

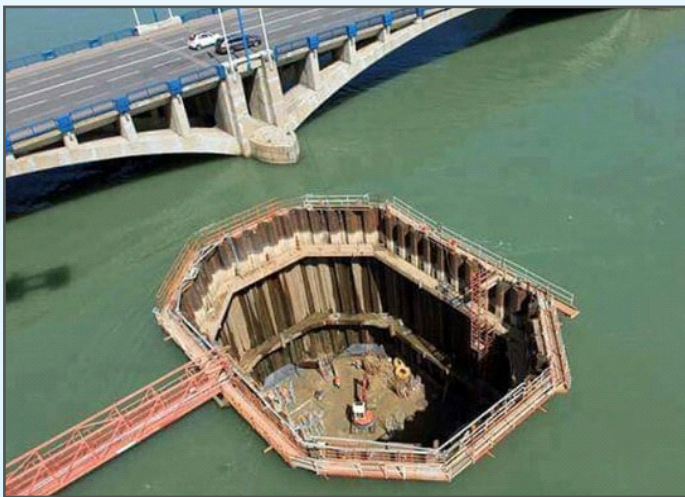
Why Submerged Pump for Pontoon based Pumping Station for Initial - fill & Make-up Water

100% Guarantee for dot On-time Water

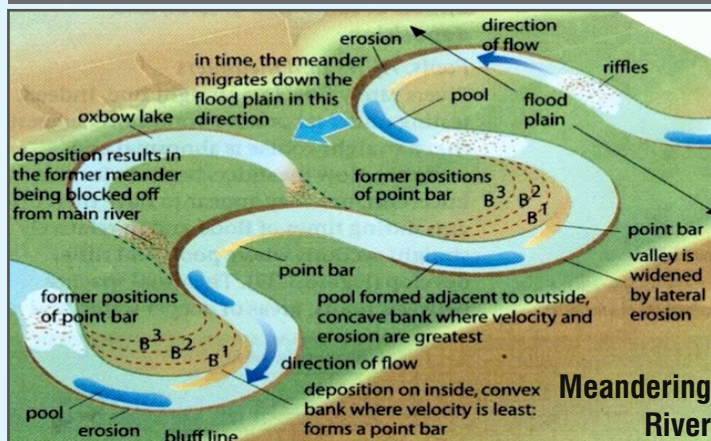
Construction of Intake Well is a Complex & Tedious job :

Constraints:

- **Perennially Standing water;** creating difficulties in construction.
- **Location** of Intake Well being **near Dam Spillway Face** thereby raising Dam Safety issues during Construction phase.



Costly & Risky Coffor Dams are often required for construction of Intake Wells



Constraints:

- **Meandering River.**
- **Soil Bearing Capacity issues...**

Solution :

Instead of a Fixed Well, go for a Submerged Pump based Floating Pontoon Station as it can be **easily Shifted / Re-Located** depending on the Water Course....



Constraints:

Financial Discouragement:

- Cost disparities & overruns (*between Actual v/s Estimated costs*);
- Minimal Profitability & Miniscular Share (*of Intake Well*) in Total Project Value yet Maximum Effort leading to it's neglect.

lead to **cascading delays** even before the Construction (*of Intake*) can begin.

These **huge delays** (*of Intake Well construction*) derail the Entire Project's Commissioning (*water supply*).

Hence, despite an Expenditure (& Execution) of upto 90% -95% Project (in a very short time) - Water Supply is inordinately delayed for years thereafter...!

Solution:

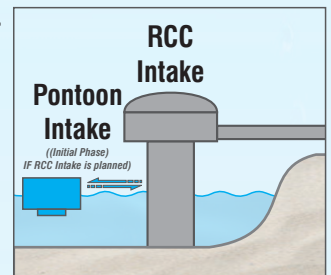


Now with Submerged pumpset (& *back-up Pontoon Technology*), you have a 100% Guarantee of being able to start water supply irrespective of delays in Construction of Intake Well, Meandering Water courses, etc



Instead of a **Intake Well dependent VT pump**, in the Tender itself; opt for Versatile **Submerged pumpsets** which can be used :

- 1) **Either**, in a **RCC Intake Well** (*if required (& as & when constructed)*)
- 2) **or** on **Floating Pontoons** also (*if the Intake Well is done away with (or delayed in construction)*) to be ordered **only if required**.



