.00 & the length at the top is 155 metre. The crest level is EL. 628.00 while the FRL is EL. 644.75. The spillway at diversion dam at Ichari has seven bays of 9.5 metre wide with 3 metre wide intermediate piers. Spillway gates are of radial type with sill elevation at EL. 628.40 and top of gate in closed position at EL.644.90. The main intake has four openings of size 5.625 metre wide x 5 metre high. The auxiliary intake has one opening of size 5M x 5M.

The Ichari Dam reservoir regulation consists of step-by-step instructions for operating the dam and reservoir during routine (normal) and emergency conditions. The operating procedures, for normal operations is being described here including operating criteria. The operation of a dam involves regulation of its reservoir as per project specific requirements. The condition where power house shall be closed in any of the following conditions-

- Level of Chibro outlet gate reaches 519.50 meter.
- If Silt concentration is more than 3000 PPM.
- If head loss is more than 2.80m.

If spillway discharge exceeds 800 cumecs then it is necessary to monitor the Chibro outlet level continuously till it reaches at the level of 519.50 meter for closing the power house .

Rule curve is not applicable as the reservoir is used for only diurnal variation.

### 6.2 Operations of spillway :

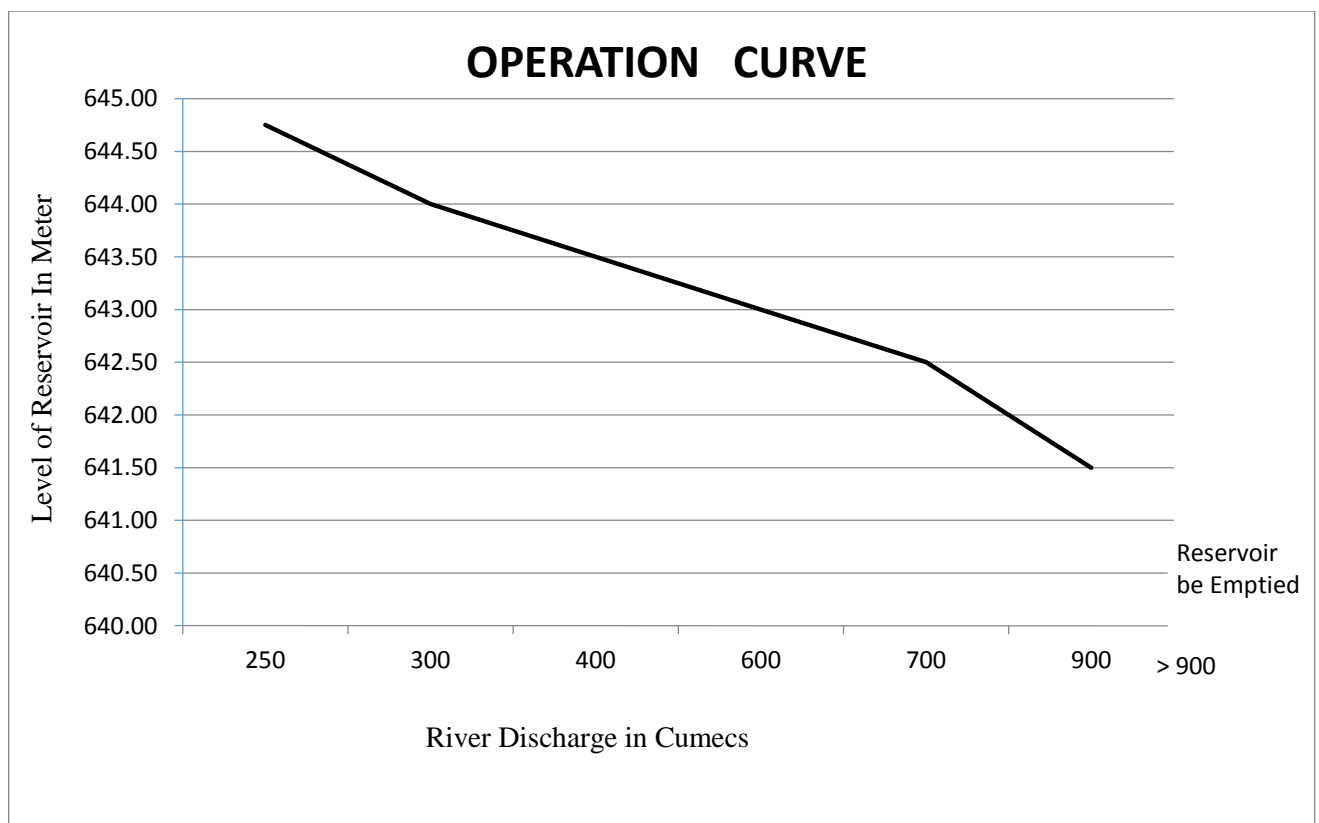
#### (A) Non monsoon period (16<sup>th</sup> oct. To 15<sup>th</sup> june)

The reservoir elevation shall be maintained at or filled up to EL. 644.75 to meet the peaking requirements. In case the reservoir is full and excess water is required to be discharge into the river, one or two spillway gates shall be opened to maintain the reservoir elevation at 644.75. The gate opening shall, therefore be maintained in such a manner that reservoir level does not exceed 644.75. During sudden tripping of power house, a situation may arise that reservoir level suddenly rises to 644.90 and water starts spilling over the top of gate. The gate opening should, there for be immediately adjusted .It will be desirable that for non monsoon operations, all the gates are used in turn for regulations. Assistant engineer (mechanical) shall assign two gates which shall be used for regulations during any week. Any other gate except those assigned shall only be used if the hoist of the assigned gate is out of operation.

**(B) Monsoon period (16<sup>th</sup> june to 15<sup>th</sup> oct.)**

For operation of power house, the minimum reservoir level required to be kept to provide proper sealing to intake opening is 639.00. During monsoon months, if power house is closed due to reasons mentioned in Sr.No 6.1, then all the spillway gates shall be open to pass the excess discharge or silt. **As per present guidelines for operation of Ichari Dam, reservoir level shall be maintained as below for different river discharges.**

Discharge of River	Reservoir Level
250 cum.	644.75
250-300 cum.	644.00
300-400 cum.	643.50
400-600 cum.	643.00
600-700 cum.	642.50
700-900 cum.	641.50
900-1400 cum	640.00



**Important note :** The above figures are guide lines for safety of water conducting system and plant against damage by excessive silt in water and possibility of choking of sedimentation chamber. Occasions can and will arise when silt content in river is high even when the river discharge is low. Hence river discharge is not the alone criteria. The silt content is equally important. For this purpose silt content in river will be taken during the monsoon regularly at every hour. For approximate idea of silt content in river, online silt

monitor is installed at control room. Silt tubes of one litre capacity are used and in course of time a co-relation, in silt tube reading, silt monitor reading in water is worked out from the data collected for this purpose.

**TABLE - 2 TRIGGER LEVELS OF ALERT FOR DISCHARGE FROM ICHARI DAM SPILLWAY.**

<b>SN.</b>	<b>Discharge in cumecs</b>	<b>Discharge duration (hr.)</b>	<b>Level of alert</b>
1.	> 4000	Any	Blue
2.	> 6500	Any	ORANGE
3.	> 13500	Any	Red

**(C) Flushing operations :**

It may be necessary particularly during monsoon to clear the floating trash logs which may accumulate in front of intake trash racks by fully opening one of the spillway gate. For flushing operation, the reservoir elevations is kept at 640.50 or above (but not above 642.00). The spillway gates are opened so that bottom of gate is above the reservoir elevation. The gates are kept in this position for five to ten minutes and the gates are closed to the same opening as existed before raising it. Gate no. 7 will normally be used for flushing operations. If this gate is not in operative position than gate no. 6 is used .The interval of flushing operation depends upon the extent of floating trash and logs etc, coming into the river.



## 7. RESPONSIBILITIES

### 7.1 Dam Owner's Responsibilities

The dam owner UJVN Limited is responsible for all dam operations and maintenance. The EAP is not intended to designate a specific person for a specific responsibility but instead will designate the duties or job for both, before and during Emergency event.

**TABLE - 3 Dam owner's Responsibilities**

S.No	Dam Personnel	Responsibility
1.	Emergency Planning Manager  Executive Engineer (E&M), UJVN Limited, Ichari Dam , Dakpathar, Dehradun.	<p><b><u>Preparedness &amp; Responsibilities:</u></b></p> <ul style="list-style-type: none"> <li>➤ Coordinate routine inspections and Dam operations.</li> <li>➤ Ensure effective transmission of hydro metrological and stream flow data through different means.</li> <li>➤ Ensure proper accessibility to all vulnerable points for constant monitoring during emergency situations.</li> <li>➤ Identify primary and secondary communication systems, both internal (between persons at the dam) and external (between dam personnel and outside entities).</li> <li>➤ Provide security measures at the dam (CCTV surveillance, security guards, fencing).</li> <li>➤ Ensure the availability of adequate staff at dam site during holidays, nights and round the clock in weekdays.</li> <li>➤ Ensure that the EAP is functional and staffs are familiar with their responsibilities.</li> <li>➤ Ensure that a signboard is installed and clearly visual in different locations at dam site and operation room, with the most common evidence of distress and corresponding levels of alert and remedial actions.</li> <li>➤ Ensure all the equipment/means at dam site to response to an emergency are easily accessible and well maintained (generators, vehicles, lanterns, radios, heavy equipment, etc.)</li> <li>➤ Ensure the installation and proper maintenance of a warning system (sirens, horns) in the critical areas within the floodplain (less than 2 hours of wave arrival time)</li> <li>➤ Ensure the current approved version of the EAP is available to all relevant stakeholders (those who have a functional role in the emergency response)</li> <li>➤ Ensure all necessary means to manage the emergency response are available and operative in the Emergency Operation Center.</li> <li>➤ Participate in exercises for test/improvement of this EAP</li> </ul> <p><b><u>Emergency Responsibilities:</u></b></p> <ul style="list-style-type: none"> <li>➤ Ensure a continuous and reliable communication with dam site officers.</li> <li>➤ Receive and assess any distress condition as notified by site engineers, observer or regular inspection.</li> <li>➤ Classify the incident/distress condition reported by the</li> </ul>



		<p>observer into the different Emergency Levels (Blue, ORANGE, Red) based on as per Action Data Sheet (ANNEXURE 5).</p> <ul style="list-style-type: none"> <li>➤ Initiate/implement the Emergency Action Plan and Emergency Operation center if it is deemed necessary.</li> <li>➤ Identify the area that would be potentially impacted by the emergency events.</li> <li>➤ Provide updates of the situation to the District(s) Disaster Management Authority to assist them in making timely and accurate decisions regarding warning and evacuations.</li> <li>➤ Propagate the emergency information to other relevant stakeholders.</li> <li>➤ Support the communication needs of local emergency authority.</li> </ul>
	<p>Executive Engineer (Civil), Project Civil Maintenance, UJVN Limited, Dakpathar, Dehradun.</p>	<p><b><u>Preparedness &amp; Responsibilities:</u></b></p> <ul style="list-style-type: none"> <li>➤ Coordinate routine inspections.</li> <li>➤ Ensure effective transmission of hydro metrological and stream flow data through different means.</li> <li>➤ Ensure the availability of adequate staff at dam site during holidays, nights and round the clock in weekdays for any emergency civil maintenance.</li> <li>➤ Ensure proper accessibility to all vulnerable points for constant monitoring during emergency situations.</li> <li>➤ Ensure that the EAP is functional and staffs are familiar with their responsibilities.</li> </ul> <p><b><u>Emergency Responsibilities:</u></b></p> <ul style="list-style-type: none"> <li>➤ Ensure a continuous and reliable communication with dam site officers.</li> <li>➤ Support the communication needs of local emergency authority.</li> <li>➤ Receive and assess any distress condition as notified by site engineers, observer or regular inspection and inform the current situation to the Emergency Planning Manager based on various alerts shown in the Action data sheet Annexure - 5</li> </ul>
	<p>Deputy General Manager (E&amp;M), UJVN Limited , Dakpathar, Dehradun.</p> <p>Deputy General Manager (CM-YV), UJVN Limited , Dhalipur, Dehradun.</p>	<p><b><u>Preparedness &amp; Responsibilities:</u></b></p> <ul style="list-style-type: none"> <li>➤ Ensure an annual review of the EAP.</li> <li>➤ Coordinate the annual / regular testing events of the EAP, such as tabletop exercises, mock drills, stake holder's consultation</li> <li>➤ Coordinate training events in problem detection, evaluation and appropriate corrective measures</li> <li>➤ Supervise the functioning of control room and ensure to be well equipped with all type of information to facilitate the rescue and relief operations</li> <li>➤ Ensure proper access to site at the earliest possible.</li> <li>➤ Ensure the current approved version of the EAP is available to all relevant stakeholders (those who have a functional role in the emergency response)</li> </ul>



		<ul style="list-style-type: none"> <li>➤ Ensure all necessary means to manage the emergency response are available and operative in the Emergency Operation Center.</li> <li>➤ Participate in exercises for test/improvement of this EAP.</li> <li>➤ Ensure that the EAP is functional and staffs are familiar with their responsibilities.</li> </ul> <p><b><u>Emergency Responsibilities:</u></b></p> <ul style="list-style-type: none"> <li>➤ Ensure a continuous and reliable communication with dam site officers./Executive Engineer.</li> <li>➤ Receive and assess any distress condition as notified by site engineers, observer or regular inspection.</li> <li>➤ Have a constant liaison with Indian Meteorological Department (IMD) during emergency periods related with flood events.</li> </ul>
	<p>Dam Site Engineers  (Assistant Engineer / Junior Engineer)</p>	<p><b><u>Preparedness &amp; Responsibilities:</u></b></p> <ul style="list-style-type: none"> <li>➤ Monitor and surveillance of dam and appurtenant structures looking for evidence of distress mentioned.</li> <li>➤ Conduct Pre and Post monsoon Inspections under the direction of the Executive Engineer.</li> <li>➤ Inform the Emergency planning Manager /Executive Engineer about any irregular/unusual condition at dam site and keep him/her posted about any progression/change.</li> <li>➤ Operate dam's gates/ under the direction of Executive Engineer.</li> <li>➤ Conduct routine dam maintenance.</li> <li>➤ Collect instrumentation measurements.</li> <li>➤ Ensure effective working condition of the warning system (Sirens).</li> <li>➤ Participate in exercises for test/improvement of this EAP</li> </ul> <p><b><u>Emergency Responsibilities:</u></b></p> <ul style="list-style-type: none"> <li>➤ Monitor the emergency event at dam site and keep posted the Emergency Planning Manager/Executive Engineer about any change in the development.</li> <li>➤ Contact the suppliers/contractors.</li> <li>➤ Supervise the work of the labour contractors and machineries engaged at the site for rehabilitation/remedial works.</li> <li>➤ Conduct the remedial actions as per Action Data Sheet (ANNEXURE 5)</li> </ul>
	<p>General Manager(E&amp;M), UJVN Limited , Dakpathar, Dehradun.</p>	<p><b><u>Preparedness &amp; Responsibilities:</u></b></p> <ul style="list-style-type: none"> <li>➤ Assist the Dam Owner's officers in preparation of Action Data Sheet (ANNEXURE 5).</li> <li>➤ Recommend specific actions in order to improve the readiness of emergency actions</li> <li>➤ Support and Monitor the remedial construction activities such as special investigations, etc.</li> <li>➤ Decide depending upon the quantum of repair/reconstruction work, whether the work is to be got executed through large construction firms or purely</li> </ul>

		<p>through the department or small contractors.</p> <ul style="list-style-type: none"> <li>➤ Undertake an engineering assessment of the safety hazard at the dam in collaboration with the Dam Safety Authority (DSO)</li> </ul> <p><b><u>Emergency Responsibilities:</u></b></p> <ul style="list-style-type: none"> <li>➤ Advise the dam's Emergency Planning Manager/Deputy General Manager with the emergency level determination, if time permits.</li> <li>➤ Advise the dam's Emergency Planning Manager/Deputy General Manager with remedial actions to take if Blue / ORANGE events occurs, and if time permits.</li> <li>➤ Direct specific and appropriate procedures to open/close the spillway's gates during the reservoir operation.</li> <li>➤ Play the role of "Public Affairs Officer" in case external/public notifications is released.</li> <li>➤ Keep close watch on the different activities being carried out by different agencies at the time of emergency</li> </ul>
	General Manager(CM), UJVN Limited , Ganga Bhawan, Dehradun	<p><b><u>Preparedness &amp; Responsibilities:</u></b></p> <ul style="list-style-type: none"> <li>➤ Recommend specific actions in order to improve the readiness of emergency actions</li> <li>➤ Support and Monitor the remedial construction activities such as earth moving especial investigations, etc.</li> <li>➤ Decide depending upon the quantum of repair/reconstruction work, whether the work is to be got executed through large construction firms or purely through the department or small contractors.</li> </ul> <p><b><u>Emergency Responsibilities:</u></b></p> <ul style="list-style-type: none"> <li>➤ Advise the dam's Emergency Planning Manager/Deputy General Manager with the emergency level determination, if time permits.</li> <li>➤ Advise the dam's Emergency Planning Manager/Deputy General Manager with remedial actions to take if Blue / ORANGE events occurs, and if time permits</li> <li>➤ Keep close watch on the different activities being carried out by different agencies at the time of emergency</li> </ul>

## 7.2 Dam Safety Organization's Responsibilities

The following are the basic emergency planning , response roles and responsibilities for the dam safety authorities (State and National level). The Dam Safety Organization (DSO) is the first point of contact for BLUE alert

- Is responsibility of the dam safety organizations undertaking an engineering assessment of the safety hazard at the dam.
- The DSO may inspect the dam at its discretion and inform the Emergency planning manager if Ichari dam is considered to be at BLUE alert.
- The DSO may advise the Dam Owner/Emergency planning Manager for remedial actions to take if BLUE/ORANGE events occur.
- The DSO may have an active role in ORANGE/RED levels of alert. The DSO may advise the dam Owner /Emergency Planning Manager for the Emergency level determination.

