MINUTES OF DISCUSSION ON INTERIM REPORT FOR THE DEVELOPMENT OF CONCEPT DESIGN OF CP1 COMPONENT CONDUCTED BY THE SUPERINTENDING ENGINEER (DESALINATION), CMWSSB WITH THE PROJECT MANAGEMENT CONSULTANT FOR THE PROPOSED 400MLD SWRO DESALINATION PLANT AT PERUR AND ITS ALLIED WORKS ON 30.04.2020 AT 11.30 AM

Venue: Online Zoom conference call

Officials of CMWSSB

1. Superintending Engineer (Desal)
2. Superintending Engineer (Con) – I/ Executive Engineer (Desal)$_{i/c}$
3. Executive Engineer (Desal)
4. Assistant Executive Engineer (Desal)
5. Assistant Engineer (Desal)

PMC SERVICES

1. Dr.P.Dharmabalan, Project Manager
2. Dr.Ghulam Mustafa, Desalination Expert
3. Michel Morillon, Mechanical Engineer (Desal)
4. S.M.Karthikaeswaran, Environmental Specialist
5. Senthil Ramesh, Civil Engineer

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- The Superintending Engineer (Desal) welcomed the Engineers of Desalination wing and the PMC Consultant members.
- The PMC Consultant Dr.P.Dharmabalan, Project Manager stated that presentation will be made by the specialists in this Zoom meeting and started briefing about the overview of interim report.
- In continuation, Mr. Karthikaeswaran, Environmental Specialist discussed about the datas collected from CMWSSB since January 2020 and about the data gaps. Further, requested to furnish the MFS and drawings for 150MLD, the coordinates of 150MLD intake pipe & outfall pipe, Enter upon the permission for Plant site and Concern To Establish (CTE) letters from TNPCB for 100MLD Nemmeli & Minjur and 150MLD plant under construction at Nemmeli.
- The Superintending Engineer (Desal) informed that the coordinates of 150MLD intake pipe & outfall pipe will be given.
- The PMC Consultant Mr. Karthikaeswaran informed that Topographical survey, Geo technical survey and additional investigation regarding TOC will be taken up by the labs identified by the PMC consultant after the lockdown period. Further, stated that the sampling points for these surveys are also identified.
- Th.Srinivasa Rao, Project Coordinator informed that the labs identified for Seawater Quality sample analysis will be shared with CMWSSB.

- The PMC Consultant Dr.Ghulam Mustafa, Desalination Expert suggested that such a large plant should have a elevation of 10m above Mean Sea Level and the 6.5m above MSL is minimum and may need backfilling of the proposed site of this project. The Superintending Engineer (Con) – I / Executive Engineer $(Desal)_{i/c}$ informed that the Finished Ground Level of existing 100MLD Nemmeli Desalination plant and the 150MLD Nemmeli plant under construction is around +6.50m above MSL with finished ground level of +7.00m above MSL.
- The PMC Consultant Dr.P.Dharmabalan, Project Manager and Dr. Ghulam Mustafa, Desalination Expert stated that they will discuss internally and clarify CMWSSB.
- The PMC Consultant Dr. Ghulam Mustafa Desalination Expert suggested single trench for two pipes on the same alignment to reduce the pipe laying cost at an interval of 600m between the intake and outfall pipes.
- The PMC Consultant Dr. Ghulam Mustafa suggested intake pipes to reach approximately 1700-1800 m and discharge pipe length 900 m to achieve no recirculation in static conditions and informed that the brine dispersion model will be studied by PMC post lockdown and the length of intake and outfall pipes will be optimized on brine dispersion.
- The PMC Consultant Dr. Ghulam Mustafa, Desalination Expert informed that 30% of marine works costs is for mobilization and demobilisation and suggested for plant capacity expansion upto 600MLD.
- The Superintending Engineer (Desal) informed the PMC Consultant to consider the plant size as approved by JICA.
- The PMC Consultant Dr. Ghulam Mustafa, Desalination Expert made inference on the raw water quality assessment in DPR and JICA report.
- The Superintending Engineer (Desal) insisted to take into consideration about the white fibrous particle issue that affects the pre treatment, RO and ERD of the existing 100MLD Nemmeli Desalination Plant while doing the conceptual design of this 400MLD plant.
- The PMC Consultant Dr. Ghulam Mustafa informed that a survey near the intake for a radius of 10Km will be carried out by PMC to study about the white fibrous particle.
- The PMC Consultant Dr. Ghulam Mustafa, Desalination Expert discussed about the analysis made on the 5 years raw seawater to arrive the design envelops for the SWRO parameter and Pretreatment parameters as below:

Sl.No.	Design envelop	Minimum	Maximum
1	TDS	32,000 mg/L	38,500 mg/L
2	Temperature	31.5°C	26.0°C
3	TSS	10 mg/L	300 mg/L
4	Turbidity	1 NTU	150 NTU
5	TOC		
a	Raw water (Nemmeli DSP)	19 mg/L	256 mg/L
b	RO feed water (Nemmeli DSP)	11 mg/L	233 mg/L
c	Raw water (NIOT report)	6 mg/L	7 mg/L

- In this regard, the Superintending Engineer (Desal) informed that the Total Dissolved Solids (TDS) of 41,000 mg/l is considered as maximum value for the existing 100MLD Nemmeli Desalination Plant and the 150MLD Nemmeli Desalination Plant, under construction.
- The PMC Consultant Dr. Ghulam Mustafa, Desalination Expert explained that in choosing higher TDS, RO feed pressure increases and accordingly pump size and cost. The PMC Consultant Mr. Srinivasarao, Project Co-ordinator also echoed about the increase in project cost.
- The PMC Consultant Dr. Ghulam Mustafa, Desalination Expert explained that if the maximum TSS goes beyond the upper limit, then Coagulation & flocculation can be adjusted in the design. The PMC consultant Mr.Michel Morillon, Mechanical Engineer(Desal) added that peak occurs occasionally.
- The Superintending Engineer (Con) – I / Executive Engineer $(Desal)_{i/c}$ insisted to consider the IIT report and accordingly the TOC value.
- The PMC Consultant Dr. Ghulam Mustafa proposed locations for new analyses of raw seawater for intake tower location at 1800 m from the shore, keeping the same pipe direction at 2100 m from the shore and at 2400m from the shore to crosscheck the data delivered by the plant. Also, single sourcing of raw water induces a non-acceptable risk.
- The PMC Consultant Dr. Ghulam Mustafa requested CMWSSB to confirm the design envelops for the SWRO parameter and Pretreatment with the following proposal.

