

GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION No. **963**
TO BE ANSWERED ON WEDNESDAY, JULY 16, 2014

DATA ON SEISMIC ACTIVITIES

963. SHRI DILIPKUMAR MANSUKHLAL GANDHI

Will the Minister of **EARTH SCIENCES** be pleased to state?

- (a) whether the Government has collected data related to all the low intensity seismic activities during each of the last three year and the current year;
- (b) if so, the details of the earthquake zones which have been studied;
- (c) whether various Hydro Power Projects, dams and Atomic Energy Plants have been set up in the high intensity seismic zones;
- (d) if so, the details thereof, State-wise;
- (e) whether the Government has taken any steps to monitor the seismic movements at various such locations including where atomic energy plants have been set up; and
- (f) if so, the details thereof and if not, the reasons therefore?

ANSWER

MINISTER FOR MINISTRY OF SCIENCE AND TECHNOLOGY AND
MINISTRY OF EARTH SCIENCES
(DR. JITENDRA SINGH)

- (a) Yes Madam. Earth System Science Organisation- Indian Meteorological Department (ESSO-IMD) monitors earthquake activity on continuous basis through the National Seismological Network.
- (b) The seismic zoning map of India has been prepared by Bureau of Indian Standards IS 1893: 2002 which shows four seismic zones viz. Zone-II, Zone-III, Zone-IV and Zone-V is the most vulnerable zone. This seismic zoning map is periodically updated using newly acquired data.
- (c) Yes Madam.
- (d) Statewise list of completed Large Dams as per National Register of Large Dam (NRLD) maintained by Central Water Commission and additional information available on the basis of information furnished by the State Governments /Authorities is in Annexure.
- (e & f) Considering the global advancements in the Geo-Technical Engineering and developments in the design, research and construction of dams, India is capable of executing development projects including construction of dams, Nuclear Power Plants and Hydro Power Projects that would withstand a seismic jolt through adequate safety measures.

Due action/steps have been taken by the Government from time to time as per the recommendations of the Dam Safety Organisation of the Central Water Commission for seismic monitoring of reservoirs such as Koyna and Warna in Maharashtra; Nagarjuna Sagar and Srisaïlam in Andhra Pradesh and nuclear power sites of Nuclear Power Corporation of India Limited (NPCIL). A set of guidelines for inspection of dams following earthquakes have also been developed in respect of safe operation and maintenance of the existing dams/ reservoirs.

Details of safety requirements for Nuclear Power Plant (NPP) are specified in “code of practice on safety in nuclear power plant siting” and related “safety guides” evolved by the Atomic Energy Regulatory Board (AERB), which are always in a state of continuing review.

Following the Fukushima (Japan) incident, the Government has directed safety reviews of all Indian nuclear power plants in operation, and under construction. Accordingly, safety review of Indian nuclear power plants was carried out by task forces of Nuclear Power Corporation of India Limited together with the committee set up by the Atomic Energy Regulatory Board. These reviews have found that Indian reactors are safe and have sufficient margins and features in their design to withstand extreme natural events such as earthquakes and tsunamis.

Statewise list of completed Large Dams in National Register of Large Dam (NRLD) maintained by CWC and additional information available on the basis of information furnished by the State Governments /Authorities

State:- Uttarakhand

Sl.no.	Name of dam	Seismic zone
1	Ichari	IV
2	Ram Ganga	IV
3	Maneri Stage I	IV
4	Dhauliganga Dam	V
5	Tanakpur Barrage	IV

State:Assam

Sl.no.	Name of dam	Seismic zone
1	Khangdong Dam	V
2	Umrong Dam	V

State:- Punjab

Sl.no.	Name of dam	Seismic zone
1	Nangal	IV
2	Maili	IV
3	Dholbaha	IV
4	Janauri	IV
5	Damsal	IV
6	Chohal	IV
7	Perch	IV
8	Saleran	IV
9	Mirzapur	IV
10	Siswan	IV
11	Jainti	IV
12	Patuari	IV
13	Thana	IV