Either ways, Client is assured of Timebound Commissioning of Water Supply (*as soon as Pipelines are laid & Electrification is done*) at **No Additional Cost** - *i. e. an Insurance Policy without Premium.*



Submerged Pumps save the Day..!

Due to Water Logging, Construction of Intake Well was abandoned (*i.e. Saving*) after which the Submerged Pumps were Commissioned from Floating Pontoons instead (*i.e. Extra*)



Initial Fill
(During Commissioning)

Make Up Water
(MUW) (During Operation)

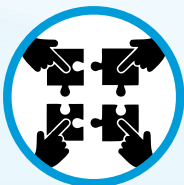
Aqua's Submerged Pumps mounted either on Aqua's Pontoons or Directly in Water Body are the Most Economical, Quickest & Simplest Solution.

Aqua has Lifted 1.4 TMC / 444 MLD / 18,494 m³/hr Water for the Initial-fill of the Lower Reservoir at World's Largest IREP at M/s. Greenko's Pinnapuram in Time bound fashion under Challenging & Unforeseen (*El Nino*) Conditions.



Fixed installation or Floating installation i.e. Pumps mounted on Pontoon, **AQUA** is End-to-End Solution Provider for Initial Fill and Make Up Water applications.

Synchronization of
Hydraulic Engg + Pump + Pontoon + Walkway + Electricals + Piping
system design under a SINGLE ROOF for
Turnkey Responsibility &
Harmonious System Performance



Pontoon Pumping Station:



*Aqua's (1005 hp @ 3.3kV) Submerged Centrifugal Pumpsets
based Floating Pumping Station to lift **18,494m³/hr @ 140m**
Water for the Initial-fill of the Lower Reservoir at
Pinnapuram IREP 1,680 MW*



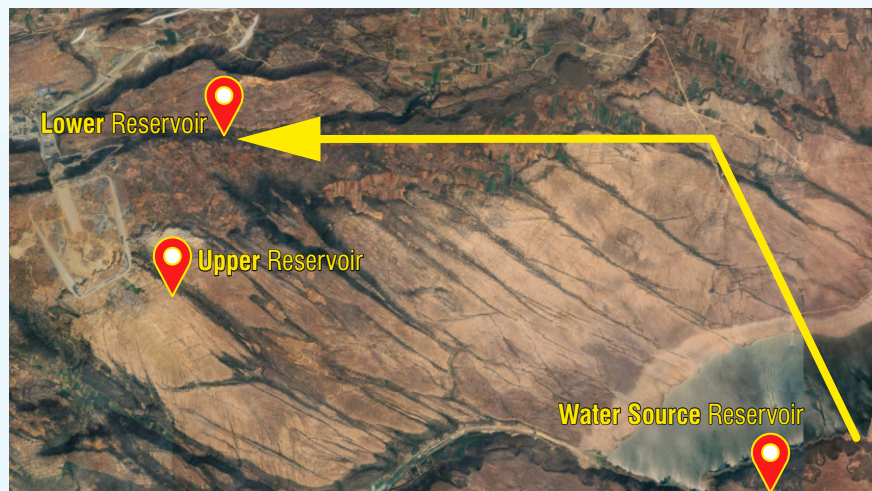
Two large artificial lakes were made for feeding the RPT's which required a Initial charge of **1.4TMC** of water.