- A DSO's officer may be called on to be the subject matter expert at the Emergency Operation/Response Center.
- The DSO is responsible for reviewing and accepting the Emergency Action Plan, before its final publication.
- Dam Safety organization shall constitute a dam safety review panel consisting of engineers, geologist and hydrologist to analyse the distress conditions of dam periodically.
- Support for the preparation of asset management plans, emergency preparedness plans, emergency warning systems, flood plain mapping, preparation of flood inundation maps in different areas for Basin and downstream impact mitigation measures.
- Focus on legal, regulatory and technical frameworks for dam safety assurance.
- Participate/ conduct a public hearing program before finalization of the emergency Action plan.

### 7.3 RESPONSIBILITIES FOR NOTIFICATION

After an event level has been determined, appropriate notifications shall be made in accordance with the corresponding notification Flow Chart provided in this EAP (**See Notification Flow Charts (ANNEXURE 6)**). These Notification Flowcharts list the names and contact information and identifying who is to be notified for a dam safety incident, by whom, and in what order. Alternate contacts and their confirmed telephone numbers are also listed, in case primary contact is unavailable. Each official listed in the notification flowcharts should be familiar with it and immediately notify the Emergency Planning Manager in case of cessation of his/her functions within the organization. Responsibilities of officials for notification are tabulated as Table 4.

**TABLE - 4 RESPONSIBILITIES FOR NOTIFICATION**

<b>Designation of Officials</b>	<b>Responsibilities (During Preparedness and Emergency Events)</b>
Emergency Planning Manger (Executive Engineer)	<ul style="list-style-type: none"> <li>➤ Notify the District Disaster Management authorities and District Collector in case of ORANGE/Red alert.</li> <li>➤ Notify the District Authorities about any emergency response action at dam site and impact in the downstream area (e.g. large releases).</li> <li>➤ Assist the District Collectors/relief Authorities involved in the emergency response actions with information about condition at dam site.</li> <li>➤ Where the residences located immediately downstream of a dam that would be inundated within minutes of a dam failure, wherein the available warning time is very limited, in that cases, Emergency Planning Manager will arrange to notify the residences directly without waiting for the local administration to act upon before an emergency situation develops.</li> </ul>
Dam Site Engineers (Assistant Engineer / Junior Engineer)	<ul style="list-style-type: none"> <li>➤ Keep inform the Executive Engineer about the progress of the situation at dam site.</li> </ul>
Deputy General Manger/ General Manger	<ul style="list-style-type: none"> <li>➤ Notify /inform higher authorities on the mishap as per notification flow chart of particular alert level as per situation at site.</li> <li>➤ Notify/inform media representatives about the</li> </ul>

	<p>emergency situation.</p> <ul style="list-style-type: none"> <li>➤ Define emergency situations for which each medium will be utilized and include a news release that would be the most effective for each possible emergency, avoiding disseminate false/overstated messages among the population.</li> </ul>
District Collector(s)/ District Disaster Management Authority	<ul style="list-style-type: none"> <li>➤ Implement the Notification Flow chart for regional and State Disaster Management Contacts.</li> <li>➤ Contact Local Law Enforcement Authorities and Relief Authorities under their jurisdiction.</li> <li>➤ Liaisoning and coordinating with Early Warning Agencies like IMD, CWC, INCOIS, etc. for disaster specific information and disseminating the information for coordinating with the State Govt. and facilitating the deployment of NDRF in the disaster affected districts.</li> <li>➤ Issue public announcements in co-ordination with Dam Owner's officials and media representatives about the status of the emergency event.</li> </ul>
Relief Authorities (Police Department, Civil Defence, Army Forces)	<ul style="list-style-type: none"> <li>➤ Notify downstream residents in vulnerable areas.</li> <li>➤ Provide to the District Disaster Management Authority precise and accurate feedback information about the progress of relief actions and advise when the emergency can be terminated.</li> <li>➤ Notify to their corresponding command the necessity to deploy more resources to attend the rescue and relief actions.</li> </ul>
Media Representatives	<ul style="list-style-type: none"> <li>➤ Disseminate wide public awareness during emergency condition of Dam through Social Media Platform such as Facebook, Twitter, Whatsapp &amp; Instagram.</li> <li>➤ The news media, including radio, television and newspapers should be utilized to the extent available and appropriate.</li> <li>➤ Pre-plan in co-ordination with General Manager /Deputy General manager the most effective way to disseminate the most delicate and common emergency situations among the population. Pre-defined news shall be available in order to improve readiness of the decision-making process.</li> </ul>

#### 7.4 RESPONSIBILITIES FOR EVACUATION

Evacuation and relief actions are exclusive responsibilities of Districts Authorities and Emergency Relief Forces at Local and State Level. For Ichari Dam, a total of five districts (Dehradun, Sirmaur, Yamuna Nagar, Saharanpur, Karnal) would be directly affected by a potential failure/emergency event at the dam site, and therefore, each district's representative is responsible for evacuation/relief actions in his jurisdiction.

**District Collector(s) acting as District's Disaster Management Authority is responsible to coordinate actions along with the following specialized teams/forces:**

- Police and Fire Departments
- National Disaster Management Authority (Response Force)

- Civil Defense
- Army/ Navy/Air Forces.

Responsibilities of Various Authorities for evacuation in case of potential failure/  
Emergency event are below;

**District Collector's acting as District's Disaster Management Authority**

**UNDER BLUE ALERT (Preparedness)**

- Participate in review, updates and exercises of the EAP.
- Dissemination among the population and making them aware about their own risk.
- Conduct training/education programs among the population in regard, how to act before, during and after emergency events such as flash floods.

**UNDER ORANGE ALERT**

- Prepare emergency response personnel for possible evacuations that may be needed if a RED alert is declared.
- Provide resources as necessary to the dam owners.
- Serve as the primary contact responsible for co-ordination of all emergency actions for potentially affected communities.
- Consider drafting a State of Local Emergency in preparation for RED alert.
- Maintain close liaison with the district and the State Governments as well as the nearest units of Armed Forces/Central police organizations and other relevant Central Government organizations like Ministries of Communications, Water Resources, Health, Drinking Water, Surface Transport, who could supplement the efforts of the district administration in the rescue and relief operations.
- Decide in co-ordination with the Emergency Planning Manager when to terminate the Emergency.

**UNDER RED ALERT**

- Initiate warnings and order evacuation of people under vulnerable areas as per Evacuation maps (ANNEXURE 4).
- Direct local emergency response services (may include local law enforcement) to carry out the evacuation of people and close roads/crossings within the evacuation area (see local Evacuation Plan (ANNEXURE 4).
- Declare a State of Local Emergency if required.
- Provide resources as necessary to the dam owners.
- Decide in co-ordination with the Emergency Planning Manager when to terminate the Emergency.

**Police Department**

- Warn the public under vulnerable areas in their jurisdiction as per Evacuation maps (ANNEXURE 4).
- Secure and control access to evacuated areas.
- Install barricades in the affected bridges and crossings as per Table 9 & 10 and (ANNEXURE 4)
- Assist in conducting rescue and recovery operation as required.
- Ensure proper access to the emergency services.
- Prioritize the vehicle movement to the emergency site.
- Control the traffic and divert through alternative routes.
- Ensure no unauthorized person entering into the emergency site.

- Permit with minimum delay the entry of authorized personnel and recognize outside agencies, vehicles etc. involved in the emergency operations that come to help.
- Any other responsibility as entrusted by the higher officers

#### Fire department (s) Army & Navy Force

- Assist in evacuation operations and initiate the evacuation of impact areas in cooperation with Emergency Management Agency and Police Department
- Request mutual aid for boats and initiate rescue of trapped residents as needed
- Supply special equipment/teams to support rescue operations (e.g. Helicopters, divers and vehicles).

### 7.5 RESPONSIBILITIES FOR TERMINATION AND FOLLOW-UP

Once EAP operations have begun under BLUE, ORANGE or RED alerts levels, the EAP operations must eventually be terminated and follow-up procedures completed. EAP operations can only be terminated after completing operations under **RED** or **BLUE** alert levels. If **ORANGE** Event Level is declared, the operations must be designated **RED** Event Level or BLUE before terminating the EAP operations.

Please check the Action data Sheets (**ANNEXURE 5**) for further details in when to declare an emergency event terminated. **Table 5** below shows the main responsibilities in the termination and follow-up process.

**TABLE - 5 TERMINATION AND FOLLOW UP**

Officer Designation	Responsibilities (During Preparedness and Emergency Events )
Emergency planning Manger (Executive Engineer)	<ul style="list-style-type: none"> <li>➤ Declare the termination of the emergency operations in co-ordination with District Disaster Management Authority and Relief/Response Forces.</li> <li>➤ Conduct a review process of the EAP procedures.</li> <li>➤ Identify EAP procedures that were followed effectively, as well as any ways that the EAP could be improved.</li> <li>➤ Identify the causes that could have triggered the emergency event and propose actions to improve readiness and early detection. Support from the Dam Safety Organization may be requested in this regard</li> <li>➤ For Major Emergencies, the Emergency Planning manager will maintain detailed records of cost expended and will prepare a detailed report in this regard.</li> </ul>
Deputy General Manger/ General Manager	<ul style="list-style-type: none"> <li>➤ Ensure that all parties that participated in the EAP activities are involved in the review process.</li> <li>➤ Impose a time frame within which the EAP review is to be completed.</li> <li>➤ Propose any ways that the EAP could be improved.</li> <li>➤ Present the final results of the EAP evaluation in a documented report to the Higher authorities.</li> <li>➤ Ensure that there is no danger of spread of any epidemics or water borne diseases after the floods.</li> </ul>

Dam Safety organization (State & Center)	➤ Identify in co-ordination with the Emergency planning Manager the causes that could have triggered the emergency event and propose actions to improve readiness and early detection. A report should be presented to the dam owner's authorities in this regard
Disaster Management Authority (State & District)	➤ Declare the termination of the emergency operations in co-ordination with Emergency Planning Manager and Relief/Response Forces. ➤ Identify EAP procedures that were followed effectively, as well as any ways that the EAP could be improved.

## 8. COMMUNICATIONS NETWORKS

Local officials and downstream residents will be notified by landline telephone, if available; otherwise via cell phones or emergency personnel (in person or using their radios). The various networks for emergency use include the networks of the following:

S.NO.	DESIGNATION	PHONE NO	REMARK
1.	Junior Engineer (E&M)	08894682927	
2.	Assistant Engineer (E&M)	9456590181	
3.	Assistant Engineer (Civil)	9456590189	
4.	Executive Engineer (E&M)	9456590232	
5.	Executive Engineer (Civil)	9456590179	
6.	DGM (HGC) Dakpathar	9456590499	
7.	DGM (CM ) Yamuna Valley, Dhalipur	9456590261	
8.	General Manager (Yamuna Valley)	9456590377	
9.	General Manager (Civil)	9456590077	
District Dehradun			
10.	District Collector, Dehradun	0135-2622389	8650068111
11.	District Police (SSP), Dehradun	0135-2716203,209	
12.	District Disaster Management Officer	9412964935	
13.	SDM, Kalsi	01360-276011	
14.	SDM, Vikasnagar	01360-250880	9568022558
15.	Fire Department, Dehradun	01360-223621	9456597982
16.	CO, Vikasnagar	01360222100	9411112745
17.	Health & Hospital, Dist- Dehradun	0135-2726256	
18.	District Emergency Operation Centre	0135-2726066	
19.	Tehsildar, Vikasnagar	01360250200	7500883008
20.	Tehsildar, kalsi	01360276155	9410789972
21.	Police Station, Kalsi	0136-275076	9411112820
22.	Police Station, Vikasnagar	01360250342	9411112819
23.	Tota(Gram Pradhan)	9805790649	
24.	Kherooa(Gram Pradhan)	7983486037	
25.	Killor(Gram Pradhan)	8580922988	
District Sirmour (H.P)			
26.	District Sirmaur Deputy Commissioner	01702-225025	9418455298
27.	SP, Sirmaur Himachal pradesh	01702-225002	9990804366

28.	SDM, Poanta Sahib	01704-224100	9418063777
29.	District Disaster Management Officer	9459779314	9459779314
30.	Fire Officer	01704208054	7650012101
31.	Health & Hospital, Ponta shahib	01702-222543	
32.	District Emergency Operation Centre	01702-226401/402/403/404	8219607760
33.	Police Station, Paunta Sahib	01704-222322	
34.	Police Station, Silai	01704-278547	
35.	Police Station, Rajwan	01704-266211	
36.	Police Station, Singpura	01704-249701,980589348	
<b>District Yamunanagar (H.R)</b>			
37.	Deputy Commissioner	01732237800	
38.	SP. Yamunanagar	01732-268203	
39.	Health & Hospital, Yamunanagar	01732-221608	
40.	SDM, Jagdhari	01732-237805	
41.	Fire Safety officer, Yamunanagar	01732-250101	
42.	District Emergency Operation Centre	01732269150	
<b>District Saharanpur (U.P)</b>			
43.	DM, Dist. Saharanpur	0132-2726838	
44.	SP, Saharanpur	0132-2727143,	
45.	SDM, Behat	9454416972	
46.	SDM, Nakur	9454416973	
47.	Health & Hospital, Saharanpur	0132-2716204	
48.	Fire officer, Saharanpur	0132-2646100	
49.	District Emergency Operation Centre	01322723971	
<b>District Karnal (H.R)</b>			
50.	Deputy Commissioner, Karnal	0184-2667500	
51.	SP. Karnal	0184-4091002	
52.	SDM, Karnal	0184-2267701	
53.	Fire Officer, Karnal	0184-2270799, 101, 2201101	
54.	Health & Hospital, Karnal	0184-2267796,	
55.	SDM, Indri	0184-2383700	
56.	District Emergency Operation Centre	01842267271	

Sample public announcements appear in (ANNEXURE-7 ).

## **9. EMERGENCY DETECTION, EVALUATION, AND CLASSIFICATION**

### **9.1 Emergency Situations**

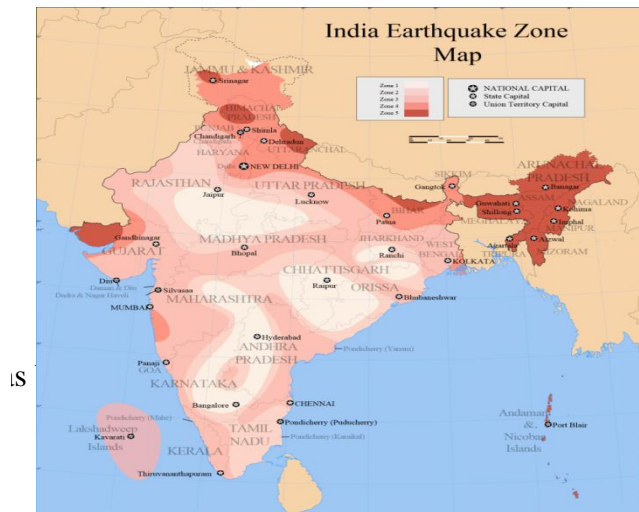
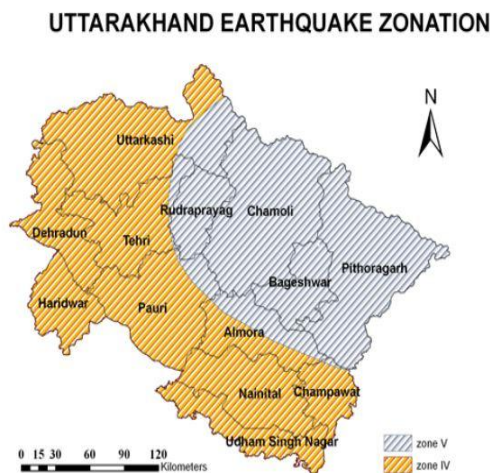
Many dam conditions can lead to emergency situations, not all of which will necessitate the implementation of the EAP. However, if any of them occur, the appropriate actions must be taken.

**Weather:** Although generally not in themselves a threat to the dam, severe storms and other inclement weather conditions can contribute to an existing problem and hinder any remediation efforts. Severe storms also cause the uncontrolled release of floodwater, and increase flow in already rain-swollen areas.

**Tropical cyclones:** Tropical cyclones do occur in the area, with the potential for structural damage to the dam, possibly resulting in its failure. If a tropical cyclone has struck in the area, an inspection of the dam for any sign of damage will be appropriate.



**Earthquakes:** Ichari Dam is located in the seismic zone 04 and is prone to natural disasters such as earthquake/ unprecedented floods. Ichari dam is being rehabilitated under DRIP (Dam Rehabilitation and improvement project) with World Bank funding through project Director, DRIP, Central Water Commission, GOI. Under the project of DRIP, “**Inspection manual for Ichari Dam after seismic event**” was prepared by Japan Water Agency, Japan under the guidance of CWC & in association with UJVNL in October 2016. After preparation of Manual, mock drill was also conducted with Japan Water Agency on dated 18.10.2016. to protect the dam.



## 9.2 SIGNS OF FAILURE

The Junior Engineer/Assistant Engineer, Ichari dam is responsible for conducting routine inspections and identifying conditions that could indicate the onset of problems leading to a dam failure. The early identification of potentially dangerous conditions can allow time for the implementation of EAPs. It is important to understand how distress can develop into failure. With appropriate action, distress need not lead to a catastrophic failure of the dam. The following sections describe some of the different types of failure which could lead to a dam failure.

**Structural Failure:** The structural failure or collapse of any non-overflow portion of the dam, spillway or spillway gates could result in loss of the reservoir. A structural failure of a portion of the spillway could cause piping and possibly embankment failure.

**Overtopping Failure:** Overtopping of the embankment results in erosion of the dam crest. Once erosion begins, it is very difficult to stop.

**Dam Burst due to Landslide / flooding :** A dam burst is a sudden release of large quantities of water causing havoc in downstream areas damaging structures & installations, disrupting socioeconomic activities, loss of life & property and ecological & environmental damage. This will also affect adversely downstream reservoirs and effect in further downstream may be more severe. Since dam bursts often happen without adequate warning, massive resource mobilization is required to tackle it.

Installation of protection against floods is paramount. It is essential that flood gates are consistently and correctly opened. While consideration for new structures is improving, the existing ones need continuous checking and vigilance for dam safety. Neglect of safety measures can cause a threat to people.

Measures like flood forecasting, a comprehensive plan for dam disaster management, flood management planning will help in ensuring safety of people.

Pre- flood maintenance of flood infrastructure and flood preparedness before the onset of monsoon plays a vital role in the smooth management of high flood situations.