State: -Kerala

Sl.no.	Name of dam	Seismic zone
1	Peruvarippallam	IV

State :- Haryana

Sl.no.	Name of dam	Seismic zone
1	Kaushalya Dam	IV

State:- Gujarat

Sl.no.	Name of dam	Seismic zone
1	Panelia	IV
2	Revania	IV
3	Lalpari	IV
4	Veri	IV
5	Khambhala	IV
6	Vijarkhi	IV
7	Adhia	IV
8	Alansagar	IV
9	Hansthal	IV
10	Moldi	IV
11	Rajavadala	IV
12	Chimnabai-Lake	IV
13	Paneli	IV
14	Anandpar	IV
15	Kuvadwa	IV
16	Mota Bandharia	IV
17	Fakirwadi	V
18	Dhameli	IV
19	Pichhavi	IV
20	Shiney	IV
21	Wandh	V
22	Ler	V
23	Kharod	IV
24	Lilpur-I	V
25	Sanava	V
26	Ambala	V
27	Mamuara	V
28	Dhaneti	V
29	Kalyanpar	V
30	Khengar Sagar	V
31	Shihan	IV
32	Machhaparo	V
33	Madhapar I	V
34	Valavad	V
35	Jhuran	V
36	Rajada	V

37	Badi-Padv	IV
38	Kothariya	IV
39	Ratia	V
40	Vijaysagar	IV
41	Tara-Manjal	V
42	Kapaddhar	V
43	Kuapaddhar	V
44	KALARWANDH	IV
45	Wandh-Mandvi	V
46	Bhuj	V
47	Kadoli	V
48	Vanothi	V
49	Ranghola	IV
50	Sinhan	IV
51	Vedmati	IV
52	Bhimdad	IV
53	Brahmani	IV
54	Ghee	IV
55	Lilpar-II	V
56	Lotiya	V
57	Mauvana	V
58	Aji I	IV
59	Badargadh(Shiv)	V
60	Chhasara	V
61	Fulra	V
62	Sargualla	V
63	Sasoi	IV
64	Shivlakha	V
65	Chorwadala	IV
66	Gajod	V
67	Kaila	V
68	Sanandharo	V
69	Solmatia	IV
70	Venghadi	V
71	Adhochhani	V
72	Baladhor	V
73	Dhandhavada	IV
74	Gondali	IV
75	Kankavati	V
76	Kharua	V
77	Moj	IV
78	Venu	IV
79	Kundhada	IV
80	Vigodi	V

81	Balapar Budadro	V
82	Bela	V
83	Hatadi	V
84	Hiran-I	IV
85	Jetawada	V
86	Wamka	V
87	Gajansar	V
88	Machhu I	IV
89	Shetrunji	IV
90	Demi I	IV
91	Dhobiyara	IV
92	Fulzar I	IV
93	Jadawas	V
94	Kodoli/Kadoli	V
95	Mevasa	V
96	Phot	V
97	Vayor	V
98	Bhmirya	IV
99	Dhrufania	IV
100	Koyadam	IV
101	Kundol Tank	IV
102	Limdi Bhogavo I	IV
103	Chang	V
104	Chavadka	V
105	Ekalia	V
106	Faradi	V
107	Piprala	IV
108	Sapada	IV
109	Shivsagar	IV
110	Thoralia Mi Tank	IV
111	Umri	IV
112	Vamaka	V
113	Vada-Tarawada	V
114	Baranda	V
115	Bhadar	IV
116	Burkhan	V
117	Hasanpur	IV
118	Kanzara	IV
119	Rakhadi	V
120	Thoriali-Limdi-Bhogavo	IV
121	Vasatava	V
122	Wagha Paddhar	V
123	Bhadra	V
124	Wasthawa	V

