Annexure E

I

ANNEXURE E—STORAGE OF WATERS
BY INDIA ON THE WESTERN RIVERS

(Article III (4))

1. The provisions of this Annexure shall apply with respect to the storage of water on the Western Rivers, and to the construction and operation of Storage Works thereon, by India under the provisions of Article III (4).

2. As used in this Annexure:
   (a) "Storage Work" means a work constructed for the purpose of impounding the waters of a stream; but excludes
      (i) a Small Tank,
      (ii) the works specified in Paragraphs 3 and 4 of Annexure D, and
      (iii) a new work constructed in accordance with the provisions of Annexure D.
   (b) "Reservoir Capacity" means the gross volume of water which can be stored in the reservoir.
   (c) "Dead Storage Capacity" means that portion of the Reservoir Capacity which is not used for operational purposes, and "Dead Storage" means the corresponding volume of water.
   (d) "Live Storage Capacity" means the Reservoir Capacity excluding Dead Storage Capacity, and "Live Storage" means the corresponding volume of water.
   (e) "Flood Storage Capacity" means that portion of the Reservoir Capacity which is reserved for the temporary storage of flood waters in order to regulate downstream flows, and "Flood Storage" means the corresponding volume of water.
   (f) "Surcharge Storage Capacity" means the Reservoir Capacity between the crest of an uncontrolled
spillway or the top of the crest gates in normal closed position and the maximum water elevation above this level for which the dam is designed, and "Surcharge Storage" means the corresponding volume of water.

(g) "Conservation Storage Capacity" means the Reservoir Capacity excluding Flood Storage Capacity, Dead Storage Capacity and Surcharge Storage Capacity, and "Conservation Storage" means the corresponding volume of water.

(h) "Power Storage Capacity" means that portion of the Conservation Storage Capacity which is designated to be used for generating electric energy, and "Power Storage" means the corresponding volume of water.

(i) "General Storage Capacity" means the Conservation Storage Capacity excluding Power Storage Capacity, and "General Storage" means the corresponding volume of water.

(j) "Dead Storage Level" means the level of water in a reservoir corresponding to Dead Storage Capacity, below which level the reservoir does not operate.

(k) "Full Reservoir Level" means the level of water in a reservoir corresponding to Conservation Storage Capacity.

(l) "Multi-purpose Reservoir" means a reservoir capable of and intended for use for more than one purpose.

(m) "Single-purpose Reservoir" means a reservoir capable of and intended for use for only one purpose.

(n) "Small Tank" means a tank having a Live Storage of less than 700 acre-feet and fed only from a non-perennial small stream: Provided that the Dead Storage does not exceed 50 acre-feet.
3. There shall be no restriction on the operation as heretofore by India of those Storage Works which were in operation as on the Effective Date or on the construction and operation of Small Tanks.

4. As soon as India finds it possible to do so, but not later than 31st March 1961, India shall communicate to Pakistan in writing the information specified in the Appendix to this Annexure for such Storage Works as were in operation as on the Effective Date. If any such information is not available or is not pertinent to the design of the Storage Work or to the conditions at the site, it will be so stated.

5. (a) If any alteration proposed in the design of any of the Storage Works referred to in Paragraph 3 would result in a material change in the information furnished to Pakistan under the provisions of Paragraph 4, India shall, at least 4 months in advance of making the alteration, communicate particulars of the change to Pakistan in writing and the provisions of Paragraph 6 shall then apply.

(b) In the event of an emergency arising which requires repairs to be undertaken to protect the integrity of any of the Storage Works referred to in Paragraph 3, India may undertake immediately the necessary repairs or alterations and, if these repairs or alterations result in a change in the information furnished to Pakistan under the provisions of Paragraph 4, India shall as soon as possible communicate particulars of the change to Pakistan in writing. The provisions of Paragraph 6 shall then apply.

6. Within three months of the receipt of the particulars specified in Paragraph 5, Pakistan shall communicate to India in writing any objection it may have with regard to the proposed change on the ground that the change involves a material departure from the criteria set out in Paragraph 11. If no objection is received by India from Pakistan within the specified period of three months, then
Pakistan shall be deemed to have no objection. If a question arises as to whether or not the change involves a material departure from such of the criteria mentioned above as may be applicable, then either Party may proceed to have the question resolved in accordance with the provisions of Article IX(1) and (2).