### **9.3 Emergency Evaluation and Classification :**

This section lists the conditions and actions which may be used to classify the level of emergency response, as a guide for the Emergency Planning Manager, Ichari Dam. Specific dam observations and corresponding emergency classification levels can be found in the Annexure 5.

**Internal Alert Condition BLUE** – A “watch” condition. A problem has been detected at the dam that requires constant monitoring. At this time, the distress condition is manageable by dam personnel. The Executive Engineer (E&M), Ichari Dam will be responsible for monitoring and repair as soon as possible and implementing the appropriate Notification Flowchart regarding the problems/failure of electrical/mechanical equipments. Executive Engineer (Civil- Maint), Ichari Dam will be responsible for monitoring and repair of civil works as soon as possible. The following is a list of conditions that would initiate this condition:

- Cracking or movement of any concrete structure
- Instrument readings are beyond threshold values..
- No active erosion in downstream areas. Discharge are above 4000 cumecs.
- Exceptionally heavy rainfall in the catchment of the dam reservoir.
- Unverified bomb threat or verified damage to the dam/appurtenances with no impact in the functioning of the dam.
- Measurable earthquake felt or reported and dam appears to be stable. If acceleration > 25 cm/sec<sup>2</sup> observed at the bottom of dam.
- Structural member of a gate, either broken or severely damaged, which prevent operation of the gate(s). No leakage or uncontrolled discharge is detected. Flood can be routed without damaged/non-operational gate(s).

**External Alert Condition ORANGE** – This is indicative of a dam condition that is progressively getting worse; and there is a high probability of dam failure. Although there is no immediate danger, the dam could fail if conditions continue to deteriorate. The Executive Engineer (E&M), Ichari Dam will be responsible for initiating immediate repairs, including lowering the reservoir if appropriate and implementing the appropriate Notification Flowchart.

Executive Engineer (Civil - Maint), Ichari Dam will be responsible for monitoring and repair of civil works as soon as possible.

The following is a list of conditions that would initiate this condition:

- Enlarging cracks (bigger than ¼ cm.) and active movement in the masonry/concrete structure with leakage passing through.
- Structural member of a gate, either broken or severely damaged, which prevents operation or malfunction of the gate(s). Considerable leakage or uncontrolled discharge is detected. Flood cannot be routed without damaged/non- operational gate(s).
- Large cracks, movement or failure of a portion of any major concrete structure that forms an integral part of the dam.
- Verified bomb threat that if carried out, could result in damage of the dam/appurtenances that impacts the functioning of the dam OR verified damages due to vandalism that impacts the normal operation of the dam.
- An increase in the reservoir level to near the top of the dam.
- Active erosion in downstream areas. Spillway's discharge is above 6500 cumecs.

**External Alert Conditions RED** – These are “failure” conditions. Either the dam is in immediate danger of failing or has already failed. No time remains to implement measures to prevent failure. Evacuate immediately. Evacuation efforts will continue until the situation is stabilized.

The Executive Engineer (E&M), Ichari Dam is responsible for implementing the appropriate Notification Flowchart. The following is a list of conditions that would initiate “imminent dam failure” or “dam failure” conditions:

- Structural member of a gate, either broken or severely damaged,, which prevents operation or malfunction of the gate(s). Unexpected high discharge is occurring. Flood cannot be routed without damaged/non-operational gate(s)..
- Detonated bomb resulting in visible damage to the dam or appurtenances OR verified damages due to vandalism causing an uncontrolled water release.
- Enlarging cracks with sudden or rapidly proceeding movements/displacements in the masonry/concrete structure with severe leakage passing through Settlement that is predicted to degrade to the reservoir level.
- Earthquake resulting in uncontrolled release of water over dam or rapidly developing flow through cracks or rapidly developing erosion through increased seepage.
- Significant movement or failure of any structure that forms an integral part of the dam.
- Overtopping of dam.
- Uncontrollable release of the reservoir
- More than ‘Design Flood’ inflow forecast

#### **PREVIOUSLY KNOWN PROBLEM.**

1. Instrumentation: Presently instrumentation work is under progress. No seismometer is installed in the Ichari Dam.
- 2.Trash racks of intake gate were damaged in 2003 and 2013 .
- 3.CPMU has assessed the peak PMF for the project in order of 16000 cumecs which is greater than the discharge capacity of spillway (13500 cumecs).

## **10. PREPAREDNESS**

Preparedness actions are to be taken both before and following the development of emergency conditions and should identify ways of preparing for an emergency, increasing response readiness in a uniform and coordinated manner, and helping to reduce the effects of a dam failure. The following are some steps that could prevent or delay failure after an emergency is first discovered.

### **10.1 Surveillance**

**Surveillance:** Round the clock surveillance at the dam and its appurtenant (on the rim of reservoir (left & right)) will be carried out by site engineers during emergency situations. For this, the posting of special observer of high experience and keen observation is an important requirement of EAP during high flood period. To ensure that the whole system (including civil structures & mechanical installations) is being maintained well up to satisfactory level, the repair maintenance must be carried out as per requirement of O & M of Ichari Dam. In addition, it must be ensured that maintenance and upkeep of different components is carried out and will be only possible through deployment of well procedure conversant and trained staff. The list of such persons should be displayed on a photo frame mounting at convenient safe places at dam site and list of local telephone numbers inside the dam & outside the dam area. It will be updated from time to time for any change

**Response on forecast of excessive inflow:** The facility of gauge, discharge, water quality, silt station has been setup in the catchment area, located at Tuni, Meenus and Attal by CWC and observations at each of these stations will be taken daily by Site Engineer.

**Response during weekends and holidays:** The Standard Operating Procedure with Reservoir Operation & Maintenance Manual and Gate Operation Manual are strictly followed throughout the year whether it is weekends/holidays/night. Executive Engineer, (E&M) will be available for emergency response during weekends and holidays and can be present at the dam site within 45 minutes of detection of an emergency condition. In case of non-availability of the Executive Engineer (E&M) Ichari Dam, the Deputy General Manager (E&M) and Assistant Engineer (E&M) will take his responsibilities.

**Response during periods of darkness and adverse weather:** Junior Engineer (E&M) (shift Incharge) will arrange for access to generators and lights to adequately monitor the situation. Dam Site Engineer(Assistant Engineer(E&M) and Assistant Engineer(Civil)), Ichari Dam will be able to access the site during adverse weather conditions by Dam's Vehicles.

## 10.2 Access to the site:

**TABLE - 6 Condition of access to Ichari Dam under emergency Conditions**

From	To	Access Description	Approximate Distance	Main Dam Failure due to overtopping
Dakpathar	Ichari dam	Village Rd (Dakpathar - Ambari bend) , NH 507 ( Ambari bend - Haripur), UK SH ( Haripur -Ichari Dam)	39 Km	Not safe
Dakpathar	Ichari dam	Village Rd (Dakpathar - Ambari bend) , NH 507 ( Ambari bend - Haripur), UK SH ( Haripur - Tuniya), Himanchal SH (Tuniya- Chiyog- Ichari Dam)	35 Km via Raod & 3 Km on foot	Not safe
Dakpathar	Ichari dam	Village Rd (Dakpathar - khodri), Himanchal Village Rd (Khodri- Purwala-Satoun-Kamrau- Kapota- Jamna-Massu-Chiyog-Ichhari Dam)	64 Km via Raod & 3 Km on foot	Not Safe
Dakpathar	Ichari dam	Village Rd (Dakpathar - Ambari bend) , NH 507 ( Ambari bend - Kalsi-Sahiya), UK Village Rd ( Sahiya- Pajitilani-Tipau-Malau- Chandeu- Khoi Supau-Kishau-Kuwanu Meenas Road- Icahari Dam)	54.50 Km	Safe to use
Dakpathar	Ichari dam	Village Rd (Dakpathar - Ambari bend) , NH 507 (Ambari bend - Kalsi-Sahiya), UK Village Rd ( Sahiya- Pajitilani- Haza-Dasou- Dodha-Gabela-Gambhari-Kuwanu- Tikkardhar- Jamua- Ichari Dam)	105 Km	Safe to use

### **10.3 Remedial Action**

Preventive measures can be taken in an emergency to prevent the catastrophic failure of the dam, but such repairs should be undertaken with extreme caution. The repairs are only temporary, and a permanent repair should be designed by an engineer as soon as possible.

The following actions should only be undertaken under the direction of a professional engineer or contractor. In all cases, the appropriate Notification Flowchart must be implemented and the personnel of the SDSO/DDMA/SDMA must be notified.

Consider the following preparedness actions if the dam's integrity is threatened by:-

#### **Seepage Failure**

- Plug the flow with whatever material is available (hay, bentonite, or plastic) if the entrance is in the reservoir.
- Lower the water level in the reservoir
- Place an inverted filter (a protective layer of sand and gravel) on the exit area to hold the material in place.
- Continue operating at a lower level until a repair is made.

#### **Structural Failure**

- Implement temporary measures to protect the damaged structure, such as placing rock riprap in the damaged area.
- Lower the water level to a safe elevation through the low flow outlet.

## **11. SUPPLIES AND RESOURCES**

### **11.1 Contracts**

If UJVN Ltd. personnel and resources prove to be inadequate during an emergency; requests will be made for assistance from other local jurisdictions, other agencies, and industry as needed. Such assistance may include equipment, supplies, or personnel. All agreements will be entered into by authorized officials and should be in writing whenever possible. The Executive Engineer (E&M), Ichari Dam & Executive Engineer (Civil Maintenance)- Ichari Dam shall have the authority to enter into agreements as deemed necessary to prevent the failure of the dam.

### **11.2 Equipment and Supplies**

Equipment that is available for use and local contractors that can be contacted to provide equipment during an emergency event are listed in **ANNEXURE 8**.

### **11.3 Technical Data**

Pre-monsoon and post-monsoon inspections of the dam are made every year during the month of June & October respectively by site engineer in co-ordination with emergency planning manager to evaluate its structural safety, stability, and operational adequacy. In the event of an abnormal occurrence, reference to these reports, particularly the photographs, can be beneficial in the evaluation of a potential problem.

Technical records such as drawings and inspection reports should be stored and carefully maintained at the UJVNL's Dakpatthar office. Alternate personnel will be familiar with the location of the documents in the event of an emergency situation.

#### **11.4 Emergency Operation Centre Activity Log**

Any unusual or emergency condition should be documented, including the following:

- Activation or deactivation of emergency facilities
- Emergency notifications to other local governments and to state and central government agencies
- Significant changes in the emergency.
- Major commitments of resources or requests for additional resources from external sources
- Telephone calls should be recorded in chronological order
- Issuance of protective action recommendations to the public.
- Evacuations Casualties
- Termination of the incident

#### **11.5 Costs of the Emergency Operation Centre**

For major emergencies, the emergency operation centre will maintain detailed records of costs expended. These records may be used to recover costs from the responsible party or insurers, or as a basis for requesting financial assistance for certain allowable response and recovery costs from the state or central government. Documented costs should include:

- Personnel costs, especially overtime.
- Equipment operation..
- Equipment leasing and rental.
- Contract services to support emergency operations.
- Specialized supplies in emergency operations.

### **12. INUNDATION AREA**

#### **12.1 Inundation Maps**

The inundation map (**ANNEXURE 3**) illustrates the areas subject to flooding from failure of the Ichari dam and is attached as separate drawing volume in A3 format. The maps are prepared using the results of a two-dimensional flow analysis considering cases of Overtopping failure, depicting the area likely to be inundated as well as the flood arrival time from the beginning of the breach to the moment the location start to be inundated.

The illustrated inundation maps were received from CWC officials vide Doc. No. CDSO\_DSR\_MAP\_ICHARI\_UJVNL\_143 on dated 25.10.2018.

Inundation maps have been prepared for the following three causes of flooding:

1. A dam failure caused by overtopping from the inflow design flood leading to breaching and uncontrolled release of impounded water.
2. A non-flood dam failure caused by internal erosion (piping) with the reservoir at full supply level (often called a "fair-weather failure") leading to breaching and uncontrolled release of impounded water.
3. A large controlled-release flood without dam failure.

**TABLE - 7 Shows various scenarios included in the Emergency Action Plan.**

	Scenario	Hazard Parameters	Number of Tiles
2-A	Overtopping Failure	Depth, Arrival Time, Velocity, Water surface Elevation (WSE), Vulnerability	(5 x 12 nos. each)
2-B	Internal erosion (piping)	Depth, Arrival Time, Velocity, Water surface Elevation (WSE), Vulnerability	(5 x 12 nos. each)
2-C	Large Controlled Release	Depth, Arrival Time, Velocity, Water surface Elevation (WSE), Vulnerability	(5 x 12 nos. each)

## 12.2 Affected Areas

The potential consequences due to various breach scenarios of Ichari Dam will affect various districts partly in part. Parts of Tehsils which are likely to be suffered with significant impact are listed in the Table 8 below

**TABLE - 8 Affected Tehsil within the Inundation area failure**

SN.	DISTRICT	TEHSIL /MUNICIPALITY	TILE ID NO. IN EVACUATION MAP ANNEXURE 4
1	DEHRADUN	KALSI	01/16
		VIKASNAGAR	02/16
2	SIRMOUR	PAONTA SHAHIB	02/16, 03/16
3	YAMUNANAGAR	JAGHADARI	04/16, 06/16, 11/16,12/16,14/16
		CHHACHHRAULI	06/16 , 12/16 , 13/16
4	SAHARANPUR	NAKUR	05/16 , 06/16 , 07/16 ,11/16 , 12/16
		BEHAT	04/16, 13/16,
		SAHARANPUR	05/16
5	KARNAL	INDRI	07/16 , 08/16, 09/16, 10/16
		KARNAL	07/16 , 08/16

It is also determined that the buildings/roads, located on the banks and adjoining areas of the downstream could be affected due to dam breach scenario.

The most important crossing structures and parts of roads, likely to be submerged due to various scenarios, are summarized in the Table 9 & 10 below and shown in Evacuation map (ANNEXURE 4) as well.

**TABLE - 9 LIST OF MAIN CROSSING STRUCTURES LIKELY TO BE SUBMERGED**

SN.	DISTRICT	BRIDGE NAME/ LOCATION	TILE ID NO. EVACUATION	DISTANCE DOWNST-REAM FORM DAM	FLOOD WAVE ARRIVAL TIME
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			MAP ANNEXURE 4 BOOKLET		(hh:mm)
1.	SIRMAUR & DEHRADUN	Tuniya Bridge (B1-B2)	1/16	4.8 Km	0:45
2.		Paonta Saheb Bridge (B9-B10)	2/16	22.8 Km	2:50
3.	DEHRADUN & SIRMAUR	Patel Bridge (B26)	1/16	09 Km	1:10
4.		Kalawar Bridge (B4)	1/16	12 Km	1:40
5.		Dakpatthar Barrage(B5, B6, B7)	1/16	19 Km	2:00
7.	YAMUNANAGAR & SAHARANPUR	Majari tapu-1 - Jairampur jagir (B8-B9)	16/16	62.6 Km	9:20
8.		Pansara - Sarsawa(B5-B14)	16/16	71.5 Km	12:35
9.		Naghly / Pahladpur - Tabor aht.(B16, B17)	16/16	78.7 Km	15:20
10.		Shergarh - Shah Alipur(B18,B19)	8/16	112.6 Km	30:20

**TABLE - 10 List of roads (NH) likely to be submerged**

SN	ROAD NH NO.	ROAD DETAILS/LANDMARKS	APP. LENGTH (KM) UNDER SUBMERGENCE (ANNEXURE 4)	TILE ID NO. IN EVACUATION MAP	DISTANCE DOWNSTREAM FORM DAM	FLOOD WAVE ARRIVAL TIME (hh:mm)
1	NH-72	KULHAL-PAONTA SHAHIB	0.8 KM	2/14	22.8 Km	2:50
2	NH-907	PAONTA SHAHIB-GHUTANPUR-01	1.00 KM	2/14	29 Km	3:30
3	NH-907	RAIYANWALA-TAJEWALA-01	1.5 KM	3/14	41.8 Km	6:15
4	NH-907	TAJEWALA-CHOOHADPUR	17 KM	3/14	47.8 Km	9:20
5	NH-344	PANSARA-SARSAWA	13 KM	5/14	71.5 Km	12:30

### 13. LOCAL EVACUATION PLAN

If imminent failure of the dam with uncontrolled downstream flooding is anticipated, local disaster management and law enforcement personnel should notify those downstream areas for evacuation in the most expedient manner possible. The organizations and personnel on the **Notification Flowchart** should be contacted immediately. Local law enforcement officials along with local mobile network operators, radio and television stations can best spread the notice for evacuation. The immediate impact will be two areas along Tons-River & Yamuna River downstream of the dam. For sunny-day and design flood breaches, the following actions should be taken by Local law enforcement officials, along with local



mobile network operators, radio and media representatives can best spread the notice for evacuation (**See Responsibilities Sections, 7.3 and 7.4**)

In addition, **ANNEXURE 5 (Emergency Level Determination & Action Data Sheets)** can be used as support in the decision-making process either to escalate or downgrade an emergency event. The most important actions that should be taken during an evacuation process are:

- Police Departments will barricade all bridges and roads that could possibly be flooded to prevent access to the affected area. These bridges include all crossings of main river and its tributaries as well as those affected roads shown in the **ANNEXURE 4 (Evacuation Maps)**. Inundation Maps along with flood hazards reference values in Crossings locations included in this annexure indicates the appropriate barricaded location under the responsibility of local law-enforcement authorities
- The Districts Disaster Management Authorities (Districts Collectors) will assist with the notification of all persons and agencies involved (relief authorities), with the possibility of additional support including contacting others not accessible by radio or telephone.
- Relief Authorities (Police, Fire, Army) are generally familiar with developed areas in their jurisdiction. Such knowledge, coupled with the requirements of state law that they respond to disasters, make them the logical officials to be notified and to spread the warning message to all areas subject to flooding.

Based on the specific results of the dam breach analysis (wave arrival time), a local evacuation plan has been developed to assist disaster management authorities in the relief actions. Local Evacuation Plan can be found in **ANNEXURE 3** of this EAP and complete list of relief camp is in the same.