125	Balamdi	IV
126	Bambhanka	V
127	Surkhan	V
128	Devalia	V
129	Khodiyar	IV
130	Sapda	IV
131	Shetrunji Khodiar	IV
132	Vartu- I	IV
133	Bhaguda	IV
134	Chiroda	IV
135	Karuda-Dabhunda	V
136	Khari	IV
137	Naniber	V
138	Odarka	IV
139	Vartu	IV
140	Dhunai	V
141	Jaday	V
142	Kaurunda	V
143	Kharadia	V
144	Loriya	V
145	Suvi	V
146	Bharapar	V
147	Niruna	V
148	Rudarmata	V
149	Vachappari	IV
150	Virani	V
151	Darsadi	V
152	Godadiya	V
153	Lodrani	V
154	Nandasar	V
155	Bamathia-1	IV
156	Dhari	IV
157	Fatehghadh (M)	V
158	Ramgadbo	IV
159	Vanthali	IV
160	Adhoi-I	V
161	Butta	V
162	Chandrabhaga	IV
163	Jagadi	IV
164	Kunaria	V

165	Mankuwa	V
166	Mewasa	IV
167	Sariyamati	IV
168	Senjal	IV
169	Mapar	V
170	Vanala	IV
171	Bamanbore	IV
172	Bendiyabeli	IV
173	Bhadreshwar	V
174	Chhaparwadi- I	IV
175	Chhaparwadi-Lunivav	IV
176	Jam Dadar	IV
177	Kalindri	IV
178	Khari	IV
179	Kuntala	IV
180	Mesariya -1	IV
181	Modhuwanti TR	IV
182	Motikharsoli	IV
183	Nanamatra	IV
184	Ratanpar	V
185	Senjal	IV
186	Vansiali	IV
187	Ambaradi	IV
188	Anandapar	IV
189	Bamathiya-2	IV
190	Dadar	IV
191	Devedhari	IV
192	Jatavada-II	V
193	Jhanjeshri	IV
194	Khadkhambhali	IV
195	Khilawad M.I.	IV
196	Khodasar	V
197	Ranipat	V
198	Sorthi	IV
199	Survanalla	IV
200	Tharawada	V
201	Thikariyala	IV

202	Ambajal	IV
203	NanaAngia	V
204	Baukha	V
205	Chachka	IV
206	Dhareshi	V
207	Godechi	IV
208	Gokhalana	IV
209	Halara	V
210	Kakari Mahudi	IV
211	Kaswati	V
212	Koriyani	V
213	Madhuvanti	IV
214	Manjal- Reladia	V
215	Morchbana	V
216	Nyari-1	IV
217	Rupen	IV
218	Rupen M.I.	IV
219	Savdi	IV
220	Suravanala	IV
221	Ambakui	V
222	Anida	IV
223	Bhekhado	V
224	Dangra	IV
225	Devsar	V
226	Fulzar II	IV
227	Gadaputha	V
228	Kevadi	V
229	Khorana	IV
230	Mulbavla	IV
231	Ravana	IV
232	Sartanpar	IV
233	Zar	IV
234	Bandhara	V
235	Goyala	V
236	Isar	V
237	Kakarwa	V

238	Bhadreshwar	V
239	Gadhda- Rasaji	V
240	Ladoi	IV
241	Machhaliwad	IV
242	Phophal I	IV
243	Umrapar	V
244	Bandra	V
245	Bhandaria	IV
246	Bhempura	IV
247	Bodi	IV
248	Chhaparwadi (J)	IV
249	Gugariyana	V
250	Hadmatia	IV
251	Jagedi	IV
252	Machhundri	IV
253	Rajawal	IV
254	Ratnal	V
255	Raval II	IV
256	Sanosara	V
257	Serai	V
258	Shingoda	IV
259	Waidy	IV
260	Vavor	V
261	Virpur	IV
262	Bedi M.I	IV
263	Hathasani	IV
264	Mota Kanthariya	IV
265	Muval	IV
266	Nara	V
267	Navabhetali	V
268	Panchavada	IV
269	Sandhara	V
270	Suvag	IV
271	Thanagalol	IV
272	Hiran-II	IV
273	Jalida	IV