Being Artificial Reservoirs,
Water for Initial Fill was to be Pumped
from nearly **14km** (from Gorakallu reservoir)
& at a Static Lift of **96m**

Aqua's Scope of Work

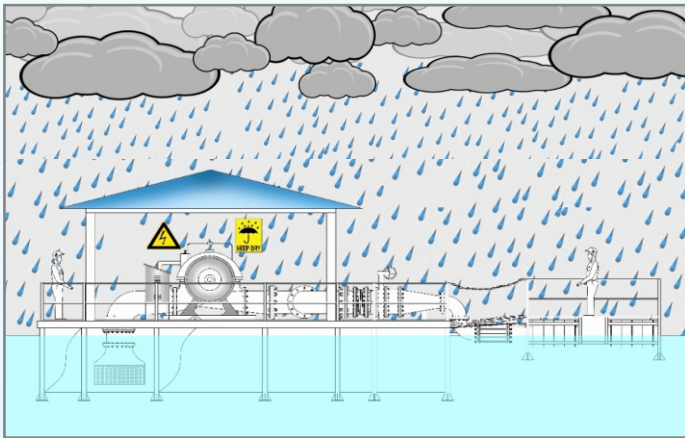
Design, Engineering, Manufacturing, Supply, Installation, Testing & Commissioning of Entire Floating Pumping Station consisting of:

- 1) **SubCF pumpsets 14W+1S, 1005hp @ 3.3kV**
(1321m³/hr x 140m)
- 2) **Pontoons along with Walkways**
- 3) **SS Flexible & MS fixed Pipelines**
- 4) **Valves**
- 5) **3.3 KV VCB Panels**
- 6) **1005hp 3.3kV FCMA Soft Starters with 3.3kV Capacitors**
- 7) **HT & LT Cables**
- 8) **Auxiliary Transformer 3.3 KV/0.415KV**
- 9) **DCDB cum Battery Charger Panel**
- 10) **Earthing etc.**

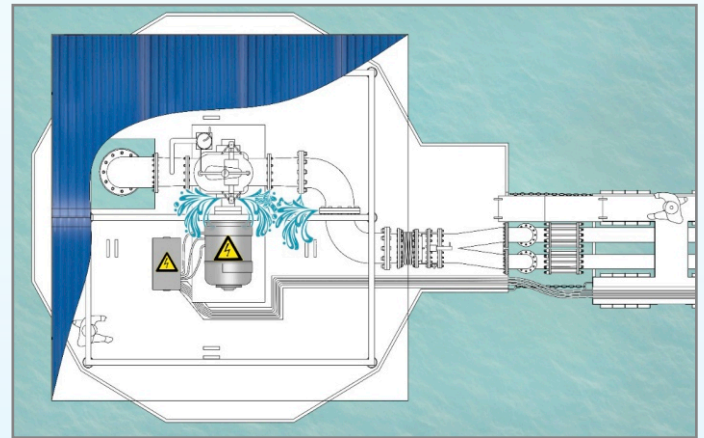




Motors of VT & Horizontal Pumps need to be Protected from...