Sl. No.	Design envelop	Minimum	Mean	Maximum
SWRO Parameter envelop				
1	TDS	32,000 mg/L	35,942 mg/L	38,500 mg/L
2	pH	8.00	8.13	8.20
3	Temperature	26.0°C	28.3°C	31.5°C
4	Boron	3.2	3.53	3.80

Sl. No.	Design envelop	Minimum	Mean	Maximum
5	TOC	5	10	20
6	COD	10	30	250
Pre treatment Parameter envelop				
1	Turbidity	1 NTU	12 NTU	150 NTU
2	TSS	10 mg/L	47 mg/L	300 mg/L
3	Hydrocarbon elements	-	-	0.10
4	Algae count (cells per ml)	100	500	30,000
5	Jelly fish attacks	N.A	N.A	Yearly Occurences

- The Superintending Engineer (Desal) informed the PMC Consultant to adopt TDS maximum of 41,000mg/L. The PMC Consultant Dr. Ghulam Mustafa, Desalination Expert explained that in choosing higher TDS, 2nd pass RO to be maintained in addition to the 1st pass RO that increases the project cost and Dr.P.Dharmabalan, Project Manager also agreed with Dr. Ghulam Mustafa.
- The PMC Consultant Dr. Ghulam Mustafa, Desalination Expert accepted to adopt TDS maximum of 39,000mg/L.
- The Superintending Engineer (Desal) informed the PMC Consultant that the treated water shall meet the Indian Standards as per IS 10500:2012 at Customers tap and insisted to maintain Boron $\leq$ 0.5mg/l. The PMC Consultant Dr. Ghulam Mustafa, Desalination Expert explained Boron tolerance upto 1mg/l as per IS 10500:2012 can be achieved by 1st pass RO, for achieving Boron $\leq$ 0.5mg/l, 2nd pass RO to be maintained, which increases project cost.
- The PMC consultant Dr. Ghulam Mustafa, Desalination Expert recommended a minimum of 80mg/L eq $CaCo_3$ for remineralisation.
- The PMC Consultant Dr. Ghulam Mustafa, Desalination Expert stated that possible pre-treatment technologies i.e. Lamella Clarifier + DAF + GDMF and recommended that inclusion of DAF is suitable at the Perur DSP due to consistent presence of white fibre and possibility of red tide.
- The PMC Consultant Dr. Ghulam Mustafa, Desalination Expert furnished the assessment of TSS and TOC reduction by the proposed pre-treatment technologies as below and stated that jar/pilot tests are required to confirm this. However, the final pre-treatment selection depends on the actual concentration of TOC in seawater.

Sl. No.	Pre-treatment	% Reduction	
		TSS	TOC
1	Lamella Clarifier	80-90 % (Heavy particles)	App.30%
2	DAF	70-80 % (light particles)	App.10-20%
3	GDMF	Remaining parts of TSS	Upto 40% of remaining TOC

- The PMC Consultant Mr. Michel Morillon, Mechanical Engineer(Desal) briefed about the 2 half plant configuration. The Superintending Engineer (Con) – I / Executive Engineer (Desal)$_{i/c}$ enquired about the impact of 2 half plant configuration on Capex and Opex.
- The PMC Consultant Mr. Michel Morillon, Mechanical Engineer(Desal) stated that Capex will increase and there is no change in Opex, also informed that the plant availability increases. Dr.P.Dharmabalan, Project Manager mentioned that flexible maintenance for 2 half plant configuration and such concept is adopted in Melbourne Desalination Plant.
- The PMC Consultant Mr. Michel Morillon, Mechanical Engineer(Desal) briefed about Conventional configuration, 3 centre configuration and pressure centre configuration of SWRO system and Energy Recovery Device (ERD).
- The PMC Consultant Mr. Michel Morillon, Mechanical Engineer(Desal) briefed about the high rejection membranes, low rejection membranes and Hybrid configuration (2 SWC4max + 4 SWC5max) and recommended Hybrid configuration for RO Membrane selection.
- The PMC consultant Mr. Srinivasarao, Project Co-ordinator informed that Merits and Demerits of train configuration will be analysed to proceed further.
- The PMC Consultant Mr. Michel Morillon, Mechanical Engineer(Desal) briefed about Energy Recovery Device.
- The Superintending Engineer (Con) – I / Executive Engineer (Desal)$_{i/c}$ informed the PMC Consultant to verify whether a Potable water tank of capacity 3MLD is sufficient and reminded about the submission of Environmental Impact Assessment (EIA) report as soon as possible.
- The international Experts of PMC services expressed that in view of the non availability of transportation facilities across the world due to Corona, they may be allowed to work in their home places until the situation becomes normal.

Sd/-xxx 04.05.2020
Superintending Engineer
(Desalination), CMWSSB

ramalingam
4/5/2020
Executive Engineer
(Desal/400 MLD)

Copy to :
1. PMC Agency