274	Kharo	IV
275	Kotda	IV
276	Mathal	V
277	Mesaria	IV
278	Sanala	IV
279	Abhalwad	IV
280	Berachiya	V
281	Bharad	IV
282	Bhukhi	V
283	Dedarani	V
284	Farera	IV
285	Godhatad	V
286	Ishwariya	IV
287	Jangadia	V
288	Junachay	V
289	Ludva	V
290	Mitti	V
291	Mobhness	IV
292	Nagarpiplalia	IV
293	Turkha	IV
294	Vadali	IV
295	Vada-Taravada	V
296	Vaghvadarada	IV
297	Don	V
298	Karmal	IV
299	Lakhanka	IV
300	Rangmati	IV
301	Vadalia	IV
302	Zalu	V
303	Adpur	IV
304	Bangawadi	IV
305	Debhari	IV
306	Dhandh	IV
307	Hamirpara	IV
308	Ingorala	IV
309	Jadsa	V

310	Khata	IV
311	Ambani Khodiar	IV
312	Bhagwanjina Muvada	IV
313	Bhanmer	IV
314	Domda M.I	IV
315	Jesar	IV
316	Kalubhar	IV
317	Mota-Zinzuda	IV
318	Nyari II	IV
319	Piyoni	V
320	Toda	IV
321	Vankol	IV
322	Aji II	IV
323	Arrni	IV
324	Kalaghogha	V
325	Megal TR	V
326	Pipardi	V
327	Rampari	IV
328	Raningpar	IV
329	Sarki	IV
330	Vrajmi	V
331	Dangra	IV
332	Dhavada	V
333	Kotadia	IV
334	Lakhapadar	IV
335	Mamasi	IV
336	Ranala	IV
337	Umarala	IV
338	Und I	IV
339	Vekari	IV
340	Venu II	IV
341	Aji III	IV
342	Demi II	IV
343	Machhu II	IV
344	Moti-Kundol	IV
345	Sod Vadar	IV

346	Fatehgadh	V
347	Laloi	IV
348	Manari	IV
349	Panch Devda	IV
350	Sheni	IV
351	Sipu	IV
352	Vansal	IV
353	Kankavati	IV
354	Motisar	IV
355	Dai(Minisar)	IV
356	Falku	IV
357	Gebanshapir	IV
358	Reshamadi Galol	IV
359	Sani	IV
360	Sonmati	IV
361	Uben	IV
362	Vadal	IV
363	Vadia	IV
364	Medha Creek TR	IV
365	Noli	IV
366	Ghodadharoi	IV
367	Mota-Chhaida	IV
368	Raidy	IV
369	Sogthi	IV
370	Tappar	V
371	Limbali	IV
372	Thebi	IV
373	Dhrafad	IV
374	Faddanbeti	IV
375	Lachhadi	V
376	Limdi-Bhogavo II	IV
377	Advana	IV
378	Bharudia	V
379	Bhogat Bandhara	IV
380	Fulzar(Kb)	IV
381	Jambuda - Bandhara	V

382	Trivni-Tranga	IV
383	Und II	IV
384	Wodisang	IV
385	Morsal	IV
386	Aji IV	IV
387	Baliyawad	IV
388	Chandravadi	IV
389	Patiyali	IV
390	Demi III	IV
391	Galath	IV
392	Khedoi	IV
393	Khodapipar	V
394	Nani Bhalsan	IV
395	Sindhani	IV
396	Vadi	IV
397	Vartu II	IV
398	Dabasang	IV
399	Rupavati	IV
400	Veardi 1	IV
401	KABARKA	IV
402	Saburi	IV
403	Bandi	IV
404	Bhadar II(Bandi)	V
405	Dondo	IV
406	Govana	IV
407	Zakashiya	IV
408	Gadhki	IV
409	Mukteshwar	IV
410	Prempara	IV
411	Raska Weir	IV
412	Karnuki	IV
413	Ratada	IV
414	Ruparel	IV
415	Sodvadar	IV
416	Sukhpar	IV
417	Khokhala	IV