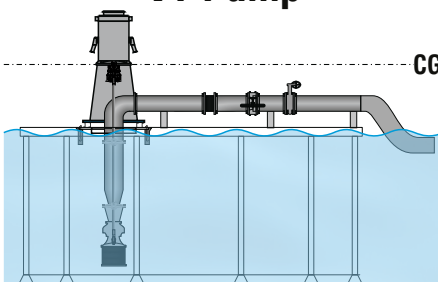
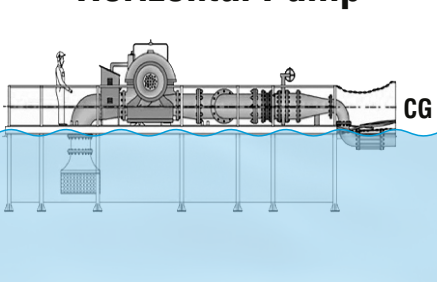
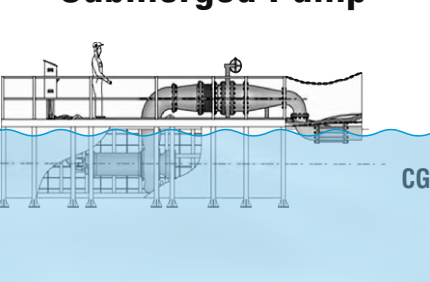
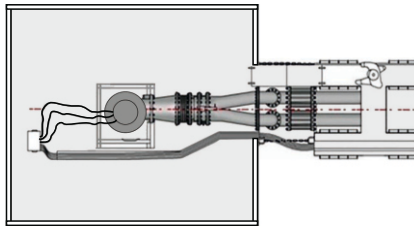
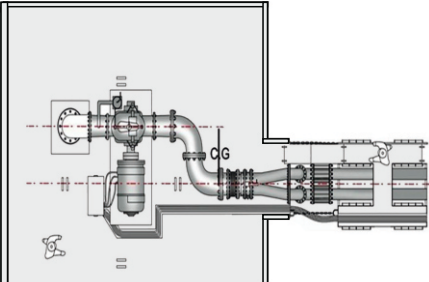
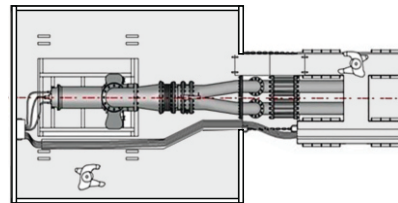
...Rains, Storms & Splashing Waves !

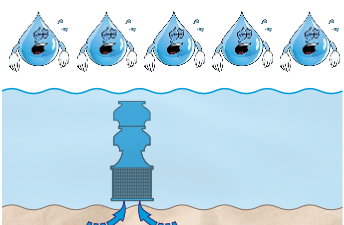
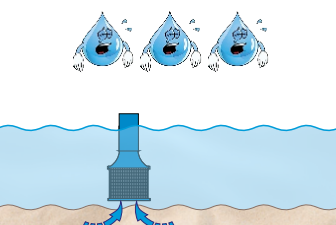
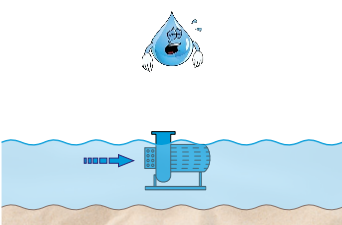


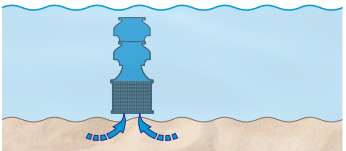
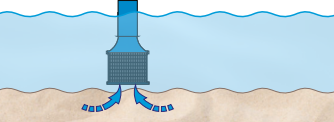
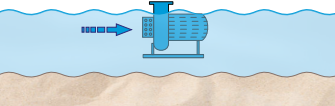
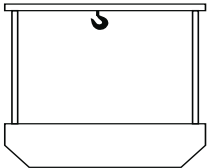
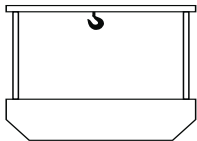
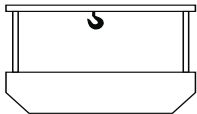
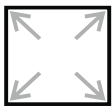
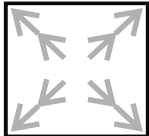
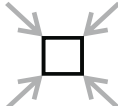
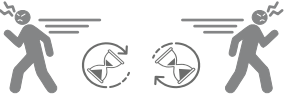
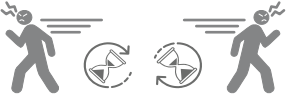
...Water Sprays !