7. The aggregate storage capacity of all Single-purpose and Multi-purpose Reservoirs which may be constructed by India after the Effective Date on each of the River Systems specified in Column (2) of the following table shall not exceed, for each of the categories shown in Columns (3), (4) and (5), the quantities specified therein:

<table>
<thead>
<tr>
<th>River System</th>
<th>General Storage Capacity</th>
<th>Power Storage Capacity</th>
<th>Flood Storage Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>(a) The Indus</td>
<td>0.25</td>
<td>0.15</td>
<td>Nil</td>
</tr>
<tr>
<td>(b) The Jhelum (excluding the Jhelum Main)</td>
<td>0.50</td>
<td>0.25</td>
<td>0.75</td>
</tr>
<tr>
<td>(c) The Jhelum Main</td>
<td>Nil</td>
<td>Nil</td>
<td>As provided in Paragraph 9</td>
</tr>
<tr>
<td>(d) The Chenab (excluding the Chenab Main)</td>
<td>0.50</td>
<td>0.60</td>
<td>Nil</td>
</tr>
<tr>
<td>(e) The Chenab Main</td>
<td>Nil</td>
<td>0.60</td>
<td>Nil</td>
</tr>
</tbody>
</table>

Provided that

(i) the storage specified in Column (3) above may be used for any purpose whatever, including the generation of electric energy;
(ii) the storage specified in Column (4) above may also be put to Non-Consumptive Use (other than flood protection or flood control) or to Domestic Use;

(iii) India shall have the option to increase the Power Storage Capacity specified against item (d) above by making a reduction by an equal amount in the Power Storage Capacity specified against items (b) or (e) above; and

(iv) Storage Works to provide the Power Storage Capacity on the Chenab Main specified against item (e) above shall not be constructed at a point below Naunut (Latitude 33° 19' N. and Longitude 75° 59' E.).

8. The figures specified in Paragraph 7 shall be exclusive of the following:—

(a) Storage in any Small Tank.

(b) Any natural storage in a Connecting Lake, that is to say, storage not resulting from any man-made works.

(c) Waters which, without any man-made channel or works, spill into natural depressions or borrow-pits during floods.

(d) Dead Storage.

(e) The volume of Pondage for hydro-electric plants under Annexure D and under Paragraph 21(a).

(f) Surcharge Storage.

(g) Storage in a Regulating Basin (as defined in Annexure D).

(h) Storage incidental to a barrage on the Jhelum Main or on the Chenab Main not exceeding 10,000 acre-feet.

9. India may construct on the Jhelum Main such works as it may consider necessary for flood control of the Jhelum Main and may complete any such works as were under construction on the Effective Date: Provided that
(i) any storage which may be effected by such works shall be confined to off-channel storage in side valleys, depressions or lakes and will not involve any storage in the Jhelum Main itself; and

(ii) except for the part held in lakes, borrow-pits or natural depressions, the stored waters shall be released as quickly as possible after the flood recedes and returned to the Jhelum Main lower down.

These works shall be constructed in accordance with the provisions of Paragraph 11(d).

10. Notwithstanding the provisions of Paragraph 7, any Storage Work to be constructed on a Tributary of The Jhelum on which Pakistan has any Agricultural Use or hydro-electric use shall be so designed and operated as not to adversely affect the then existing Agricultural Use or hydro-electric use on that Tributary.

11. The design of any Storage Work (other than a Storage Work falling under Paragraph 3) shall conform to the following criteria:—

(a) The Storage Work shall not be capable of raising artificially the water level in the reservoir higher than the designed Full Reservoir Level except to the extent necessary for Flood Storage, if any, specified in the design.

(b) The design of the works shall take due account of the requirements of Surcharge Storage.

(c) The volume between the Full Reservoir Level and the Dead Storage Level of any reservoir shall not exceed the Conservation Storage Capacity specified in the design.

(d) With respect to the Flood Storage mentioned in Paragraph 9, the design of the works on the Jhelum Main shall be such that no water can spill from the Jhelum Main into the off-channel storage except when the water level in the Jhelum Main rises above the low flood stage.
(e) Outlets or other works of sufficient capacity shall be provided to deliver into the river downstream the flow of the river received upstream of the Storage Work, except during freshets or floods. These outlets or works shall be located at the highest level consistent with sound and economical design and with satisfactory operation of the Storage Work.

(f) Any outlets below the Dead Storage Level necessary for sediment control or any other technical purpose shall be of the minimum size, and located at the highest level, consistent with sound and economical design and with satisfactory operation of the Storage Work.

