

APPENDIX 7					
REV. NO.	DATE	DESCRIPTION	BY	CHK.	APP.
0	9 th MAY-2022	TECHNICAL SPECIFICATION			
1	15-SEPT-2022	TECHNICAL SPECIFICATION			
TECHNICAL SPECIFICATION QUICK MECHANICAL OPENING MECHANISM FOR PONTOON KULFI SYSTEM					
HULL NO.		PROJECT			
		PONTOON KULFI SYSTEM			
APPROVED		TECHNICAL SPECIFICATION FOR PONTOON KULFI SYSTEM			
CHECKED					
PREPARED					
		DATE	DRAWING NO.	REV. NO.	SHEETS
		15-SEPT-2022	CICMT/IWAI/KULFI1&2/8	1	

SECTION – ‘A’ GENERAL

Technical Specification for the Swing barge cum Ro-ro ferry system for the floating pontoon bridge at Patna

1. **Aim. :** To lay down the requirements for
 - a. 1 no. 39.60 M Self Propelled Ro-Ro ferry cum pontoon barge for vehicular and human traffic across the river Ganges at various locations in Bihar and Uttar Pradesh.
 - b. 2 no. end pontoon 20m moored barges to provide the stable platform to swing the barge against.

2. **Functions for main barge**
 - a. 39.6 M Self Propelled Pontoon Barge
 - (a) To act as a passenger and car ferry during the rainy seasons
 - (b) To act as the main link in the pontoon bridge that can be detached and swiveled to clear a passage for passing barges .

3. **Functions for mooring barge**
 - a. 2 nos. 20m moored Barge
 - (a) To act as a boarding unit during ferry or pontoon bridge operation by creating a steady platform by mooring, and acting as a connection to the PIPA units

4. A certificate is to be provided by the Classification Society confirming that ‘Class Notations have been provided for all functional requirements indicated in the specification’.

5. The main and auxiliary machinery of the barge should permit a continuous operation of 48 hrs when operating as a ferry.

6. The barge should have an expected life of 25 years minimum.

7. **Speed.**
 - a. In the Pontoon Bridge. mode the angular speed in opening should be such that a rotation of 90 deg is achieved in not more than 10 minutes.
 - b. In the ferry mode, the economic speed should be about 7 to 8 knots in still water without shallow water effect and the maximum speed 8.5 knots at 92% MCR of the propulsion units.

8. Dimensions.

The principle dimensions of the main barge should be as follows : -

a. Length Overall	39.6	m
b. Beam (mld) –	10	m excluding propulsor platforms
c. Beam (extreme) –	13.4	m including propulsor platforms
d. Draught -	0.6	m.
e. Depth -	1.95	m at side
	2.10	m at centre

The principle dimensions of the moored end barges should be as follows : -

f. Length Overall	20.4	m
g. Beam	5	m
h. Draught	0.40	m
i. Depth	1.75	m at side
	0.85	m at centre

9. Endurance.

Not less than 150 nm.

10. Crew.

- a. Main Barge (Pontoon Mode) – 3
- b. Main Barge (Ferry mode) - 5
- c. Moored barge 0 (The crew of 39.6 m barge to operate and maintain

11. Operating

All equipment should be marinised and capable of performing under the following Environmental conditions: -

- (a) Air Temperature - upto 45 °C
- (b) Average Machinery Space Temperature - upto 55 °C.
- (c) Relative Humidity - 95 % condensation at temp of 35 °C.

SECTION – ‘B’ NAVIGATION

12. Bridge. /Control Cabin

- Bridge/Control Cabin is at a height from the deck of the main barge as shown in the General Arrangement drawing. It should have large inclined windows for all around visibility to assist maneuvering alongside both when operating as a ferry and for swinging open to provide passage to river barges. One window on each side should be provided with window wipers.
- Lighting, fans , wipers and fog horn should be powered by Li-Ion batteries charged with solar panels on the wheelhouse top and on top of the canopy over the walk way with adequate back up for 24 hours of continuous operation.

13. Mast.

The Mast should be capable of carrying navigational lights, electric foghorn, search light flags as per rules. It should be mounted with a hinge such that the vessel can go below low bridges.

14. NAV Lights.

As per IWT rules.