(Frequently Emanating from Pipeline Leakages)

Pros & Cons of Various Pontoon mounted Pumps

VT Pump 	Horizontal Pump 	Submerged Pump 
		

	VT Pump	Horizontal Pump	Submerged Pump
Pumping CutOff Depth <i>...ability to Lift Dead Water</i> 	  Very High <i>...due to Long Underhanging depth & Vertically Bottom Suction - huge wastage of dead water</i> 	 High <i>...due to NPSHr Cavitations Problems & Vertical Bottom Facing Suction - Substantial wastage of dead water</i> 	 Minimal <i>...due to Horizontal Side Suction & Minimalistic Underhanging Depth</i> 

	VT Pump	Horizontal Pump	Submerged Pump
Risk of Toppling & Lateral Stability due to Lower Center of Gravity (CG) & Low Roll Center (LRC)	Much Above the Deck ...leads to pendulum like high amplitude oscillations  Highly Unstable ☠️	Above the Deck ...leads to mild oscillations  Unstable 😞	Below Deck ...so no oscillations  Stable 😊
Stability against Waves, Storms etc.	Highly Unstable ...leading to Chances of Toppling & Oscillating	Mildly Unstable ...having Some Chances of Toppling	Very Stable... ...no Chances of Toppling
Direction of Pump's Inlet Suction Flow	Vertical Bottom Facing ...leads to Undesirable Suction of Silt ☠️ 	Vertical Bottom Facing ...leads to Undesirable Suction of Silt 😞 	Horizontal Side Facing ...leads to Suction of Fairly Clear Water from Upper Strata. 😊 
Pontoon's Head Room requirement (for Lifting Hoist)	Very High 	High 	Medium 
Size of Pontoon	Bulky 	Very Bulky 	Compact 
Lubrication of Pumpsets	Forced Water Lubrication is Continuously required. ...is Very Costly & Very Complex ☠️ to Operate & Maintain	Periodic Oiling &/or Greasing is required. ...is Costly & Tedious to Operate & Maintain ☠️	Not required. 😊
Installation & Operating Manpower: Skill level required & Quantity	Ultra Highly Skilled ☠️ 	Highly Skilled ☠️ 	Medium Skilled 😊 
Conducive to Remote Operation	No ☠️ 	No ☠️ 	Yes 😊 
Need for Operator to go to Pontoon Frequently ...for Priming, Alignment of Shaft/Coupling; Gland Packing Replacement / Tightening; Valve Opening / Closing; Forced Water Lubrication; Re-Oiling, Re-Greasing; Sleeve Replacement; etc.	Yes ☠️ 	Yes ☠️ 	Not Required. 😊 

Summary

	VT Pump	Horizontal Pump	Submerged Pump
Startup	Suction Priming	Mandatory <i>tedious & requires the operator to go upto the pump during each startup; adds to overall Maintenance</i>	
	Suction Vacuum Pump <i>Operation during Pump Start</i>		
	Need of Vacuum Pump/ Foot Valves		
	Installation & Operating Manpower : Skill Level required & Quantity		
	Time Consumed		
	Ease of Operation		
	Conducive to Remote Operation		
	Risk of Bearings Damage <i>(due to Raw Water/Moisture Ingress)</i>		
Routine Maintenance	Recommended Mean Time between Maintenance of Gland : <i>(Rope / Mechanical Seal)</i>		
	Recommended Mean Time between Alignment Check (if) & Maintenance of Couplings (if) & Shaft		
	Vibration & Noise Checking		
	Suction Manifold Cleaning		
Periodic Maintenance	Spare Parts : <i>nos./types of Spare Parts to be kept in Stock as per DIN 24296 for 2y of operation</i>		
	Bearing Re-Lubrication		
	Shaft Sleeve Replacement		
	Mean Time Between Replacement of Bearings		
	Discharge Valves Maintenance		
	Operational Energy Cost (kW/hr)		
	Pumping Plant Load Factor (PPLF)		
	Cummulative Water Actually Dewatered in LifeTime		



Saves (upto 45%-75%) Spare Parts*



Saves (upto 66%) Man Power*



Saves (upto 70%) Consumables*

Aqua Machineries Private Limited

www.aquapumps.com

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