(g) If a power plant is incorporated in the Storage Work, the intakes for the turbines shall be located at the highest level consistent with satisfactory and economical construction and operation of the plant and with customary and accepted practice of design for the designated range of the plant's operation.

12. To enable Pakistan to satisfy itself that the design of a Storage Work (other than a Storage Work falling under Paragraph 3) conforms to the criteria mentioned in Paragraph 11, India shall, at least six months in advance of the beginning of construction of the Storage Work, communicate to Pakistan in writing the information specified in the Appendix to this Annexure; if any such information is not available or is not pertinent to the design of the Storage Work or to the conditions at the site, it will be so stated:

Provided that, in the case of a Storage Work falling under Paragraph 9,

(i) if the work is a new work, the period of six months shall be reduced to four months, and

(ii) if the work is a work under construction on the Effective Date, the information shall be furnished not later than 31st December 1960.
13. Within three months (or two months, in the case of a Storage Work specified in Paragraph 9) of the receipt by Pakistan of the information specified in Paragraph 12, Pakistan shall communicate to India in writing any objection that it may have with regard to the proposed design on the ground that the design does not conform to the criteria mentioned in Paragraph 11. If no objection is received by India from Pakistan within the specified period of three months (or two months, in the case of a Storage Work specified in Paragraph 9), then Pakistan shall be deemed to have no objection.

14. If a question arises as to whether or not the design of a Storage Work (other than a Storage Work falling under Paragraph 3) conforms to the criteria set out in Paragraph 11, then either Party may proceed to have the question resolved in accordance with the provisions of Article IX(1) and (2).

15. (a) If any alteration proposed in the design of a Storage Work (other than a Storage Work falling under Paragraph 3) before it comes into operation would result in a material change in the information furnished to Pakistan under the provisions of Paragraph 12, India shall immediately communicate particulars of the change to Pakistan in writing and the provisions of Paragraphs 13 and 14 shall then apply, but where a period of three months is specified in Paragraph 13, that period shall be reduced to two months.

(b) If any alteration proposed in the design of a Storage Work (other than a Storage Work falling under Paragraph 3), after it comes into operation would result in a material change in the information furnished to Pakistan under the provisions of Paragraph 12, India shall, at least four months in advance of making the alteration, communicate particulars of the change to Pakistan in writing and the provisions of Paragraphs 13 and 14 shall then apply, but where a period of three months is specified in Paragraph 13, that period shall be reduced to two months.
16. In the event of an emergency arising which requires repairs to be undertaken to protect the integrity of a Storage Work (other than a Storage Work falling under Paragraph 3), India may undertake immediately the necessary repairs or alterations; if these repairs or alterations result in a change in the information furnished to Pakistan under the provisions of Paragraph 12, India shall, as soon as possible, communicate particulars of the change to Pakistan in writing to enable Pakistan to satisfy itself that after such change the design of the work conforms to the criteria specified in Paragraph 11. The provisions of Paragraphs 13 and 14 shall then apply.

17. The Flood Storage specified against item (b) in Paragraph 7 may be effected only during floods when the discharge of the river exceeds the amount specified for this purpose in the design of the work; the storage above Full Reservoir Level shall be released as quickly as possible after the flood recedes.

18. The annual filling of Conservation Storage and the initial filling below the Dead Storage Level, at any site, shall be carried out at such times and in accordance with such rules as may be agreed upon between the Commissioners. In case the Commissioners are unable to reach agreement, India may carry out the filling as follows:

(a) if the site is on The Indus, between 1st July and 20th August;

(b) if the site is on The Jhelum, between 21st June and 20th August; and

(c) if the site is on The Chenab, between 21st June and 31st August at such rate as not to reduce, on account of this filling, the flow in the Chenab Main above Meralia to less than 55,000 cusecs.

19. The Dead Storage shall not be depleted except in an unforeseen emergency. If so depleted, it will be refilled in accordance with the conditions of its initial filling.
20. Subject to the provisions of Paragraph 8 of Annexure C, India may make releases from Conservation Storage in any manner it may determine.

21. If a hydro-electric power plant is incorporated in a Storage Work (other than a Storage Work falling under Paragraph 3), the plant shall be so operated that:

(a) the maximum Pondage (as defined in Annexure D) shall not exceed the Pondage required for the firm power of the plant, and the water-level in the reservoir corresponding to maximum Pondage shall not, on account of this Pondage, exceed the Full Reservoir Level at any time; and

(b) except during the period in which a filling is being carried out in accordance with the provisions of Paragraph 18 or 19, the volume of water delivered into the river below the work during any period of seven consecutive days shall not be less than the volume of water received in the river upstream of the work in that seven-day period.