## **14. IMPLEMENTATION**

### **14.1 Development**

This EAP version has been prepared by UJVN Limited in co-ordination with Central Project Management Unit. The document has to be sent to Central Water Commission (CWC) for review, and their comments will be incorporated into this document for final publication.

### **14.2 UPDATING**

Copies of the EAP have been provided to the appropriate persons and the EAP has been approved and signed by the owner and the person(s) in charge of emergency response, as shown on the Distribution List and Approval and Implementation sheets at the front of the report.

This plan will be reviewed and updated annually before 1<sup>st</sup> of June of every year by DGM(HGC), UJVN Ltd., Dakpathar and personnel from local disaster management agencies. The DGM(HGC), UJVN Ltd., Dakpathar will review and complete all items on the Annual EAP Evaluation Checklist as per **ANNEXURE 9**.

After the annual update is completed, a new Approval and Implementation sheet will be attached and the annual update will be documented on the Plan Review and Update sheet in **ANNEXURE 10**. If revisions to the EAP are made as a result of the annual update, such changes will be recorded on the Log Sheet of Changes form at the front of the report. A copy of the updated portions of the EAP will be sent to the SDSO and all other concerned as per the EAP Distribution List. If the EAP is reviewed and revisions are not required, the UJVN Ltd. will submit written notification to all concerned that no updates to the EAP have been adopted or implemented.

### 14.3 Testing

The Deputy General Manger shall organize the following exercises as specified below:

**Orientation (Stake holders' Consultation):** The Deputy General Manger will organize an orientation meeting every year with local responders and stakeholders to solicit input, established roles during emergency situation and facilitate reliable responses to the emergencies. In orientation meeting, the Emergency Planning Manager will introduce the revised EAP to local officials and emergency responders and provide those entities the opportunity to review and comment on the documents and on their roles and responsibilities, described in EAP.

**Tabletop exercises:** Deputy General Manger and Emergency Planning Manager will organize a table- top drill once in 2 years to discuss and review the simulated or imaginary emergency situation. The tabletop drill involves a meeting of Emergency Planning Manager with local and state Disaster Management Officials in a conference room. The drill begins with a description of a simulated event and proceeds with discussions by the participants to evaluate the EAP and response procedures, and to resolve concerns regarding co-ordination and responsibilities. Any problem identified during a drill should be included in revisions to the EAP.

Before the tabletop exercise begins, participants will visit the dam to familiarize with the dam site. Emergency Planning Manager will present a scenario of an unusual or emergency event at the dam. The scenario will be developed prior to the exercise with the support of the Dam Safety Organization.

Once the scenario has been presented, the participants will discuss the risk involved, responses and related actions that they would take to address and resolve the scenario throughout the exercise. The exercise provides an opportunity to discuss EAP and response procedures and resolve the questions throughout the exercise. It will also clarify roles and responsibilities and will identify additional threat mitigation and preparedness actions.

Records and reporting of the main conclusions/findings of both meetings will be maintained in ANNEXURE 10 and following the deadline given in Table 11.

**TABLE - 11 EAP Exercise/ testing requirements**

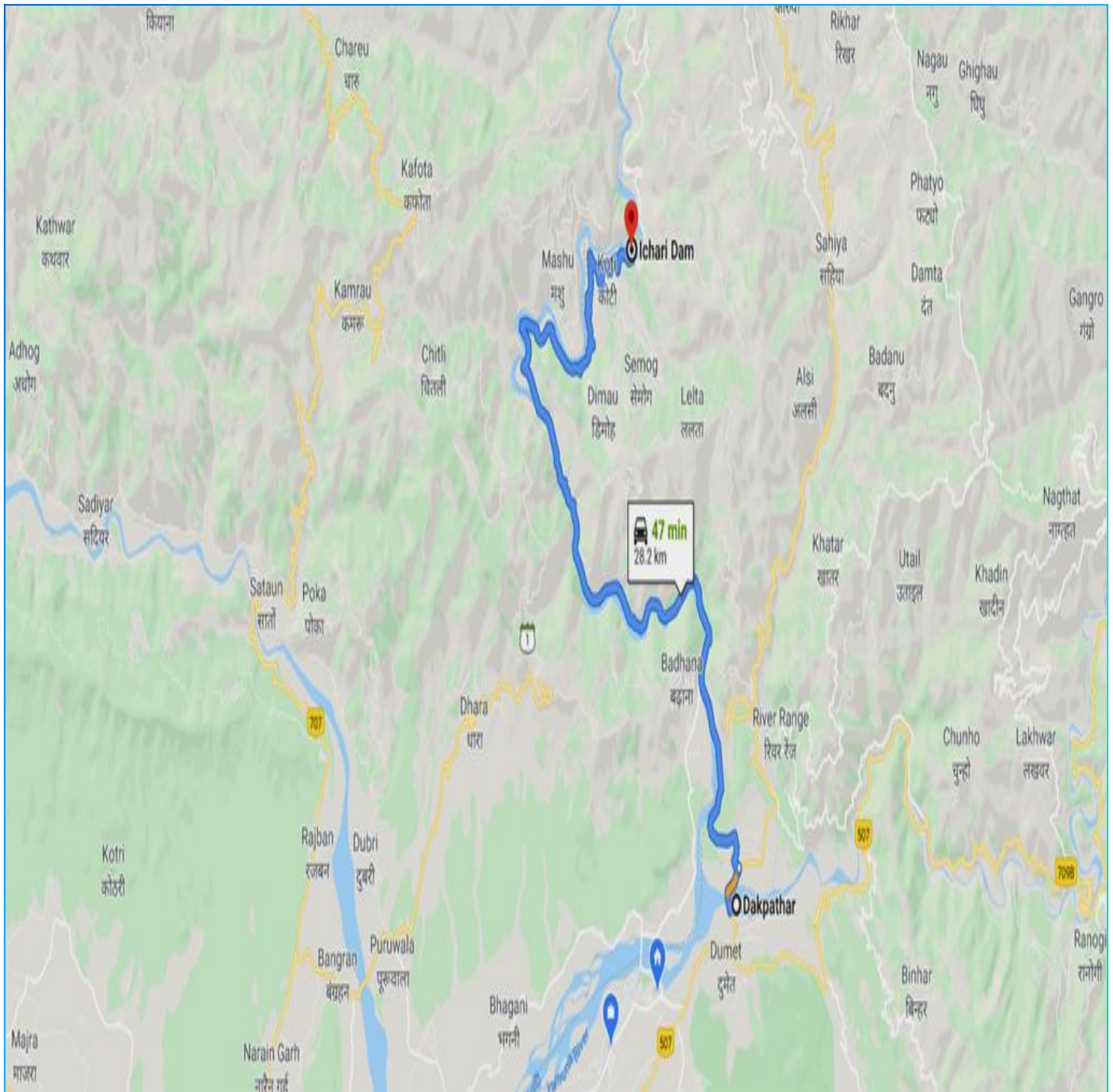
EXERCISE	SCHEDULE	REPORTING DEADLINES
Orientation (Stakeholders Consultation)	Annual	<input type="checkbox"/> Pre-Event: Submit Agenda to Stakeholders 30 days before meeting <input type="checkbox"/> Post-Event: Update Form 2 ( <b>ANNEXURE 10</b> ), within 30 days after meeting
Tabletop Exercise	Once every 2 years (before monsoon season)	<input type="checkbox"/> Pre-Event: Submit Exercise Plan and Schedule to participants 90 days before exercise <input type="checkbox"/> Post-Event: Update Form 2 ( <b>ANNEXURE 10</b> ) and submit Evaluation Report within 60 day after exercise

### 14.4 Training

All people involved in the EAP will be trained to ensure that they are thoroughly familiar with its elements, the availability of equipment, and their responsibilities and duties under the plan. Personnel will be trained in problem detection, evaluation, and appropriate corrective measures. This training is essential for proper evaluation of developing situations at all levels of responsibility. Training records will be maintained in **ANNEXURE 11**.

# ANNEXURE

## ANNEXURE 1: VICINITY MAP



Vicinity Map of Ichari Dam

**ANNEXURE 2: SALIENT FEATURES****Name of Project: Ichari Dam**

<b>(1) Type of scheme</b>	Run-off-river with pondage for daily peak operation
<b>(2) Reservoir</b>	
• Catchment area: -	4890 km <sup>2</sup>
• Capacity -	4.687 million m <sup>3</sup> at reservoir level 644.75 m
<b>(3) Dam</b>	
• Type: -	Concrete straight gravity; dam height 59.75 m from foundation
• Spillway: -	Gated spillway; 7 nos. Radial gates 9.5 x 16.5 m each
• Design flood:	13,500 m <sup>3</sup> /s
<b>(4) Desilting chamber-</b>	
• Type: -	Underground submerged hopper with 2 nos. 12.75 m wide ducts
• Velocity of flow: -	For 235 cumecs discharge velocity decreases from 1.39 m/sec to 0.63 m/sec
• Roof slab thickness: -	2.00 m
<b>(5) Intake Gates</b>	
• No of gates :-	4 Nos.
• Opening Size :-	5.625 m X 5.00 M
• Weight of each gate :-	24.25 Tonnes
• Sill elevation :-	EL. 632.00 m
• Designed head of gate:-	18.75 m
<b>(6) Headrace tunnel</b>	
• Type:-	Circular cross section; concrete lined; diameter 7.00 m; length 6220 m
• Design discharge: -	Continuous discharge 225 m <sup>3</sup> /s; max. Short time discharge 235 m <sup>3</sup> /s
<b>(7) Spillway Gate &amp; Hoist</b>	
Clear distance between piers:-	9.5 m
Height of Gate :-	16.5 m
Crest level :-	EL 628.80 m
Hoisting Capacity:-	70.00 Tonnes
• Lifting Speed:-	300 mm per minute
<b>(8) Stoplog gates</b>	
• No of units:-	13
• Width of opening:-	9500 mm
• Weight of each unit:-	8.00 Tonnes
• Overall size of unit:-	10028 mm X 1300 mm X 936mm ( L X H X D )
<b>(9) Spillway Gantry Crane</b>	
• Type:-	Electrically operated gantry crane
• Centre to centre rail:-	3.750 m
• Total Travel:-	20000 mm
• Total kentledge weight:-	26.00 Tonnes
• Rope Drum:-	30" Dia (Two Drum)
<b>(10) Dewatering Pumps</b>	
• Capacity:-	1 cusec capacity at 50 m head, 1.5 cusec capacity at 50 m head
• Type of installation:-	Horizontal
• Bottom level of sump:-	EL 594.40 m
• Minimum water level in sump:-	EL 595.70 m
• EL. At discharge:-	EL 646.00 m

- Diameter of discharge pipes:- 150.00 mm
- (11) Flushing Conduit**
- No of F.C :- 3 Nos.
- Cross section:- Two Nos. 2 m X 1.1 m ( H X W), One No 1.670 circular dia.
- Lower lip :- EL 616.00 m
- (12) Intake Trashracks**
- Total Height :- 8.00 m ( from 631.00 m to 639.00 m)
- Size of each unit:- 1.8 m X 4.00 m (H X W)
- No. of trash racks:- 32
- Hoist capacity:- 7.5 Tonnes

**ANNEXURE 3: INUNDATION MAP**  
**(Separate Booklet)**



## **ANNEXURE 4: SHELTERS / RELIEF CAMPS LIST / EVACUATION MAP**

### **Evacuation Map (Separate Booklet)**

**ANNEXURE 5: EMERGENCY LEVEL DETERMINATION ACTION DATA SHEET**

Event/General Observation	Specific Observation/Condition	Emergency Level	Action Data Sheet
Unexpected Failure	Dam unexpectedly and without warning begins to fail	RED	SHEET A
Spillway Release, Increasing Reservoir Water Surface Elevation	No active erosion in downstream areas. Discharge is above 4000 cumecs.	BLUE	SHEET B1
	Active erosion in downstream areas. Spillway's discharge are above 6500 cumecs.	ORANGE	SHEET B2
	Active erosion in downstream areas or advancing headcut that is threatening the dam toe. Discharge is above 13500 cumecs.	RED	SHEET B3
Concrete/ Masonry structure	Minor cracks ( bigger than ¼ cm.) in the masonry/concrete structure, without leakage.	BLUE	SHEET C1
	Enlarging cracks (bigger than ¼ cm.) and active movement in the masonry/concrete structure, with leakage passing through.	ORANGE	SHEET C2
	Enlarging cracks with sudden or rapidly proceeding movements/displacements in the masonry/concrete structure with severe leakage passing through.	RED	SHEET C3
Instrumentation	Instrument readings are beyond threshold values.	BLUE	SHEET D1
Malfunction of Radial/Sluice Gate(s)	Structural member of a gate, either broken or severely damaged, which prevent operation of the gate(s). No leakage or uncontrolled discharge is detected. Flood can be routed without damaged/non-operational gate(s).	BLUE	SHEET E1
	Structural member of a gate, either broken or severely damaged, which prevents operation or malfunction of the gate(s). Considerable leakage or uncontrolled discharge is detected. Flood cannot be routed without damaged/non- operational gate(s).	ORANGE	SHEET E2
	Structural member of a gate, either broken or severely damaged,, which prevents operation or malfunction of the gate(s). Unexpected high discharge is occurring. Flood cannot be routed without damaged/non-operational gate(s).	RED	SHEET E3

Earthquake	Measurable earthquake felt or reported and dam appears to be stable. If acceleration > 25 cm/sec <sup>2</sup> observed at the bottom of dam.	BLUE	SHEET F1
	Earthquake resulting in visible damage to the dam or appurtenances which can cause a potential dangerous situation	ORANGE	SHEET F2
	Earthquake resulting in uncontrolled release of water over dam or rapidly developing flow through cracks or rapidly developing erosion through increased seepage	RED	SHEET F3
Security Threat/ Sabotage/ Vandalism	Unverified bomb threat or verified damage to the dam/appurtenances with no impact in the functioning of the dam	BLUE	SHEET G1
	Verified bomb threat that if carried out, could result in damage of the dam/appurtenances that impacts the functioning of the dam OR verified damages due to vandalism that impacts the normal operation of the dam.	ORANGE	SHEET G2
	Detonated bomb resulting in visible damage to the dam or appurtenances OR verified damages due to vandalism causing an uncontrolled water release	RED	SHEET G3
Overtopping Failure	Potential Embankment Overtopping. Reservoir water surface elevation is one (1) meter Level 651.00 meter below the top of the dam.	ORANGE	SHEET H2
	Water from the reservoir is flowing over the top of the dam level is 652.00 meter.	RED	SHEET H3

<b>RED ALERT</b>	<b><u>Event Description:</u></b> <b>UNEXPECTED FAILURE</b>	<b>SHEET A</b>
<b>RECOMMENDED ACTIONS</b>		
<p><b><u>Emergency Planning Manager</u></b> (may be split responsibilities, i.e One person for handling the dam on site, a different person who can make notification). (APPLICABLE TO ALL ACTION DATA SHEETS ).</p> <p>A. Implement the “Failure Condition Notification Flowchart”, using pre-scripted message.</p> <p>B. Activate the Emergency Operation Center.</p> <p>C. Recommend to the District Collectors and Disaster Management authorities IMMEDIATE EVACUATION downstream of the dam and affected areas as per Local Evacuation Plan.</p> <p>D. Stay at a safe distance away from the dam. The immediate concern is the safety of the downstream public.</p> <p>E. Record all information, observations, and actions on an Event Log Form (FORM 1 ).</p> <p><b><u>Site Engineers</u></b></p> <p>F. Stay a safe distance away from the dam.</p> <p>G. Observe conditions of dam site periodically and provide decision support as appropriate.</p> <p><b><u>Deputy General Manager / General Manager</u></b></p> <p>H. Communicate and keep informed the higher authorities of UJVN LIMITED.</p> <p>I. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p> <p><b><u>Dam safety organization's Staff</u></b></p> <p>J. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p>		
<p>Evaluate conditions CONTINUOUSLY and determine if:</p> <p>A. The event warrants downgrade if there is no longer an impending threat of dam failure with no additional rainfall occurring yet there is damage to the dam that prevents safe impoundment of water. All contacts on red level notification Flow Chart shall be notified of downgrade to ORANGE/ blue level.</p> <p>B. Event may be Terminated only when either:</p> <ul style="list-style-type: none"> <li>- There is no longer an impending threat of dam failure with no additional rainfall occurring and it has been determined by Dam Safety staff safe to impound water or;</li> <li>- The dam has failed and there is no longer a threat to the downstream public</li> </ul> <p>All contacts on Notification Flow Chart shall be updated of changes.</p>		
Based on this evaluation, follow the appropriate action		
<b>A. EVENT LEVEL</b>	<b>B. TERMINATION</b>	
Monitor conditions until damage is repaired	Go to Termination and Follow-up	

<b>BLUE ALERT</b>	<p align="center"><b><u>Event Description:</u></b></p> <p><b>SPILLWAY RELEASE : NO ACTIVE EROSION IN DOWNSTREAM AREAS. DISCHARGE IS ABOVE 4000 CUMECs.</b></p>	<b>SHEET B1</b>
<b>RECOMMENDED ACTIONS</b>		
<p><b><u>Emergency Planning Manager</u></b></p> <p>A. Implement the “Watch Condition Notification Flowchart”, using pre-scripted message.</p> <p>B. Make careful observation and inspection of every part of the dam; this should be done to monitor without compromising the safety of anyone performing the tasks.</p> <p>C. Record all information, observations, and actions on an Event Log ( Form 1 ).</p> <p>D. Contact the Deputy General manager at least daily to report the latest observations and conditions. If conditions change significantly, go to re-evaluation/decision section and follow relevant steps immediately.</p> <p><b><u>Site Engineers</u></b></p> <p>E. Stay at a safe distance away from the dam.</p> <p>F. Observe conditions of dam periodically and provide decision support as appropriate.</p> <p><b><u>Deputy General Manager / General Manager</u></b></p> <p>G. Communicate and keep informed the Higher authorities .</p> <p>H. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p> <p><b><u>Dam safety organization's Staff</u></b></p> <p>I. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p>		
<b>RE-EVALUATION / DECISIONS</b>		
<p>Evaluate conditions CONTINUOUSLY and Determine if:</p> <p>A. The event can be terminated when the intensity of rainfall is dwindling as per the Forecast.</p> <p>B. The event remains at the current Level.</p> <p>C. The event warrants escalation to ORANGE alert if the controlled release through spillway more then 6500 cumecs.</p> <p>All contacts on Notification Flow Chart shall be updated of changes.</p>		
<b>Based on this evaluation, follow the appropriate action</b>		
<b>A. EVENT LEVEL DOWNGRADE</b>	<b>B. TERMINATION</b>	<b>C. EVENT LEVEL ESCALATION</b>
Spillway release less than 1200 cumecs.	Continue recommended actions on this sheet	Go to SHEET B2 (ORANGE Alert)