418	Mobhness	IV
419	Orvada	IV
420	Rampuri	IV
421	Ravana	IV
422	Dhingalvada	IV
423	Bachadiya	IV
424	Bhesania	IV
425	Bantwakharo	IV
426	Goma	V
427	Kalbhar	IV
428	Marsal	IV
429	Mevasa	IV
430	Minsar	IV
431	Mota Gujariya	IV
432	Mudhan	IV
433	Saburi	IV
434	Sherdi	IV
435	Simleti	IV
436	Bed TR	IV
437	Lank	IV
438	Ozat II	IV
439	Ozat Weir (Vanthali)	IV
440	Shingoda 1	IV
441	Silmeti	IV
442	Vadisang	IV
443	Vaidal	IV
444	Virpur	IV

State:- Maharashtra

Sl.no.	Name of dam	Seismic zone
1	Aad	IV
2	Achler	IV
3	Adare	IV
4	Alur	IV
5	Ambai	IV
6	Ambatkhol	IV
7	Ambi	IV

8	Amboli	IV
9	Anala	IV
10	Arli	IV
11	Arsoli	IV
12	Asane	IV
13	Asurde	IV
14	Awashi	IV
15	Bagalwadi	IV
16	Banganga	IV
17	Barewadi	IV
18	Barki	IV
19	Beni	IV
20	Benitura	IV
21	Berdewadi	IV
22	Bharti	IV
23	Bholawali	IV
24	Billur(A)	IV
25	Bubali	IV
26	Chalakewadi	IV
27	Chandani	IV
28	Chandoli	IV
29	Chaphal	IV
30	Chinchali	IV
31	Chinchwad	IV
32	Chivari-omrga	IV
33	Cholmukh	IV
34	Dahifal	IV
35	Deoghar	IV
36	Dev dhanora	IV
37	Devale	IV
38	Dhoki	IV
39	Dhom	IV
40	Dhombalakwadi	IV
41	Diggi	IV
42	Gadgadi	IV
43	Gadnadi	IV

44	Gawane	IV
45	Gawase	IV
46	Ghatkarwadi	IV
47	Gopalwadi	IV
48	Gormala	IV
49	Guhagar	IV
50	Hangarga	IV
51	Harangaon	IV
52	Hardkhale	IV
53	Harni	IV
54	Hateghar	IV
55	Hipparga	IV
56	Horti	IV
57	Ijoli	IV
58	Inambari	IV
59	Irrachiwadi	IV
60	Itkal	IV
61	Jamb	IV
62	Jategaon	IV
63	Juwathi	IV
64	Kachurli	IV
65	Kadavi	IV
66	Kadvai	IV
67	Kalamba	IV
68	Kalambwadi	IV
69	Kalwande	IV
70	Kamtha	IV
71	Kandvan	IV
72	Kanher	IV
73	Karanjikheda	IV
74	Kasari	IV
75	Kaseli	IV
76	Kasmalwadi	IV
77	Kelamba	IV
78	Kesarjawada	IV
79	Khamkarwadi	IV

80	Khandeshwar	IV
81	Kharsai	IV
82	Khopad	IV
83	Kolakewadi	IV
84	Kolegaon	IV
85	Konde	IV
86	Kondivali	IV
87	Koregaon	IV
88	Koregaonwadi	IV
89	Koyana	IV
90	Kudnur	IV
91	Kumathe	IV
92	Kumbhavade	IV
93	Kundali	IV
94	Kurnur	IV
95	Lingwane	IV
96	Lower terna (makni)	IV
97	Mahabaleshwadi S.T.	IV
98	Mahu	IV
99	Malatwadi	IV
100	Malghar	IV
101	Mandave	IV
102	Manoli	IV
103	Masala	IV
104	Morana(gureghar)	IV
105	Moravane	IV
106	Morde	IV
107	Nagewadi	IV
108	Naigaon2	IV
109	Nandari	IV
110	Nandla	IV
111	Nandvipurar	IV
112	Nandwal	IV
113	Niradevghar	IV
114	Nittur1	IV
115	Nive	IV