SECTION C – HULL, MACHINERY FIRE FIGHTING AND DAMAGE CONTROL

15. Hull.

- a) **Hull Form.** The main barge and the moored barges are to be of single hull steel construction .
- b) **Construction Material.** Ordinary hull structural steel is a hull structural steel with a minimum yield stress of 235 [N/mm²] and a tensile strength generally in the range of 400-490 [N/mm²].
- c) **Plate Thicknesses & Scantlings.** Corrosion allowances specified in Classification Society rules are to be provided. Plate thickness of less than 5 mm is not to be used for main hull.
- d) **Hull Strength.** All Structural Bulkheads, Decks, Super Structure, Structural Closures, Mast, Foundation etc, will be as per Class requirements. The structural arrangements will be as per the design provided.
- e) **Water Tight Integrity (Main Barge)** Collision bulkhead is to be provided in accordance with class rules and should extend to the uppermost continuous deck . Watertight transverse and longitudinal
- f) bulkheads are to be provided as shown in general arrangement drawings . Both port and starboard side will have 2 lattice bhds in ways of wheel load of vehicles.

16. Superstructure

A two tier superstructure unit is provided housing the bridge with all round visibility and central control for winches, pumps , lighting systems and propulsion units

17. Pedestrian Walkway

Separate pedestrian walkway is provided with a canopy on top for weather protection to provide additional safety for the pedestrians

18. Ramps

A sturdy ramp on each side is provided for vehicles and pedestrians to cross over. When used as a passenger ferry, the ramp has to be suitably designed as to the lengths and strengths to accommodate the shore incline of the landing zone.

19. Winches

Four electrical winches of 5 ton capacity each to be provided for lifting and lowering of the ramps.

20. Paint

- (a) Long life paint scheme is to be applied
- (b) A long life paint scheme for hull and interiors is to be proposed along with the bid. The walkways on the main barge and on the moored barges should have anti-skid paint.

21. Main and Aux Machineries.

- a. The main barge is to be powered by two z-drive azimuthal propulsion devices , as shown in the general arrangement drawings, both for river pontoon bridge mode to swing open and for passenger ferry mode . The units are to be powered by diesel engines manufactured in India.
- b. The propellers should be clear of the hull in way to ensure proper flow below the hull in the swing mode.
- c. In the Pontoon bridge mode the angular speed in opening should be such that a rotation of 90 deg is achieved in not less than 10 minutes.
- d. In the ferry mode, the economic speed should be about 7 to 8 knots and the maximum speed 9 knots at 92% MCR of the propulsion units.
- e. Propulsion package and auxiliary machinery having indigenous product support are to be provided.
- f. The propellers should have 360deg rotation capability.
- g. The engines should be controllable from the wheelhouse, with manual override at the engines.
- h. Main and auxiliary machinery are to be mounted on anti vibration mounts.
- i. Pumps, powered by on-board generators are to be provided for the following operations. A detailed load computation is to be submitted with the bid.
 - (a) Ballasting and de ballasting
 - (b) Dewatering/ Clearing bilge
 - (c) Fire Fighting
 - (d) Deck washing.

- j. Engine controls, using modern, indigenous, Commercial Off the Shelf (COTS) component, are to be provided in the Bridge and Engine Room.

22. **Steering Gear.**

Steering gear of the azimuthal propulsor units should be Electro Hydraulic .

23. **Fuel Storage :**

2 Ton fuel storage tanks (1 t tank for each propulsor apart from adequate ready use tanks mounted on the engine) to be provided. The filling will be done by standard oil tankers coming on board.

24. **Safety**

Adequate fire-fighting , Life saving appliances, and Light and sound signals as per class rules are to be provided.

SECTION E – ELECTRICAL

25. **Power Generation and Distribution**

- a. . The deck lighting for the main barge shall be by 6 nos. solar powered 6 m high pole lights with two light fittings of 15 watts each LED with Li ion batteries contained inside. Back up 24 hours.
- b. The moored barges should be provided with four such units each as shown in the ga Back up 24 hours is to be designed for.

26. **Control room lighting** , fan , electric horn to be powered by solar panels mounted on top of control room.

27. **Navigational lighting** conforming Inland water requirement shall be provided and is to powered by the control room top solar panels. In case of cloudy weather, power should be from the onboard generator

- a. Sockets and hand lamps (IP 57) are to be provided near the engines and near the ramps for carrying out maintenance and /or emergency repair work at night.