<b>ORANGE ALERT</b>	<p align="center"><b><u>Event Description:</u></b></p> <p><b>SPILLWAY RELEASE: ACTIVE EROSION IN DOWNSTREAM AREAS. SPILLWAY'S DISCHARGE IS ABOVE 6500 CUMECS.</b></p>	<b>SHEET B2</b>
<b>RECOMMENDED ACTIONS</b>		
<p><b><u>Emergency Planning Manager</u></b></p> <p>A. Implement the “Failure Condition Notification Flow Chart”, using pre-scripted message.</p> <p>B. Identify the areas that would be potentially impacted by the emergency events.</p> <p>C. Make careful observation and inspection of every part of the dam; this should be done without compromising the safety of anyone performing these tasks. Monitor water level in the reservoir continuously.</p> <p>D. Record all information, observations, and actions on an Event Log ( Form 1 ).</p> <p>E. Contact the Deputy General manager hourly to report the latest observations and conditions. If conditions change significantly, go to re-evaluation/decision section and follow relevant steps immediately.</p> <p><b><u>Site Engineers</u></b></p> <p>F. Observe conditions of dam periodically and provide decision support as appropriate.</p> <p>G. Provide corrective actions or work as required.</p> <p><b><u>Deputy General Manager / General Manager</u></b></p> <p>H. Direct specific and appropriate procedures for reservoir operations.</p> <p>I. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p> <p><b><u>Dam safety organization's Staff</u></b></p> <p>J. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p>		
<b>RE-EVALUATION / DECISIONS</b>		
<p>Evaluate conditions CONTINUOUSLY and Determine if:</p> <p>A. The event warrants downgrade to BLUE alert if discharge goes below 6500 cumecs .</p> <p>B. The event remains at the current Event Level (No change in situation).</p> <p>C. The event warrants escalation to RED alert if the intensity of the discharge goes above 13,500 cumecs.</p> <p>All contacts on Notification Flow Chart shall be updated of changes.</p>		
<b>Based on this Evaluation, follow the appropriate action</b>		
A. EVENT LEVEL DOWNGRADE	B. EVENT LEVEL REMAINS THE SAME	C. EVENT LEVEL ESCALATION
Go to SHEET B1(BLUE Alert)	Continue recommended actions on this sheet	Go to SHEET B3 (RED Alert)

<b>RED ALERT</b>	<b>Event Description:</b> <b>SPILLWAY RELEASE: ACTIVE EROSION IN DOWNSTREAM AREAS OR ADVANCING HEADCUT THAT IS THREATENING THE DAM TOE. DISCHARGE IS ABOVE 13500 CUMECS.</b>	<b>SHEET B3</b>
<b>RECOMMENDED ACTIONS</b>		
<p><b><u>Emergency Planning Manager</u></b></p> <p>A. Implement the “Failure Condition Notification Flowchart”, using pre-scripted message.</p> <p>B. Identify the areas that would be potentially impacted by the emergency events.</p> <p>C. Recommend to the District Collectors and Disaster Management Authorities IMMEDIATE EVACUATION downstream of the dam and affected areas as per Local Evacuation Plan.</p> <p>D. Stay at a safe distance away from the dam. The immediate concern is the safety of the downstream public.</p> <p>E. Record all information, observations, and actions on an Event Log ( Form 1 ).</p> <p><b><u>Site Engineers</u></b></p> <p>F. Observe conditions from a safe place at dam site periodically and provide decision support as appropriate.</p> <p><b><u>Deputy General Manager / General Manager</u></b></p> <p>G. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p> <p><b><u>Dam safety organization's Staff</u></b></p> <p>H. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p>		
<b>RE-EVALUATION / DECISIONS based upon ANNEXURE 3</b>		
<p>Evaluate conditions CONTINUOUSLY and Determine if:</p> <p>A. The event warrants downgrade to ORANGE alert if there is no longer an immediate impending threat of dam failure and water discharge below 6500 cumecs.</p> <p>B. The event remains at the current Event Level (No change in situation). All contacts on Notification Flow Chart shall be updated of changes.</p>		
<b>Based on this determination, follow the appropriate action</b>		
A. EVENT LEVEL DOWNGRADE	B. EVENT LEVEL REMAINS THE SAME	
Go to SHEET B2 (ORANGE Alert)	Continue recommended actions on this sheet	

<b>BLUE ALERT</b>	<p align="center"><b><u>Event Description:</u></b></p> <p><b>STRUCTURE CRACKING: MINOR CRACKS (BIGGER THAN ¼ CM.) IN THE MASONRY/CONCRETE STRUCTURE, WITHOUT LEAKAGE.</b></p>	<b>SHEET C1</b>
<b>RECOMMENDED ACTIONS</b>		
<p><b><u>Emergency Planning Manager</u></b></p> <ul style="list-style-type: none"> <li>A. Implement the “Watch Condition Notification Flowchart”, using pre-scripted message.</li> <li>B. Make careful observation and inspection of every part of the dam; this should be done to monitor without compromising the safety of anyone performing the tasks.</li> <li>C. Monitor water levels in the reservoir. Install a measurement device to monitor progress/movement in crack(s).</li> <li>D. Classify and describe the type of crack pattern and evaluate possible causes.</li> <li>E. Record all information, observations, and actions on an Event Log ( Form 1 ).</li> <li>F. Contact the Deputy General manager at least daily to report the latest observations and conditions. If conditions change significantly, go to re-evaluation/decision section and follow relevant steps immediately.</li> </ul> <p><b><u>Site Engineers</u></b></p> <ul style="list-style-type: none"> <li>G. Photograph and record the location, direction (longitudinal, vertical, diagonal etc.), depth, length, width and offset of each crack that has been discovered. Compare observations with earlier results.</li> <li>H. Closely monitor the crack for changes and look for structural damage, including misalignment, settlement, vertical and horizontal displacements.</li> </ul> <p><b><u>Deputy General Manager/ General Manager</u></b></p> <ul style="list-style-type: none"> <li>I. Review the pertinent information in order to recommend appropriate actions to Emergency Planning Manager. Provide corrective actions or works as required.</li> <li>J. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</li> </ul> <p><b><u>Dam safety organization's Staff</u></b></p> <ul style="list-style-type: none"> <li>K. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</li> </ul>		
<b>RE-EVALUATION / DECISIONS</b>		
<p>Evaluate conditions CONTINUOUSLY and Determine if:</p> <ul style="list-style-type: none"> <li>A. The event can be terminated if it is determined that the dam no longer poses an immediate threat to downstream.</li> <li>B. The event remains at the current Event Level.</li> <li>C. The event warrants escalation to ORANGE alert if the cracks are enlarging and leakage begins to flow from cracks.</li> </ul> <p>All contacts on Notification Flow Chart shall be updated of changes.</p>		
Based on this evaluation, follow the appropriate action		
A. TERMINATION	B. EVENT LEVEL REMAINS THE SAME	C. EVENT LEVEL ESCALATION
Go to Termination and Follow-up	Continue recommended actions on this sheet.	Go to SHEET C2 (ORANGE Alert)



<b>ORANGE ALERT</b>	<p align="center"><b><u>Event Description:</u></b></p> <p><b>STRUCTURE CRACKING: ENLARGING CRACKS (BIGGER THAN ¼ CM.) AND ACTIVE MOVEMENT IN THE MASONRY/CONCRETE STRUCTURE, WITH LEAKAGE PASSING THROUGH.</b></p>	<b>SHEET C2</b>
<b>RECOMMENDED ACTIONS</b>		
<p><b><u>Emergency Planning Manager</u></b></p> <p>A. Implement the “Failure Condition Notification Flow Chart”, using pre-scripted message.</p> <p>B. Identify the areas that would be potentially impacted by the emergency events.</p> <p>C. Make careful observation and inspection of every part of the dam; this should be done without compromising the safety of anyone performing these tasks. Monitor closely for changes in the spillways and outlet structures that may be affected. Items to be monitored include vertical, horizontal and lateral displacements, structural cracking and tilting of spillway walls.</p> <p>D. Monitor water levels in the reservoir and development of new crack(s).</p> <p>E. Record all information, observations, and actions on an Event Log Form1 .</p> <p>F. Contact the Deputy General manager hourly to report the latest observations and conditions. If conditions change significantly, go to re-evaluation/decision section and follow relevant steps immediately.</p> <p><b><u>Site Engineers</u></b></p> <p>G. Observe conditions at dam periodically and provide decision support as appropriate.</p> <p>H. Provide corrective actions or work as required.</p> <p><b><u>Deputy General Manager/ General Manager</u></b></p> <p>I. Study an emergency lowering of the reservoir.</p> <p>J. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p> <p><b><u>Dam safety organization's Staff</u></b></p> <p>K. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p>		
<b>RE-EVALUATION / DECISIONS</b>		
<p>Evaluate conditions CONTINUOUSLY and Determine if:</p> <p>A. The event warrants downgrade to BLUE alert if the water level is lowered to safe level. Event may not be terminated until repairs are made and causes of crack (s) have been determined.</p> <p>B. The event remains at the current Event Level.</p> <p>C. The event warrants escalation to RED alert if the integrity of the dam appears to be threatened by sudden or rapidly proceeding movements/displacements.</p> <p>All contacts on Notification Flow Chart shall be updated of changes.</p>		
Based on this Evaluation, follow the appropriate action		
A. EVENT LEVEL DOWNGRADE	B. EVENT LEVEL REMAINS THE SAME	C. EVENT LEVEL ESCALATION
Go to SHEET C1(BLUE Alert)	Continue recommended actions on this sheet	Go to SHEET C3 (RED Alert)

<b>RED ALERT</b>	<b>Event Description:</b> <b>STRUCTURE CRACKING: ENLARGING CRACKS WITH SUDDEN OR RAPIDLY PROCEEDING MOVEMENTS/ DISPLACEMENTS IN THE MASONRY/CONCRETE STRUCTURE WITH SEVERE LEAKAGE PASSING THROUGH.</b>	<b>SHEET C3</b>
<b>RECOMMENDED ACTIONS</b>		
<p><b><u>Emergency Planning Manager</u></b></p> <p>A. Implement the “Failure Condition Notification Flowchart”, using pre-scripted message.</p> <p>B. Identify the areas that would be potentially impacted by the emergency events.</p> <p>C. Recommend to the District Collectors and Disaster Management Authorities IMMEDIATE EVACUATION downstream of the dam and affected areas as per Local Evacuation Plan.</p> <p>D. Stay at a safe distance away from the dam. The immediate concern is the safety of the downstream public.</p> <p>E. Record all information, observations, and actions on an Event Log ( Form 1 ).</p> <p><b><u>Site Engineers</u></b></p> <p>F. Observe conditions from a safe place at dam site periodically and provide decision support as appropriate.</p> <p><b><u>Deputy General Manager/ General Manager</u></b></p> <p>G. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p> <p><b><u>Dam safety organization's Staff</u></b></p> <p>J. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p>		
<b>RE-EVALUATION / DECISIONS based upon ANNEXURE 3</b>		
<p>Evaluate conditions CONTINUOUSLY and Determine if:</p> <p>A. The event warrants downgrade to ORANGE alert if there is no longer an immediate impending threat of dam failure and water level reduced below FRL.</p> <p>B. The event remains at the current Event Level (No change insituation).</p> <p>C. Event may be Terminated only when:</p> <ul style="list-style-type: none"> <li>- The dam has failed AND there is no longer a threat to the downstream public.</li> </ul> <p>All contacts on Notification Flow Chart shall be updated of changes.</p>		
<b>Based on this determination, follow the appropriate action</b>		
<b>A. EVENT LEVEL DOWNGRADE</b>	<b>B. EVENT LEVEL REMAINS THE SAME</b>	<b>C. TERMINATION</b>
Go to SHEET C2(ORANGE Alert)	Continue recommended actions on this sheet	Go to Termination and Follow-up

<b>BLUE ALERT</b>	<b><u>Event Description:</u></b> <b>INSTRUMENTATION: INSTRUMENTATION READINGS ARE BEYOND THRESHOLD VALUES.</b>	<b>SHEET D1</b>
<b>RECOMMENDED ACTIONS</b>		
<p><b><u>Emergency Planning Manager</u></b></p> <p>A. Implement the “Watch Condition Notification Flowchart”, using pre-scripted message.</p> <p>B. Make careful observation and inspection of every part of the dam related with the instruments’ measurements.</p> <p>C. Monitor water levels and instrument readings for changes or anomalies.</p> <p>D. Record all information, observations, and actions on an Event Log ( Form 1 ).</p> <p>E. Contact the Deputy General manager at least daily to report the latest observations and conditions.</p> <p>F. If instrument readings at the dam are determined to indicate a potentially dangerous situation, go to the re-evaluation/decision section and follow relevant steps immediately.</p> <p><b><u>Site Engineers</u></b></p> <p>G. Contact the Quality assurance/monitoring Division to inform the anomalies.</p> <p>H. Closely monitor the instruments’ performance and increase frequency of readings to determine negative/ dangerous trends.</p> <p><b><u>Deputy General Manager/ General Manager</u></b></p> <p>I. Review all pertinent information in order to recommend appropriate actions to Emergency Planning Manager. Provide corrective actions or works as required.</p> <p>J. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p> <p><b><u>Dam safety organization's Staff</u></b></p> <p>J. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p>		
<b>RE-EVALUATION / DECISIONS</b>		
<p>Evaluate conditions CONTINUOUSLY and Determine if:</p> <p>A. The event can be terminated if instrument readings back to normal or if instrument readings determined to be invalid.</p> <p>B. The event remains at the current Event Level.</p> <p>C. The event warrants escalation, if instrument readings at the dam are determined to indicate a potentially dangerous situation.</p> <p>All contacts on Notification Flow Chart shall be updated of changes.</p>		
<b>Based on this evaluation, follow the appropriate action</b>		
<b>A. TERMINATION</b>	<b>B. EVENT LEVEL REMAINS THE SAME</b>	<b>C. EVENT LEVEL ESCALATION</b>
Go to Termination and Follow-up	Continue recommended actions on this sheet.	Monitor conditions until damage is repaired.

<b>BLUE ALERT</b>	<p style="text-align: center;"><b><u>Event Description:</u></b></p> <p>MALFUNCTIONING OF GATES: STRUCTURAL MEMBER OF A GATE, EITHER BROKEN OR SEVERELY DAMAGED, WHICH PREVENT OPERATION OF THE GATE(S). NO LEAKAGE OR UNCONTROLLED DISCHARGE IS DETECTED. FLOOD CAN BE ROUTED WITHOUT DAMAGED/NON-OPERATIONAL GATE(S).</p>	<b>SHEET E1</b>
<b>RECOMMENDED ACTIONS</b>		
<p><b><u>Emergency Planning Manager</u></b></p> <p>A. Implement the “Watch Condition Notification Flowchart”, using pre-scripted message.</p> <p>B. Make careful observation and inspection of every part of spillways, gates etc.</p> <p>C. Monitor water levels in the reservoir and flood forecasting reports continuously.</p> <p>D. Record all information, observations, and actions on an Event Log ( Form 1 ).</p> <p>E. Contact the Deputy General manager at least daily to report the latest observations and conditions. If conditions change significantly, go to re-evaluation/decision section and follow relevant steps immediately.</p> <p>F. If forecasting reports bring about the need to operate the damaged/non operational gate, go to the re-evaluation /decision section and follow relevant steps immediately.</p> <p><b><u>Site Engineers</u></b></p> <p>G. Monitor and supervise any remedial action and inform The Emergency Planning Manager.</p> <p>H. Assure forecast data is transmitted at a higher frequency than normal operations.</p> <p><b><u>Deputy General Manager/ General Manager</u></b></p> <p>I. Review all pertinent information in order to recommend appropriate actions to Emergency Planning Manager. Provide corrective actions or works as required.</p> <p>J. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p> <p><b><u>Dam safety organization's Staff</u></b></p> <p>K. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p>		
<b>RE-EVALUATION / DECISIONS</b>		
<p>Evaluate conditions CONTINUOUSLY and Determine if:</p> <p>A. The event can be terminated if the the gates back to normal operation and damage has been repaired.</p> <p>B. The event remains at the current Event Level if considerable leakage or uncontrolled discharge is detected.</p> <p>C. The event warrants escalation to ORANGE alert if the it is impossible to handle the flood without the operation of damaged gate.</p> <p>All contacts on Notification Flow Chart shall be updated of changes.</p>		
<b>Based on this evaluation, follow the appropriate action</b>		
<b>A. TERMINATION</b>	<b>B. EVENT LEVEL REMAINS THE SAME</b>	<b>C. EVENT LEVEL ESCALATION</b>
Go to Termination and Follow-up	Continue recommended actions on this sheet.	Go to SHEET E2 (ORANGE Alert)