22. In applying the provisions of Paragraph 21(b):

(a) the period of seven consecutive days shall commence at 8 A.M. on every Saturday and the time shall be Indian Standard Time;

(b) a tolerance of 10% in volume shall be permissible and adjusted as soon as possible; and

(c) any temporary uncontrollable retention of water due to variation in river supply will be accounted for.

23. When the Live Storage Capacity of a Storage Work is reduced by sedimentation, India may, in accordance with the relevant provisions of this Annexure, construct new Storage Works or modify existing Storage Works so as to make up the storage capacity lost by sedimentation.
24. If a power plant incorporated in a Storage Work (other than a Storage Work falling under Paragraph 3) is used to operate a peak power plant and lies on any Tributary of The Jhelum on which there is any Agricultural Use by Pakistan, a Regulating Basin (as defined in Annexure D) shall be incorporated.

25. If the change referred to in Paragraph 5(a) or 15 is not material, India shall communicate particulars of the change to Pakistan, in writing, as soon as the alteration has been made or the repairs have been undertaken. The provisions of Paragraph 6 or Paragraphs 13 and 14, as the case may be, shall then apply.
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APPENDIX TO ANNEXURE E

(Paragraphs 4 and 12)

1. Location of Storage Work

General map showing the location of the site; if on a Tributary, its situation with respect to the main river.

2. Hydrologic Data

(a) General map (Scale: \( \frac{1}{4} \) inch or more = 1 mile) showing the discharge observation site or sites or rainfall gauge stations, on whose data the design is based. In case of a work on a Tributary, this map should also show the catchment area of the Tributary above the site.

(b) Observed or estimated daily river discharge data on which the design is based (observed data will be given for as long a period as available; estimated data will be given for as long a period as possible; in both case data may be limited to the latest 25 years).

(c) Flood data, observed or estimated (with details of estimation).

(d) Gauge-discharge curve or curves for site or sites mentioned in (a) above.

(e) Sediment data.

3. Hydraulic Data

(a) Stage-area and stage-capacity curves of the reservoir with contoured survey maps on which based.

(b) Reservoir Capacity, Dead Storage Capacity, Flood Storage Capacity, Conservation Storage Capacity, Power Storage Capacity, General Storage Capacity and Surcharge Storage Capacity.
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(c) Full Reservoir Level, Dead Storage Level and levels corresponding to Flood Storage and Surcharge Storage.

(d) Estimated evaporation losses in the reservoir.

(e) Maximum designed flood discharge and discharge-capacity curve for spillway.

(f) If a power plant is incorporated in a Storage Work:
   (i) Stage-area and stage-capacity curves of forebay and Regulating Basin, with contoured survey maps on which based.
   (ii) Estimated evaporation losses in the Regulating Basin, head-race, forebay and tail-race.
   (iii) Designated range of operation.

4. Particulars of Design

(a) Dimensioned plan showing dam, spillway, diversion works and outlet works.

(b) Type of dam, length and height above mean bed of the river.

(c) Cross-section of the river at the site and mean bed level.

(d) Type of spillway, length and crest level; size, number and top level of spillway gates.

(e) Type of diversion works, maximum designed capacity, number and size; sill levels.

(f) Outlet works: function, type, size, number, maximum designed capacity and sill levels.

(g) If a power plant is incorporated in a Storage Work,
   (i) Dimensioned plan showing head-race and forebay, powerhouse, tail-race and Regulating Basin.
   (ii) Type of intake, maximum designed capacity, size and sill level.
(iii) Head-race and tail-race, length, size and maximum designed capacity.

(iv) Discharge proposed to be passed through the plant, initially and ultimately, and expected variations in the discharge on account of the daily and the weekly load fluctuations.

(v) Maximum aggregate capacity of power units (exclusive of standby units) for firm power and secondary power.

(vi) Regulating Basin and its outlet works: type, number, size, sill levels and designed maximum discharge capacity.

5. General

(a) Probable date of completion of river works and probable dates on which various stages of the work would come into operation.

(b) Estimated effect of proposed Storage Work on the flow pattern of river supplies below the Storage Work or, if India has any other Storage Work or Run-of-River Plant (as defined in Annexure D) below the proposed Storage Work, then on the flow pattern below the last Storage Work or Plant.