28. **Main Switch Board.**

- a. Suitably rated Switch Board should be provided inside the control room to take input from solar, onboard genset and shore connection and distribute.
- b. Shore Supply Arrangements. In case of extended period of cloudy weather ,the batteries may need to be charged from the shore supply.
- c. Water tight (IP 57) shore supply connection boxes should be fitted on main deck of the main barge at an appropriate position on Stbd side below the control cabin. The shore supply box should be connected by permanent cables to the switch-board and should have suitable terminals for connecting flexible cables upto 100 meters length. Shore supply Cable is to be provided with securing drum/ reel.
- d. Batteries with Charging Arrangement. Maintenance free batteries of adequate capacities and Battery Bay with requisite battery charging arrangement as per Classification Society regulations are to be provided in a separate room below the control cabin. Switch-board should have internal rectifier mechanism so that batteries are automatically charged with shore supply.

29. **Cables.**

Low fire hazard cables (EBXL cables) as per Classification Society Requirements should be used

Electrical machinery/ equipment/ fittings should conform to Classification Society standards/ specifications.

SECTION D – SEAMANSHIP, LIFE SAVING AND SAFETY EQUIPMENT

30. **Safety**

Adequate fire-fighting , Life saving appliances, and Light and sound signals as per class rules are to be provided.

31. **Seamanship Fittings.**

- a. Anchor and Chain Cable & Fittings. Anchor and anchoring arrangement for the main barge are to be as per Classification Society Rules for the passenger ferry mode. No anchors needed for pontoon mode..
- b. Mooring arrangement and anchors for the moored barges shall be with four spuds in addition to two anchors with adequate chains.

32. **Anchor Windlass & Fittings.**

- a. As per Classification Society Requirements .