<b>ORANGE ALERT</b>	<p style="text-align: center;"><b><u>Event Description:</u></b></p> <p>MALFUNCTIONING OF GATES: STRUCTURAL MEMBER OF A GATE, EITHER BROKEN OR SEVERELY DAMAGED, WHICH PREVENTS OPERATION OR MALFUNCTION OF THE GATE(S). CONSIDERABLE LEAKAGE OR UNCONTROLLED DISCHARGE IS DETECTED. FLOOD CANNOT BE ROUTED WITHOUT DAMAGED/NON-OPERATIONAL GATE(S).</p>	<b>SHEET E2</b>
<b>RECOMMENDED ACTIONS</b>		
<p><b><u>Emergency Planning Manager</u></b></p> <p>A. Implement the “Failure Condition Notification Flow Chart”, using pre-scripted message.</p> <p>B. Identify the areas that would be potentially impacted by the emergency events.</p> <p>C. Make careful observation and inspection of every part of spillways, gates etc.</p> <p>D. Monitor water levels in the reservoir and flood forecasting reports continuously.</p> <p>E. Record all information, observations, and actions on an Event Log ( Form 1) .</p> <p>F. Contact the General manager hourly to report the latest observations and conditions. If conditions change significantly, go to re-evaluation/decision section and follow relevant steps immediately.</p> <p><b><u>Site Engineers</u></b></p> <p>G. Observe conditions at dam periodically and provide decision support as appropriate.</p> <p>H. Provide corrective actions or work as required.</p> <p><b><u>Deputy General Manager/ General Manager</u></b></p> <p>I. Study an emergency lowering of the reservoir.</p> <p>J. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p> <p><b><u>Dam safety organization's Staff</u></b></p> <p>K. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p>		
<b>RE-EVALUATION / DECISIONS</b>		
<p>Evaluate conditions CONTINUOUSLY and Determine if:</p> <p>A. The event warrants downgrade to BLUE alert if leakage has been stopped and but still repair action shall be done. Event may not be terminated until repairs are made.</p> <p>B. The event remains at the current Event Level.</p> <p>C. The event warrants escalation to RED alert if the leakage is rapidly increasing through gates or the failure of gate is imminent. Unexpected discharges during non-flood season should be considered as high-risk events where an escalation in the level of alert is necessary.</p> <p>All contacts on Notification Flow Chart shall be updated of changes.</p>		
Based on this Evaluation, follow the appropriate action		
A. EVENT LEVEL DOWNGRADE	B. EVENT LEVEL REMAINS THE SAME	C. EVENT LEVEL ESCALATION
Go to SHEET E1(BLUE Alert)	Continue recommended actions on this sheet	Go to SHEET E3 (RED Alert)

<b>RED ALERT</b>	<p align="center"><b>Event Description:</b></p> <p>MALFUNCTIONING OF GATES: STRUCTURAL MEMBER OF A GATE, EITHER BROKEN OR SEVERELY DAMAGED, WHICH PREVENTS OPERATION OR MALFUNCTION OF THE GATE(S). UNEXPECTED HIGH DISCHARGE IS OCCURRING. FLOOD CANNOT BE ROUTED WITHOUT DAMAGED/NON-OPERATIONAL GATE.</p>	<b>SHEET E3</b>
<b>RECOMMENDED ACTIONS</b>		
<p><b><u>Emergency Planning Manager</u></b></p> <p>A. Implement the “Failure Condition Notification Flowchart”, using pre-scripted message.</p> <p>B. Identify the areas that would be potentially impacted by the emergency events.</p> <p>C. Recommend to the District Collectors and Disaster Management Authorities IMMEDIATE EVACUATION downstream of the dam and affected areas as per Local Evacuation Plan.</p> <p>D. Stay at a safe distance away from the dam. The immediate concern is the safety of the downstream public.</p> <p>E. Record all information, observations, and actions on an Event Log ( Form 1).</p> <p><b><u>Site Engineers</u></b></p> <p>F. Observe conditions from a safe place at dam site periodically and provide decision support as appropriate.</p> <p><b><u>Deputy General Manager/ General Manager</u></b></p> <p>G. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p> <p><b><u>Dam safety organization's Staff</u></b></p> <p>H. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p>		
<b>RE-EVALUATION / DECISIONS based upon ANNEXURE 3</b>		
<p>Evaluate conditions CONTINUOUSLY and Determine if:</p> <p>A. The event warrants downgrade to ORANGE alert if there is no longer an immediate impending threat of dam failure and water discharge reduces below the safe level .</p> <p>B. The event remains at the current Event Level (No change insituation).</p> <p>C. Event may be Terminated only when: The gate has failed AND there is no longer a threat to the downstream public. All contacts on Notification Flow Chart shall be updated of changes.</p>		
<b>Based on this determination, follow the appropriate action</b>		
A. EVENT LEVEL DOWNGRADE	B. EVENT LEVEL REMAINS THE SAME	C. TERMINATION
Go to SHEET E2(ORANGE Alert)	Continue recommended actions on this sheet	Go to Termination and Follow-up

<b>BLUE ALERT</b>	<p align="center"><b><u>Event Description:</u></b></p> <p><b>EARTHQUAKE: MEASURABLE EARTHQUAKE FELT OR REPORTED AND DAM APPEARS TO BE STABLE. IF ACCELERATION &gt; 25 CM/SEC<sup>2</sup> OBSERVED AT THE BOTTOM OF DAM.</b></p>	<b>SHEET F1</b>
<b>RECOMMENDED ACTIONS</b>		
<p><b><u>Emergency Planning Manager</u></b></p> <p>A. Implement the “Watch Condition Notification Flowchart”, using pre-scripted message.</p> <p>B. Make careful observation and inspection of every part of dam.</p> <p>C. Be prepared for after shocks.</p> <p>D. Record all information, observations, and actions on an Event Log (Form1).</p> <p>E. Contact the Deputy General manager at least daily to report the latest observations and conditions.</p> <p>F. If inspection has determined a potentially dangerous situation, go to the reevaluation /decision section and follow relevant steps immediately.</p> <p><b><u>Site Engineers</u></b></p> <p>G. Conduct a comprehensive site inspection of the dam and appurtenant elements and make a report on most important finding.</p> <p>H. Monitor and supervise any remedial action and inform Emergency Planning Manager</p> <p><b><u>Deputy General Manager / General Manager</u></b></p> <p>I. Review the pertinent information in order to recommend appropriate actions to EmergencyPlanning Manager. Provide corrective actions or works as required.</p> <p>J. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p> <p><b><u>Dam safety organization's Staff</u></b></p> <p>K. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p>		
<b>RE-EVALUATION / DECISIONS</b>		
<p>Evaluate conditions CONTINUOUSLY and Determine if:</p> <p>A. The event can be terminated if the dam is determined to be stable and a sufficient amount of time has passed. After shocks are not expected.</p> <p>B. The event remains at the current Event Level.</p> <p>C. The event warrants escalation to ORANGE alert if the inspection has determined a potentially dangerous situation.</p> <p>All contacts on Notification Flow Chart shall be updated of changes.</p>		
<b>Based on this evaluation, follow the appropriate action</b>		
<b>A. TERMINATION</b>	<b>B. EVENT LEVEL REMAINS THE SAME</b>	<b>C. EVENT LEVEL ESCALATION</b>
Go to Termination and Follow-up	Continue recommended actions on this sheet.	Go to SHEET F2 (ORANGE Alert)



<b>ORANGE ALERT</b>	<p align="center"><b><u>Event Description</u></b></p> <p><b>EARTHQUAKE: EARTHQUAKE RESULTING IN VISIBLE DAMAGE TO THE DAM OR APPURTENANCES WHICH CAN CAUSE A POTENTIALLY DANGEROUS SITUATION</b></p>	<b>SHEET F2</b>
<b>RECOMMENDED ACTIONS</b>		
<p><b><u>Emergency Planning Manager</u></b></p> <p>A. Implement the “Failure Condition Notification Flow Chart”, using pre-scripted message.</p> <p>B. Identify the areas that would be potentially impacted by the emergency events.</p> <p>C. Be prepared for after shocks. Make careful observation and inspection of every part of dam.</p> <p>D. Monitor water levels in the reservoir and development of new damages or movements.</p> <p>E. Record all information, observations, and actions on an Event Log Form 1 .</p> <p>F. Contact the Deputy General manager hourly to report the latest observations and conditions.</p> <p>G. If visible damages aggravate, rapidly go to re-evaluation/decision section and follow relevant steps immediately.</p> <p><b><u>Site Engineers</u></b></p> <p>H. Observe conditions at dam periodically and provide decision support as appropriate.</p> <p>I. Conduct a comprehensive site inspection of the dam and appurtenant elements and make a report on most important finding.</p> <p>J. Provide corrective actions or work as required.</p> <p><b><u>Deputy General Manager / General Manager</u></b></p> <p>K. Study an emergency lowering of the reservoir.</p> <p>L. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p> <p><b><u>Dam safety organization's Staff</u></b></p> <p>M. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p>		
<b>RE-EVALUATION / DECISIONS</b>		
<p>Evaluate conditions CONTINUOUSLY and Determine if:</p> <p>A. The event warrants downgrade to BLUE alert if the water level in the reservoir is lowered below the bottom level of the damaged section.</p> <p>B. The event remains at the current Event Level.</p> <p>C. The event warrants escalation to RED alert if one or multiple of the conditions have been observed;</p> <ol style="list-style-type: none"> <li>1. Uncontrolled release of water over dam/rapidly developing flow through cracks.</li> <li>2. All contacts on Notification Flow Chart shall be updated of changes.</li> </ol>		
<b>Based on this Evaluation, follow the appropriate action</b>		
A. EVENT LEVEL DOWNGRADE	B. EVENT LEVEL REMAINS THE SAME	C. EVENT LEVEL ESCALATION
Go to SHEET F1(BLUE Alert)	Continue recommended actions on this sheet	Go to SHEET F3 (RED Alert)



<b>RED ALERT</b>	<p align="center"><b>Event Description:</b></p> <p><b>EARTHQUAKE: EARTHQUAKE RESULTING IN UNCONTROLLED RELEASE OF WATER OVER DAM OR RAPIDLY DEVELOPING FLOW THROUGH CRACKS OR RAPIDLY DEVELOPING EROSION THROUGH INCREASED SEEPAGE</b></p>	<b>SHEET F3</b>
<b>RECOMMENDED ACTIONS</b>		
<p><b><u>Emergency Planning Manager</u></b></p> <p>A. Implement the “Failure Condition Notification Flowchart”, using pre-scripted message.</p> <p>B. Identify the areas that would be potentially impacted by the emergency events.</p> <p>C. Recommend to the District Collectors and Disaster Management Authorities IMMEDIATE EVACUATION downstream of the dam and affected areas as per Local Evacuation Plan.</p> <p>D. Stay at a safe distance away from the dam. The immediate concern is the safety of the downstream public.</p> <p>E. Record all information, observations, and actions on an Event Log ( Form 1).</p> <p><b><u>Site Engineers</u></b></p> <p>F. Observe conditions from a safe place at dam site periodically and provide decision support as appropriate.</p> <p><b><u>Deputy General Manager / General Manager</u></b></p> <p>G. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p> <p>H. Communicate and keep informed the Higher authorities.</p> <p><b><u>Dam safety organization's Staff</u></b></p> <p>I. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p>		
<b>RE-EVALUATION / DECISIONS based upon ANNEXURE 3</b>		
<p>Evaluate conditions CONTINUOUSLY and Determine if:</p> <p>A. The event warrants downgrade to ORANGE alert if there is no longer an immediate impending threat of dam failure and water level lowered below the safe level.</p> <p>B. The event remains at the current Event Level (No change in situation).</p> <p>C. Event may be Terminated only when:</p> <ol style="list-style-type: none"> <li>1. The dam has failed and there is no longer a threat to the downstream public</li> <li>2. All contacts on Notification Flow Chart shall be updated of changes.</li> </ol>		
<b>Based on this determination, follow the appropriate action</b>		
<b>A. EVENT LEVEL DOWNGRADE</b>	<b>B. EVENT LEVEL REMAINS THE SAME</b>	<b>C. TERMINATION</b>
Go to SHEET F2 (ORANGE Alert)	Continue recommended actions on this sheet	Go to Termination and Follow-up

<b>BLUE ALERT</b>	<b><u>Event Description:</u></b> <b>SECURITY                      THREAT/SABOTAGE:</b> <b>UNVERIFIED      BOMB      THREAT      OR</b> <b>VERIFIED      DAMAGE      TO      THE</b> <b>DAM/APPURTENANCES WITH NO IMPACT</b> <b>IN THE FUNCTIONING OF THE DAM</b>	<b>SHEET G1</b>
<b>RECOMMENDED ACTIONS</b>		
<p><b><u>Emergency Planning Manager</u></b></p> <p>A. Implement the “Watch Condition Notification Flowchart”, using pre-scripted message.</p> <p>B. Notify Law Enforcement Authorities to help to evaluate the situation.</p> <p>C. Make careful observation and inspection of every part of dam.</p> <p>D. Record all information, observations, and actions on an Event Log ( Form 1 ).</p> <p>E. Contact the Deputy General manager at least daily to report the latest observations and conditions.</p> <p>F. If inspection has determined a potentially dangerous situation, go to the re-evaluation and follow relevant steps immediately.</p> <p><b><u>Site Engineers</u></b></p> <p>G. Access the dam only if the area has been cleared by Law Enforcement.</p> <p>H. Observe conditions from a safe place at dam site periodically and provide decision support as appropriate.</p> <p><b><u>Deputy General Manager/ General Manager</u></b></p> <p>I. Review the pertinent information in order to recommend appropriate actions to Emergency Planning Manager. Provide corrective actions or works as required.</p> <p>J. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p> <p><b><u>Dam safety organization's Staff</u></b></p> <p>K. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p>		
<b>RE-EVALUATION / DECISIONS</b>		
<p>Evaluate conditions CONTINUOUSLY and Determine if:</p> <p>A. The event can be terminated if the dam is determined to be stable and damages have been repaired. Local law enforcement authority has confirmed that there is no threat in the dam structure and surroundings.</p> <p>B. The event remains at the current Event Level.</p> <p>C. The event warrants escalation to ORANGE alert if the inspection has determined a potentially dangerous situation.</p> <p>All contacts on Notification Flow Chart shall be updated of changes.</p>		
<b>Based on this determination, follow the appropriate action</b>		
A. TERMINATION	B. EVENT LEVEL REMAINS THE SAME	C. EVENT LEVEL ESCALATION
Go to Termination and Follow-up	Continue recommended actions on this sheet.	Go to SHEET G2 (ORANGE Alert)

<b>ORANGE ALERT</b>	<p align="center"><b><u>Event Description:</u></b></p> <p><b>SECURITY THREAT/SABOTAGE: VERIFIED BOMB THREAT THAT IF CARRIED OUT, COULD RESULT IN DAMAGE OF THE DAM/APPURTENANCES THAT IMPACTS THE FUNCTIONING OF THE DAM OR VERIFIED DAMAGES DUE TO VANDALISM THAT IMPACTS THE NORMAL OPERATION OF THE DAM.</b></p>	<b>SHEET G2</b>
<b>RECOMMENDED ACTIONS</b>		
<p><b><u>Emergency Planning Manager</u></b></p> <p>A. Implement the “Failure Condition Notification Flow Chart”, using pre-scripted message.  B. Notify Law Enforcement Authorities to help to evaluate the situation.  C. Identify the areas that would be potentially impacted by the emergency event  D. Make careful observation and inspection of every part of dam.  E. Record all information, observations, and actions on an Event Log ( Form 1 ).  F. Contact the Deputy General manager hourly to report the latest observations and conditions.  G. If inspection has determined a potentially dangerous situation, go to the re-evaluation /decision section and follow relevant steps immediately</p> <p><b><u>Site Engineers</u></b></p> <p>H. Access the dam only if the area has been cleared by Law Enforcement.  I. Conduct a comprehensive site inspection of the dam and appurtenant elements and make a report on most important finding.  J. Provide corrective actions or work as required.</p> <p><b><u>Deputy General Manager/ General Manger</u></b></p> <p>K. Study an emergency lowering of the reservoir.  L. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p> <p><b><u>Dam safety organization's Staff</u></b></p> <p>M. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p>		
<b>RE-EVALUATION / DECISIONS</b>		
<p>Evaluate conditions CONTINUOUSLY and Determine if:</p> <p>A. The event warrants downgrade to BLUE alert if the water level in the reservoir is lowered below the bottom level of the damaged section.  B. The event remains at the current Event Level.  C. The event warrants escalation to RED alert if one or multiple of the conditions have been observed;</p> <ol style="list-style-type: none"> <li>1. Uncontrolled release of water over dam/rapidly developing flow through cracks</li> <li>2. All contacts on Notification Flow Chart shall be updated of changes.</li> </ol>		
<b>Based on this Evaluation, follow the appropriate action</b>		
<b>A. EVENT LEVEL DOWNGRADE</b>	<b>B. EVENT LEVEL REMAINS THE SAME</b>	<b>C. EVENT LEVEL ESCALATION</b>
Go to SHEET G1(BLUE Alert)	Continue recommended actions on this sheet	Go to SHEET G3 (RED Alert)

<b>RED ALERT</b>	<b>Event Description:</b> <b>SECURITY THREAT/SABOTAGE:</b> <b>DETONATED BOMB RESULTING IN VISIBLE DAMAGE TO THE DAM OR APPURTENANCES OR VERIFIED DAMAGES DUE TO VANDALISM CAUSING AN UNCONTROLLED WATER RELEASE</b>	<b>SHEET G3</b>
<b>RECOMMENDED ACTIONS</b>		
<p><b><u>Emergency Planning Manager</u></b></p> <p>A. Implement the “Failure Condition Notification Flowchart”, using pre-scripted message.</p> <p>B. Identify the areas that would be potentially impacted by the emergency events.</p> <p>C. Recommend to the District Collectors and Disaster Management Authorities IMMEDIATE EVACUATION downstream of the dam and affected areas as per Local Evacuation Plan.</p> <p>D. Stay at a safe distance away from the dam. The immediate concern is the safety of the downstream public.</p> <p>E. Record all information, observations, and actions on an Event Log Form1 .</p> <p><b><u>Site Engineers</u></b></p> <p>F. Observe conditions from a safe place at dam site periodically and inform Emergency Planning Manager.</p> <p><b><u>Deputy General Manager/ General Manager</u></b></p> <p>G. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p> <p><b><u>Dam safety organization's Staff</u></b></p> <p>H. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p>		
<b>RE-EVALUATION / DECISIONS based upon ANNEXURE 3</b>		
<p>Evaluate conditions CONTINUOUSLY and Determine if:</p> <p>A. The event warrants downgrade to ORANGE alert if there is no longer an immediate impending threat of dam failure and water level lowered below to a safe level.</p> <p>B. The event remains at the current Event Level (No change in situation).</p> <p>C. Event may be Terminated only when:</p> <ol style="list-style-type: none"> <li>1. The dam has failed AND there is no longer a threat to the downstream public</li> <li>2. All contacts on Notification Flow Chart shall be updated of changes.</li> </ol>		
<b>Based on this determination, follow the appropriate action</b>		
<b>A. EVENT LEVEL DOWNGRADE</b>	<b>B. EVENT LEVEL REMAINS THE SAME</b>	<b>C. TERMINATION</b>
Go to SHEET G2(ORANGE Alert)	Continue recommended actions on this sheet	Go to Termination and Follow-up