116	Otav	IV
117	Padsali	IV
118	Pahuchibari	IV
119	Palasnilgaon	IV
120	Paleshwar	IV
121	Panchanadi	IV
122	Panderi	IV
123	Panhale	IV
124	Parule	IV
125	Pashane	IV
126	Pethsangvi	IV
127	Phanaswadi	IV
128	Pimpalwadi	IV
129	Pimpar	IV
130	Pohner	IV
131	Rajewadi	IV
132	Ramganga	IV
133	Rankala	IV
134	Ransai	IV
135	Roshani	IV
136	Sakharapa	IV
137	Sangvikati	IV
138	Sheldi	IV
139	Shil	IV
140	Shinde (peth)	IV
141	Shirale	IV
142	Shirvali	IV
143	Shivdav	IV
144	Shrimant	IV
145	Sina kolegaon	IV
146	Sirsadi	IV
147	Sondheghar	IV
148	Tangar	IV
149	Tarali	IV
150	Tarandale	IV
151	Telewadi	IV

152	Terna	IV
153	Thoseghar	IV
154	Tintraj	IV
155	Tivare	IV
156	Tulshi	IV
157	Umarani no 2	IV
158	Umate	IV
159	Upper vaitarna/alwandi	IV
160	Uramodi	IV
161	Uttarmand	IV
162	Vhel	IV
163	Vinhere	IV
164	Wadji	IV
165	Waigholpada	IV
166	Warana	IV
167	Watephal	IV
168	Yermala	IV
169	Yevatimasoli	IV
170	Zapade	IV

State:- Bihar

Sl.no.	Name of dam	Seismic zone
1	Kharagpur Lake	IV
2	Nagi	IV
3	Amrity	IV
4	Badua	IV
5	Srikhandi	IV
6	Chandan	IV
7	Jalkund	IV
8	Morway	IV
9	Satgharwa (N.F)	IV
10	Kailash Ghati	IV
11	Nakti	IV
12	Baskund	IV
13	Upper Badua (N.F)	IV
14	Belharna	IV
15	Anjan	IV

16	Orhni	IV
17	Bilashi	IV
18	Upper Kiul	IV
19	Sindhwarni	IV
20	Barnar	IV

State:- Manipur

Sl.no.	Name of dam	Seismic zone
1	Khaupam	V
2	Singda	V
3	Khuga	V

State:- Meghalaya

Sl.no.	Name of dam	Seismic zone
1	Umtru Masonry Weir, Dehal, Byrnihat.	V
2	Umiam Concrete Dam (STAGE-I), Umiam (Barapani)	V
3	Umiam -Umtru Concrete Dam(STAGE -III), Kyrdemkulai	V
4	Umiam-Umtru Concrete Dam (STAGE IV), Nongkhyllem	V
5	Mawaphlang Dam, Greater Shillong Water Supply Scheme	V
6	Myntdu--Leshka Concrete Dam (STAGE-I), Suchen	V
7	Main Earth Dam Nongmihir (STAGE-III)	V

State:- TRIPURA

Sl.no.	Name of dam	Seismic zone
1	Gumti Hydro Electric Project	V

State:- Nagaland

Sl.no.	Name of dam	Seismic zone
1	Doyang Rockfil Impervious Dam	V

State:-Arunachal Pradesh

Sl.no.	Name of dam	Seismic zone
1	Ranganadi Dam	V

State:- Himachal Pradesh

Sl.no.	Name of dam	Seismic zone
1	Bhakra Dam	IV
2	Pong Dam	V
3	Pandoh Dam	V