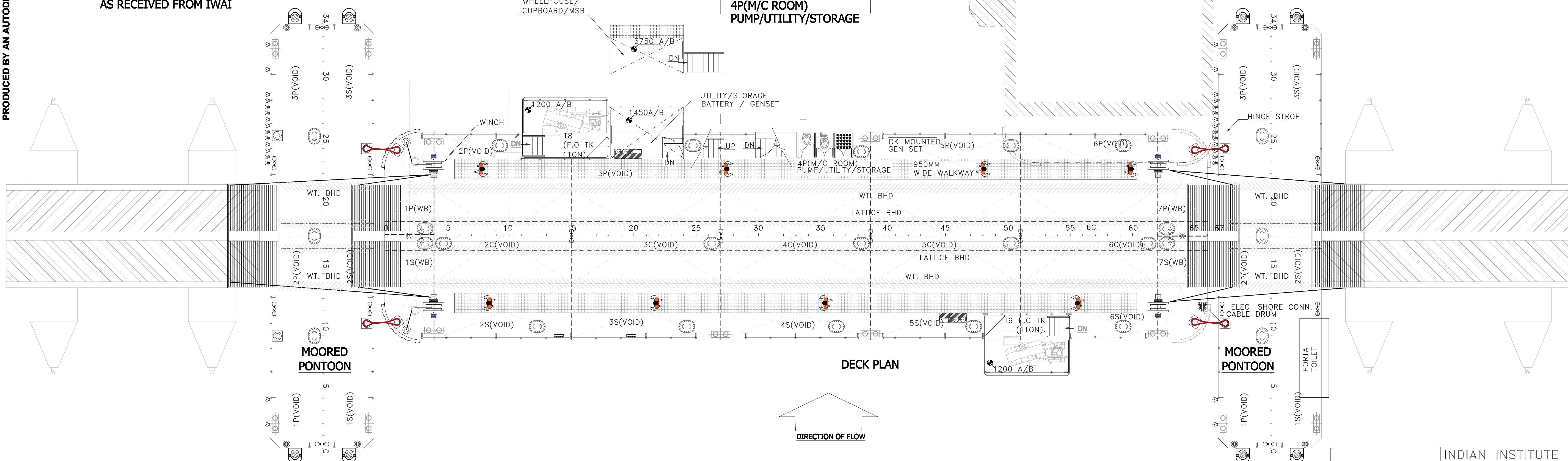
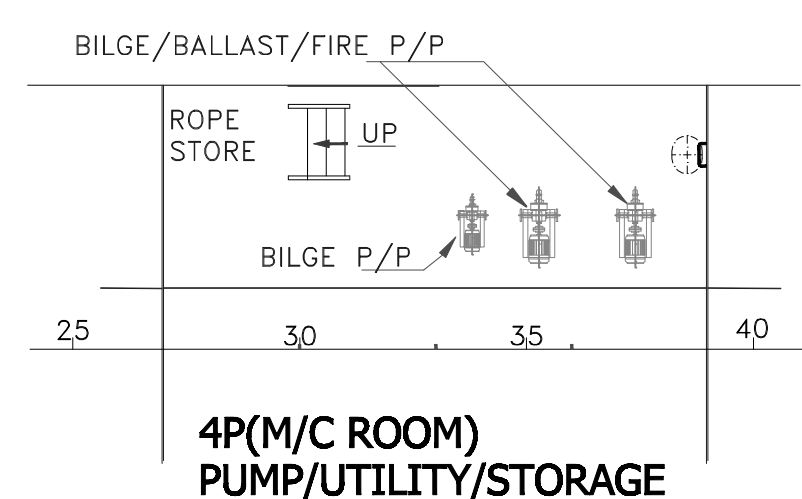
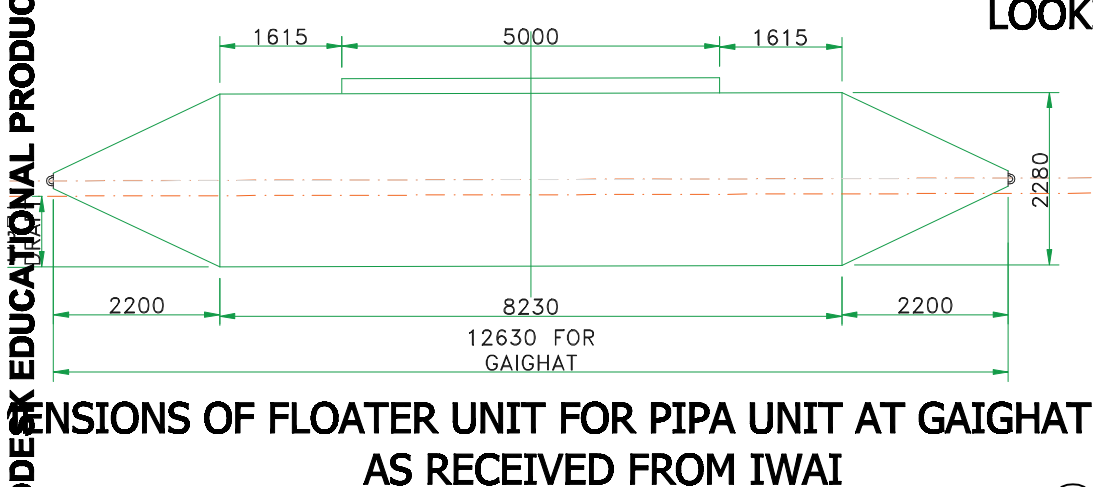
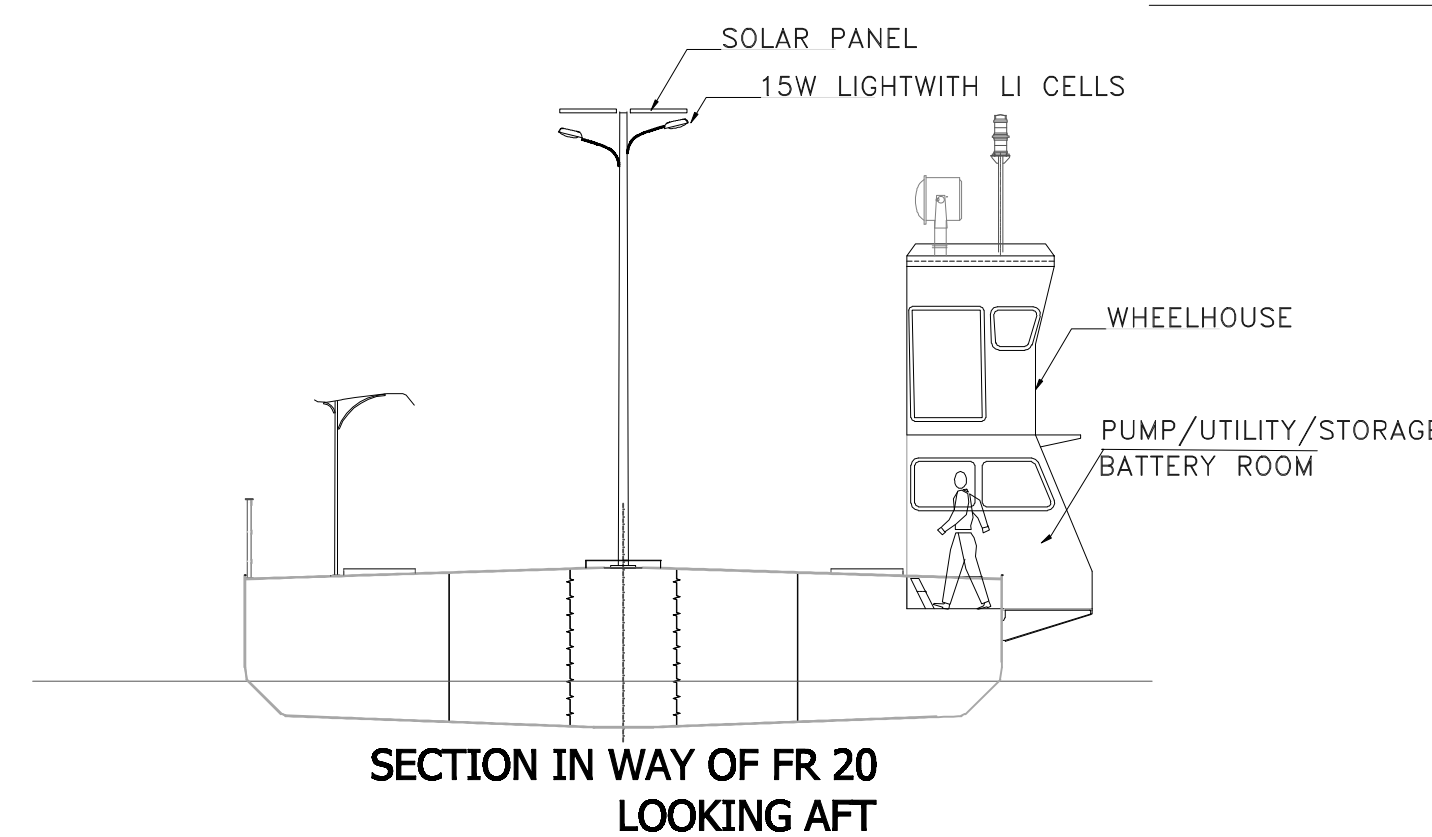
33. **Towing and Berthing Gears & Fittings.**