<b>ORANGE ALERT</b>	<b><u>Event Description:</u></b> OVERTOPPING FAILURE: POTENTIAL EMBANKMENT OVERTOPPING. RESERVOIR WATER SURFACE ELEVATION IS ONE (1) METER LEVEL 651.00 METER BELOW THE TOP OF THE DAM.	<b>SHEET H2</b>
<b>RECOMMENDED ACTIONS</b>		
<p><b><u>Emergency Planning Manager</u></b></p> <p>A. Implement the “Failure Condition Notification Flow Chart”, using pre-scripted message.</p> <p>B. Identify the areas that would be potentially impacted by the emergency events.</p> <p>C. Make careful observation and inspection of every part of the dam; this should be done without compromising the safety of anyone performing these tasks. Monitor water level in the reservoir in every hour.</p> <p>D. Record all information, observations, and actions on an Event Log Form1.</p> <p>E. Contact the Deputy General manager hourly to report the latest observations and conditions. If conditions change significantly, go to re-evaluation/decision section and follow relevant steps immediately.</p> <p><b><u>Site Engineers</u></b></p> <p>F. Observe conditions at dam periodically and provide decision support as appropriate.</p> <p>G. Provide corrective actions or work as required.</p> <p><b><u>Deputy General Manager / General Manager</u></b></p> <p>H. Direct specific and appropriate procedures for reservoir operations.</p> <p>I. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p> <p><b><u>Dam safety organization's Staff</u></b></p> <p>J. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</p>		
<b>RE-EVALUATION / DECISIONS</b>		
<p>Evaluate conditions CONTINUOUSLY and Determine if:</p> <p>A. The event warrants downgrade to BLUE alert if rainfall is dwindling as per the Forecast.</p> <p>B. The event remains at the current Event Level (No change in situation).</p> <p>C. The event warrants escalation to RED alert if the integrity of the dam appears to be threatened by sudden or rapidly proceeding movements/displacements.</p> <p>All contacts on Notification Flow Chart shall be updated of changes</p>		
Based on this Evaluation, follow the appropriate action		
A. EVENT LEVEL DOWNGRADE	B. EVENT LEVEL REMAINS THE SAME	C. EVENT LEVEL ESCALATION
Monitoring condition until reservoir levels go below full reservoir level	Continue recommended actions on this sheet	Go to SHEET H3 (RED Alert)

<b>RED ALERT</b>	<b><u>Event Description:</u></b> OVERTOPPING FAILURE: WATER FROM THE RESERVOIR IS FLOWING OVER THE TOP OF THE DAM LEVEL is 652.00 METER.	<b>SHEET H3</b>
<b>RECOMMENDED ACTIONS</b>		
<p><b>Emergency Planning Manager</b></p> <ul style="list-style-type: none"> <li>A. Implement the “Failure Condition Notification Flowchart”, using pre-scripted message and identify the areas that would be potentially impacted by the emergency events.</li> <li>B. Activate the Emergency Operation Center.</li> <li>C. Recommend to the District Collectors and Disaster Management authorities IMMEDIATE EVACUATION downstream of the dam and affected areas as per Local Evacuation Plan</li> <li>D. Stay at a safe distance away from the dam. The immediate concern is the safety of the downstream public.</li> <li>E. Record all information, observations, and actions on an Event Log ( Form 1 ).</li> </ul> <p><b><u>Site Engineers</u></b></p> <ul style="list-style-type: none"> <li>F. Stay at a safe distance away from the dam.</li> <li>G. Observe conditions at dam periodically and provide decision support as appropriate.</li> </ul> <p><b><u>Deputy General Manager / General Manager</u></b></p> <ul style="list-style-type: none"> <li>H. Communicate and keep informed the Higher authorities.</li> <li>I. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</li> </ul> <p><b><u>Dam safety organization's Staff</u></b></p> <ul style="list-style-type: none"> <li>I. Provide decision support and technical support to the Emergency Planning Manager as appropriate.</li> </ul>		
<p>Evaluate conditions CONTINUOUSLY and determine if:</p> <ul style="list-style-type: none"> <li>A. The event warrants downgrade if there is no longer an impending threat of dam failure with no additional rainfall occurring yet there is damage to the dam that prevents safe impoundment of water.</li> <li>B. The events remains at the current event level.</li> <li>C. Event may be Terminated only when either.             <ul style="list-style-type: none"> <li>1. There is no longer an impending threat of dam failure with no additional rainfall occurring and it has been determined by Dam Safety staff safe to impound water or;</li> <li>2. The dam has failed and there is no longer a threat to the downstream public</li> </ul> </li> </ul> <p>All contacts on Notification Flow Chart shall be updated of changes.</p>		
Based on this evaluation, follow the appropriate action		
A. EVENT LEVEL DOWNGRADE	B. EVENT/LEVEL REMAINS THE SAME	C. TERMINATION
Monitor conditions until damage is repaired	Continue recommended actions on this sheet	Go to Termination and Follow-up

*Emergency Action Plan - Ichari Dam [UA25HH0006]*  
**( FORM 1 )**

**UNUSUAL OR EMERGENCY EVENT LOG**  
(To be completed during the emergency)

Dam Name :- Ichari dam

District :- Dehradun

What and how was the event detected.....

.....

Weather condition:.....

.....

General Description of the emergency situation .....

.....

Emergency level determination ..... Made by.....

**Action and Event Programs**

Date	Time	Action/event progression	Recorded by

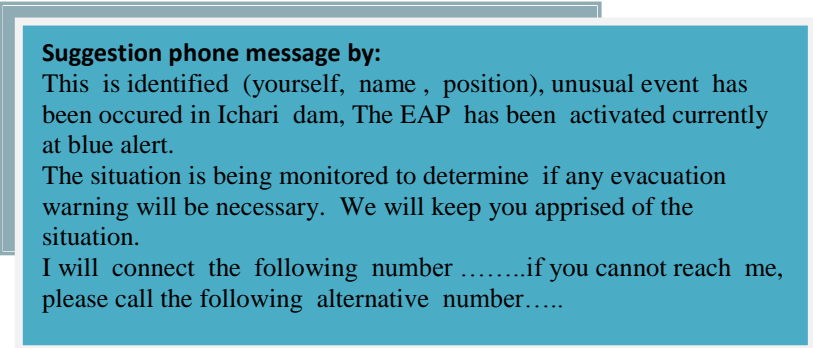
## **ANNEXURE - 6 NOTIFICATION FLOW CHART**

CALL SEQUENCE PRIORITY FOR DISTRICT EMERGENCY OPERATION CENTR BY  
EMERGENCY PLANNING MANAGER IS FOLLOWING

1. DEHRADUN
2. SIRMAUR
3. SAHARANPUR
4. YAMUNA NAGAR
4. KARNAL

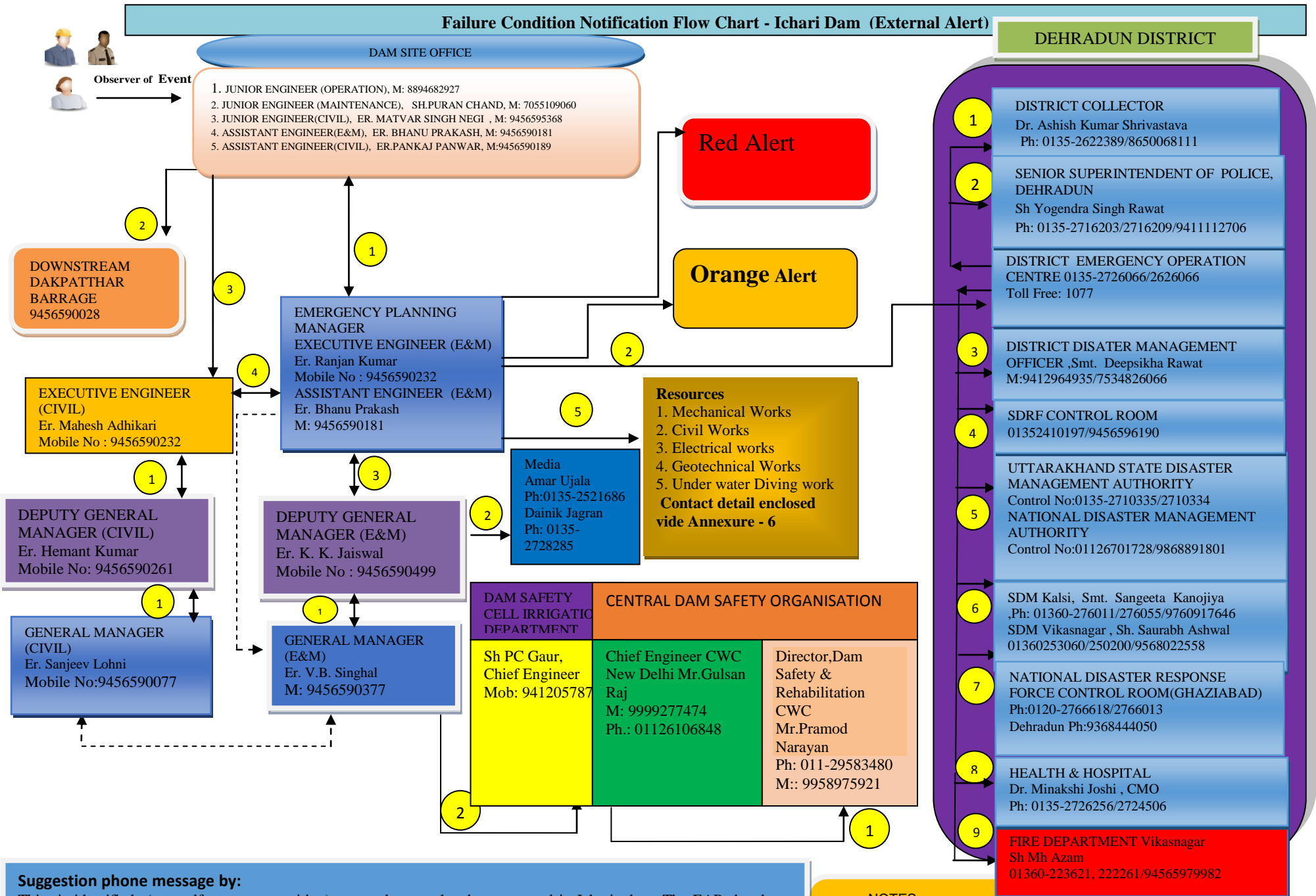


**Watch Condition Notification Flow Chart - Ichari Dam ( Internal Alert )**



# Failure Condition Notification Flow Chart - Ichari Dam (External Alert)

DEHRADUN DISTRICT



## Suggestion phone message by:

This is identified (yourself, name, position), unusual event has been occurred in Ichari dam, The EAP has been activated currently at blue alert.

The situation is being monitored to determine if any evacuation warning will be necessary. We will keep you apprised of the situation.

I will connect the following number .....if you cannot reach me, please call the following alternative number.....