- a. Towing and berthing arrangements are to be provided as per the Classification Society Requirements. In addition, following are to be provided:-
- b. Minimum 3 nos twin bollards or as required by Class on each side for the main barge
- c. Fairleads on either side of bollards.
- d. Cleats and stag horns for rigging fenders during movement
- e. Towing and mooring rope as per rule
- f. Single Bollard on the main barge with mooring pendant for acting as a hinge arrangement for the main barge to swing open. The pendant is to be pulled and the barge held tight with the mooring barge by a chain and pulley arrangement and a hand winch with easy operation.

34. **Fendering.**

- a. Fendering arrangement should be provided to avoid metal to metal contact of the hull whilst alongside other barges , towages as follows:-
- b. Heavy duty non inflatable type fixed D-type fenders made of rubber (shore hardness 65) conforming to Class Specifications should be provided as follows:-

- c. Along the hull above waterline
- d. Along the rounded corner of the main barge to facilitate swinging by 90 deg to clear passage for the river barges..



<u>LENGTH OVERALL</u>	<u>39.60 M</u>
<u>BREADTH OF HULL</u>	<u>10.00 M</u>
<u>BREADTH OVERALL</u>	<u>13.40 M</u>
<u>DEPTH AT SIDE</u>	<u>1.95 M</u>
<u>DEPTH AT CENTRE</u>	<u>2.10 M</u>
<u>DRAUGHT (LOADED)</u>	<u>0.60 M</u>

<u>LENGTH OVERALL</u>	20.40 M
<u>BREADTH OF HULL</u>	5.00 M
<u>DEPTH AT SIDE</u>	1.75 M
<u>DEPTH AT CENTRE</u>	1.85 M
<u>DRAUGHT (LOADED)</u>	0.40 M

MAIN PONTON IN RETRACTED POSITION

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