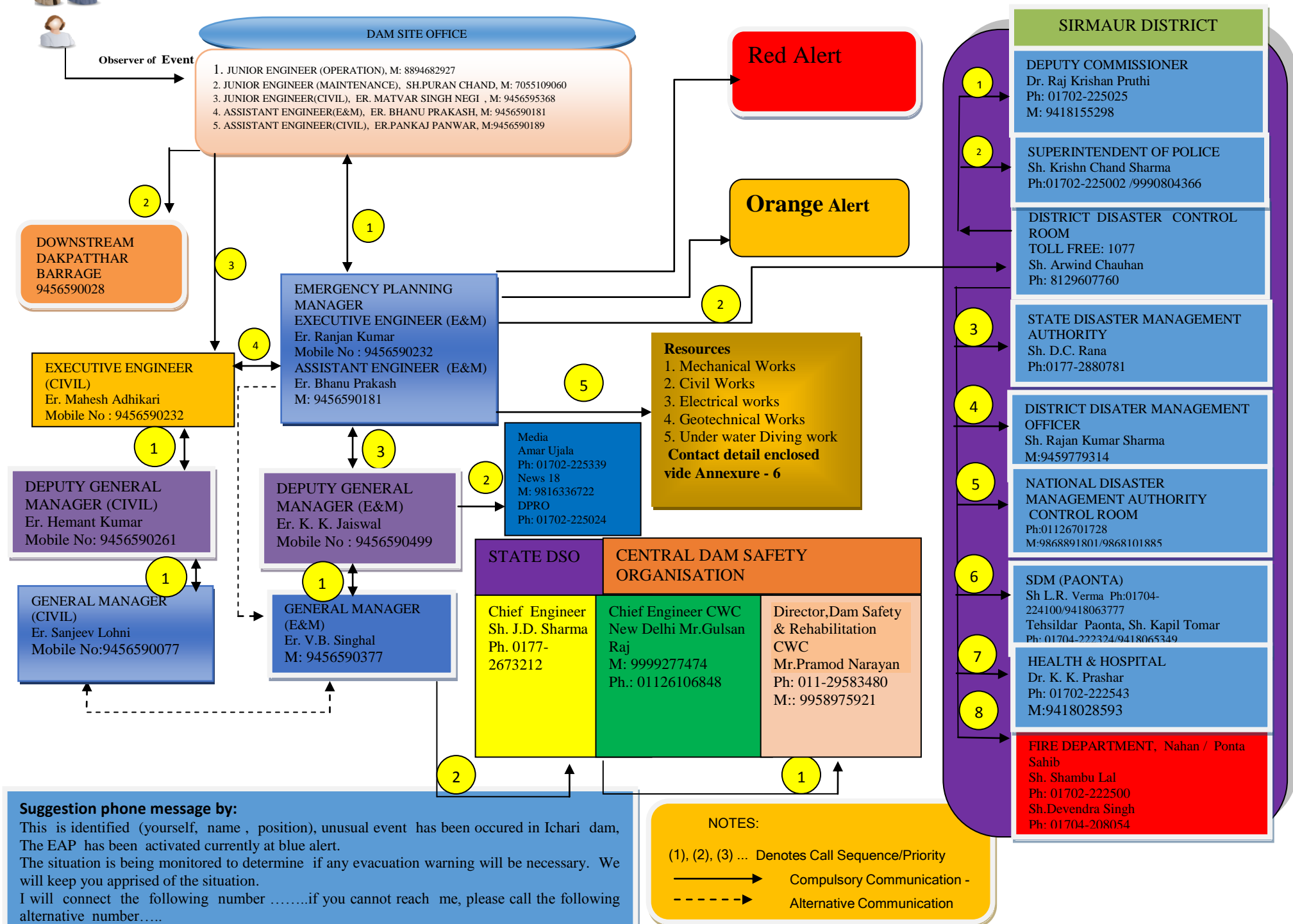
**NOTES:**

(1), (2), (3) ... Denotes Call Sequence/Priority

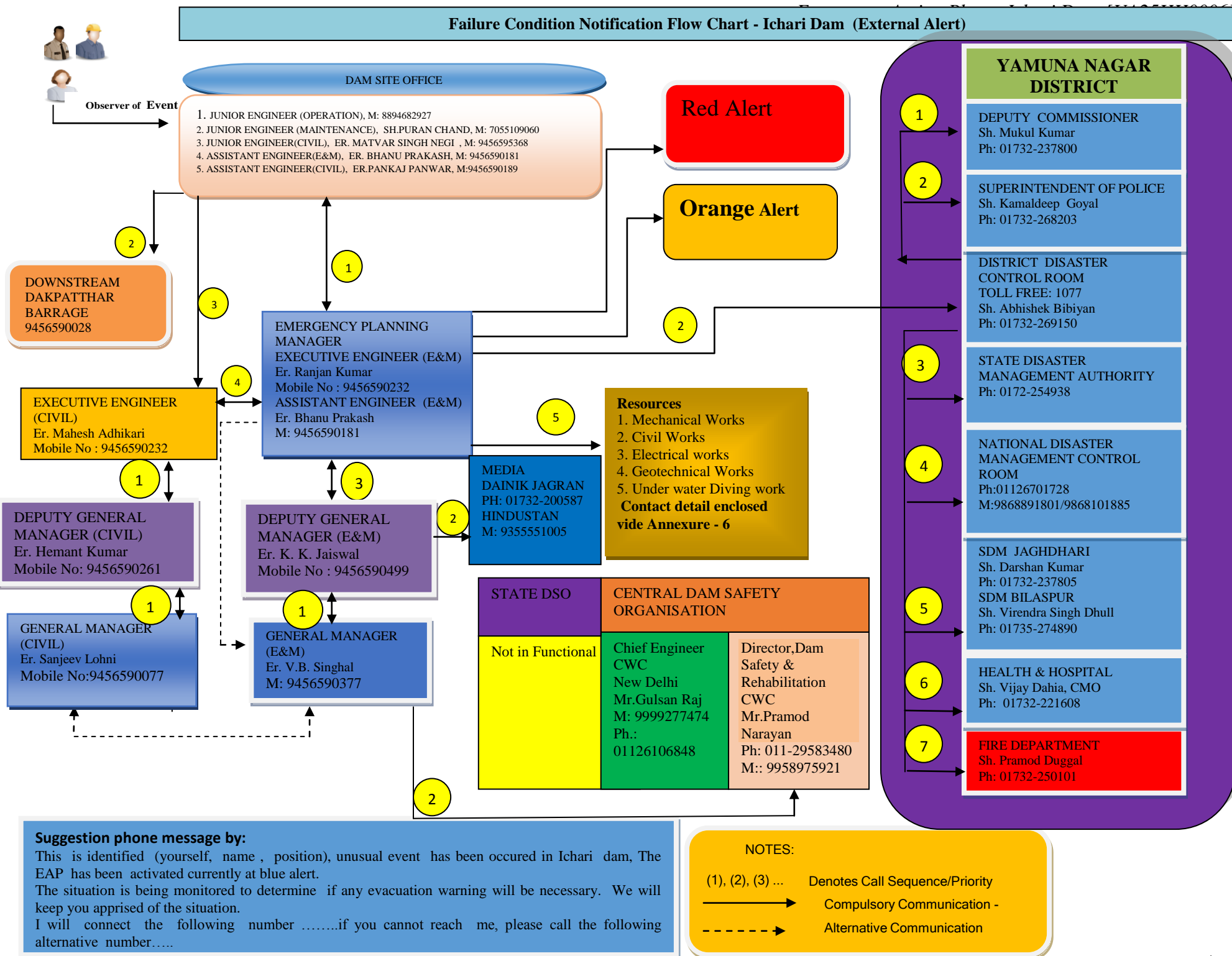
—————→ Compulsory Communication -

-----→ Alternative Communication

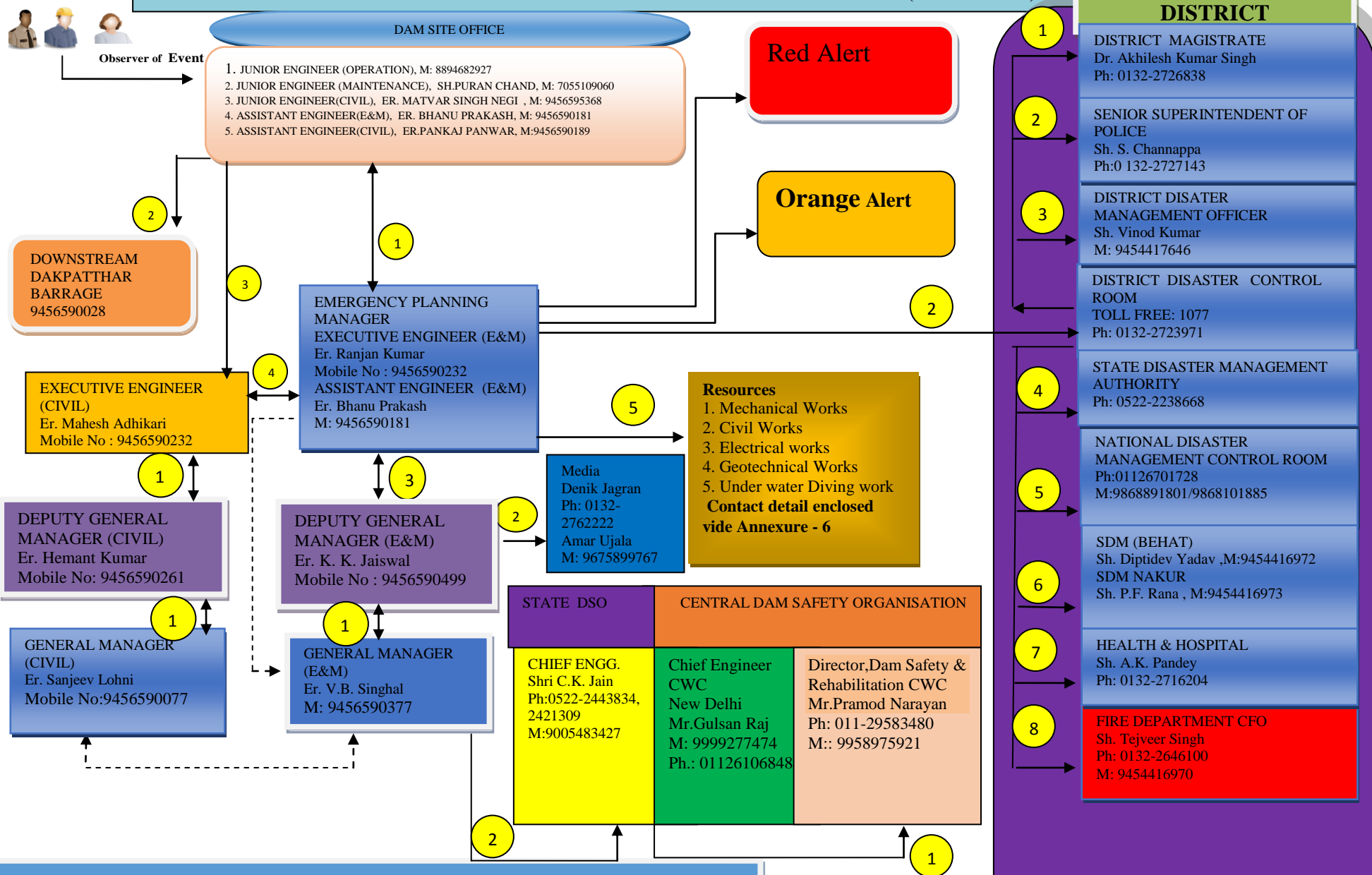
## Failure Condition Notification Flow Chart - Ichari Dam (External Alert)



## Failure Condition Notification Flow Chart - Ichari Dam (External Alert)



## Failure Condition Notification Flow Chart - Ichari Dam (External Alert)



### Suggestion phone message by:

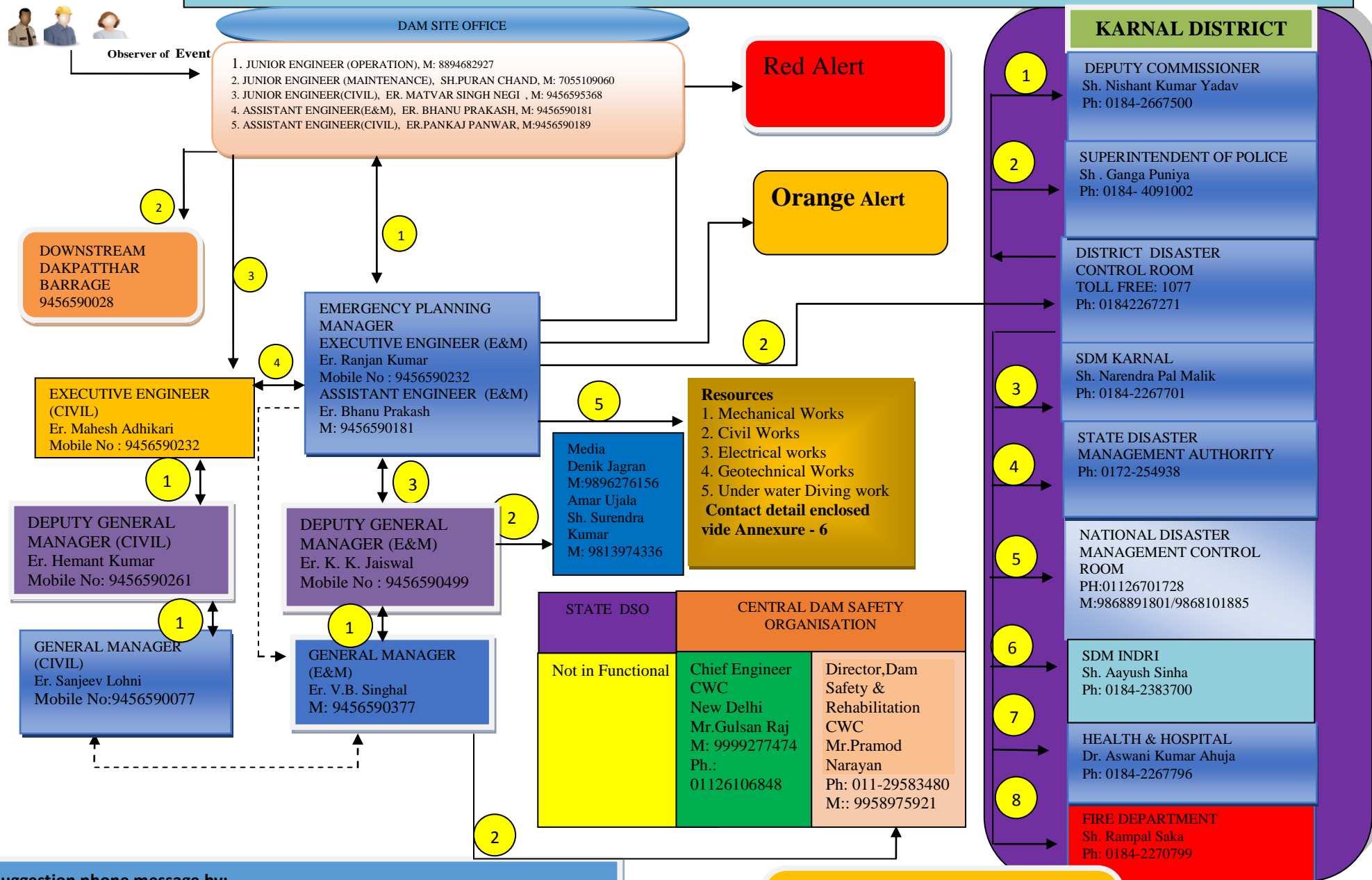
This is identified (yourself, name, position), unusual event has been occurred in Ichari dam, The EAP has been activated currently at blue alert.  
 The situation is being monitored to determine if any evacuation warning will be necessary. We will keep you apprised of the situation.  
 I will connect the following number .....if you cannot reach me, please call the following alternative number.....

### NOTES:

- (1), (2), (3) ... Denotes Call Sequence/Priority
- Compulsory Communication -
- Alternative Communication



## Failure Condition Notification Flow Chart - Ichari Dam (External Alert)



### Suggestion phone message by:

This is identified (yourself, name , position), unusual event has been occurred in Ichari dam, The EAP has been activated currently at blue alert.  
 The situation is being monitored to determine if any evacuation warning will be necessary.  
 We will keep you apprised of the situation.  
 I will connect the following number .....if you cannot reach me, please call the following alternative number.....

### NOTES:

(1), (2), (3) ... Denotes Call Sequence/Priority



Compulsory Communication -



Alternative Communication

**ANNEXURE 7: SAMPLE PUBLIC ANNOUNCEMENTS**

Note: These messages are communicated to downstream residents to alert the public of impending danger. The UJVN Ltd. should co-ordinate with the India Meteorological Department, the Dehradun Disaster Management Authority, and the District Magistrates/Collectors for Dehradun(UK)/Sirmour(HP)/ Yamuna Nagar/ Karnal prior to release. Messages can be communicated via radio, television, bulk SMSs of local mobile networks, and other media outlets.

**Announcement for a Slowly Developing “Watch” Condition (BLUE Emergency Level)**

UJVN Ltd. has declared a BLUE Level “Watch” condition for Ichari Dam, Project Identification Code UA25HH0006 as of [time and date.....]. [Briefly describe the problem or condition.....]. Although there is no immediate danger of the dam failing, [Describe what actions are being taken to monitor and control the situation.....] [State the quantity of any releases from the reservoir.....].

**Announcement for a Worsening “Watch” Condition (BLUE Emergency Level)**

UJVN Ltd. has declared a BLUE Level “Watch” condition for Ichari Dam, Project Identification Code UA25HH0006 as of [time and date.....]. [Briefly describe the problem or condition.....]. Although there is no immediate danger of the dam failing, a possibility now exists that the dam will fail if correction efforts are unsuccessful. [Describe what actions are being taken to monitor and correct the situation.....]. [State the quantity of any releases from the reservoir.....]. Additional news will be made available as soon as it is received.

**Announcement for a Probable “Failure” Condition (ORANGE Emergency Level)**

Urgent! This is an emergency message. UJVN Limited has announced that Ichari Dam, Project Identification Code UA25HH0006 is probably going to fail. [Describe what actions are being taken to monitor and control the situation.....] It is possible that the dam will fail in [ ] hours. Residents in low lying areas along the [Stream ], and the [Stream], as well as the town of [Name.....] should prepare for immediate evacuation. Additional news will be made available as soon as it is received.

**Announcement of an Impending “Failure” Condition (RED Emergency Level)**

Emergency! This is an emergency message. Ichari Dam, Project Identification Code UA25HH0006 is going to fail at any moment. Residents who have not yet done so should immediately evacuate the city of [Name.....] and low-lying areas along the [Stream.....], the [Stream.....], and the [Stream.....]. The flood waters have already reached [Highway.....] and [Road.....]. Additional news will be made available as soon as it is received.

**Announcement of an Ongoing “Failure” Condition (RED Emergency Level)**

Emergency! This is an emergency message. Ichari Dam, Project Identification Code UA25HH0006 failed at [time and date.....]. Residents who have not yet done so should immediately evacuate the city of [Name.....] and low-lying areas along the [Stream.....], and the [Stream.....]. The flood waters have already reached [Highway.....] and [Road.....]. Additional news will be made available as soon as it is received.

**ANNEXURE 8: SUPPLIES AND RESOURCES**

The following equipment and supplies may be necessary for use during a dam emergency. Contact information for local contractors who can provide the following items during an emergency is listed below.

Contractor Type	Name, Title, Phone
<b>Civil Works</b>	Navneet Kumar, Koti Colony, Koti (Dehradun) , Phone No- 9412968391 <a href="mailto:Email-navneet.kumar1971@gmail.com">Email-navneet.kumar1971@gmail.com</a>
	Construction Gallery, 1/1 Punjabi Colony, Vikas Nagar, District Dehradun , phone No- 9760819654. Email-savianand@gmail.com
	Parag Jain, Vikasnagar Road, Dakpathar Phone No- 9411730444
	Y.K Jain pahari gali, Vikasnagar Dehradun phone -9027329580
	Bharat singh Tomar, kalsi Road, Dakpathar, Dehradun Phone No-9720192424 Email- tomar.himanshu1993@gmail.com
<b>Electro/Mechanical Works</b>	Erection Division Roorkee Govt. Workshop Roorkee Phone No- 01332-273124 Email: exen.erection@gmail.com
	Pentax Engineers & Suppliers, 3/1113/4 Khanal ampura, Saharanpur. Phone No- 09634364214, 09412532220 070601549140
	M.S. Khan Jeevangarh, P.O- Ambari Vikasnagar, Dist. Dehradun. Phone No-9412018597 Email- mohdsharafatkhan3@gmail.com
	Shiv Engineering work Kalsi Road, Dakpathar, Dehradun Phone No-9411381711 Email- pankajsharma.ps99@gmail.com
<b>Electrical Works</b>	Prem Electric & Repairing Works, H.O Ward No-6, Vivek Vihar, Opp. D.R public School, Herbertpur., Mobile No-08477902600



	M/s Richardson Engineers, Hanumant Puram, Opp. Govt. ITI, Laksar Road, Kankhal, Haridwar. Mobile Ph: 9837307766 Email: richardsonengg@gmail.com
	Shubham Traders Bhairav chowk, Uttarkashi ( Uttarakhand) Phone No-9412027169,941277778 Email. Shubhamtraders7777@gmail.com
	Aman Electricals, R-9/193, Rajnagar, Ghaziabad (UP) Phone no- 9910885099,9910882510 Email- electrical.aman@gmail.com
<b>Instrumentation</b>	Contact Name: Company Name: Alpha Pacific Systems Pvt. Ltd. B-1 DSIDC Industrial complex, Kirti Nagar New Delhi, Office Ph: 09811742989 Email: projects@alphapacificsystems.com
	IAG Automation private Limited, Plot no-23, Sector -7 IIE , Sidcul Haridwar Phone No- 9368197272, 9219617442 Email- iaghwr@iagauto.com
<b>Special Works/ Equipment</b>	Geepee Reinforced products pvt. Ltd. Plot No-42 Sector -6, IMT Manesar, Gurgaon-122050, Haryana (India) Phone no-124-4367095,4113501 Email- info@geepee.in
<b>Consultants (Hydraulic, Geotechnical, Mechanical, Structural)</b>	Indian Institute of Technology Roorkee Roorkee-247667 Uttarakhand Phone:91-1332-285245 Email : dsric@iitr.ac.in
<b>Heavy Equipment (Cranes, Bulldozers etc.)</b>	GMW Pvt. Ltd 885 GIDC Industrial Estate Makarpura Vadodara. Gujrat (India) Phone- 7018786095 Email- gmw@gmw.in
<b>Communications (Warning Systems, CCTV, IT, Wireless Communications)</b>	Power Electric co. chauhan complex, Arya nagar chowk, Jwalapur, Haridwar ( Uttarakhand ) Phone No- 989707502, 9719271473 Email: powerelectric6@gmail.com
	Samvad eSolution (p)Ltd. 8, Ballupur Road, Near Kishan Nagar Chowk, dehradun
<b>Under Water Work</b>	EMGE DIVING Diving Contractors, Under Water Engineers, Plot No-21, Show Room. 2&3, Sector 1, New Bombay. Ph:02227708635

**ANNEXURE 9: ANNUAL EAP EVALUATION CHECKLIST**

Was the annual dam inspection conducted?	<input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, has the EAP been revised to include any signs of failures observed during the inspection?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Was weed clearing, animal burrow removal, or other maintenance required?	<input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, describe actions taken and date:	
Was the outlet gate operable?	<input type="checkbox"/> Yes <input type="checkbox"/> No	If no, describe actions taken and date:	
Does the Notification Flowcharts require revision?  (Note that revision of the contact information will not require EAP approval; however, the revised contact information pages will need to be redistributed as replacement pages).	<input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, list the dates of the contact information revision and redistribution:	
Was annual training or a tabletop drill conducted?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Circle: training    Drill  Date conducted:	
Are inspection and training records included in the EAP?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
Was the EAP reviewed?	<input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, review date:	
Were changes required to the EAP?	<input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, date of revised EAP approval:	

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 [Name and Title of Appropriate Manager for Owner]

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 Date

## **ANNEXURE 10: PLAN REVIEW AND UPDATE**

This plan will be reviewed and updated annually and tabletop drills will be carried out at least once every Two years.

Date of review: \_\_\_\_\_ Participants:

Date of review: \_\_\_\_\_ Participants:

Date of review: \_\_\_\_\_ Participants:

Date of review: \_\_\_\_\_ Participants:

Date of tabletop drill: \_\_\_\_\_ Participants:

**ANNEXURE 11: TRAINING RECORD**

Use this form to record training sessions. File the completed form in the appropriate annexure of the EAP. All items in the EAP should be thoroughly reviewed during training. Appropriate [Dam Owner] employees and EAP team members should attend a training session annually (or participate in a simulated drill).

<b>TRAINING LOCATION:</b>	
<b>DATE:</b>	<b>TIME:</b>
<b>INSTRUCTOR: CLASS SIGN-IN:</b>	
<b>Type of simulation conducted:</b>	<b>Specific emergency type</b> Emergency water release Watch conditions, Possible dam failure, Imminent dam failure, Actual dam failure
<b>Comments, Results of Drill:</b>	
<b>Revisions Needed to EAP Based on Results of Drill</b> (Yes / No ). If yes, list revisions required:	

