

Summary

- No major issues.
- The chlorine flush (using 3 – 5 ppm of free chlorine) commenced on Saturday 25<sup>th</sup> July.
- Water analysis for commissioning has started with first results received on 30<sup>th</sup> July 2015. Results were as expected.
- Free chlorine has returned to normal operational levels (0.5 ppm free chlorine) and the analytical programme continues.
- All sampled points within acceptable limits for bacterial counts.

Sub-systems status:

1. Source water

- Electrical components and associated wiring installation completed. Testing completed satisfactorily. Water test results were as expected (brackish source, with high TSS, TDS, sodium and fluoride).

2. Reverse osmosis

- Electrical components and associated wiring installation completed. Testing completed satisfactorily.

3. Ice production

- Operating and ready for production volume testing. Water testing showed bacterial count within acceptable limits (Kenya Standard 459-1: 2007 3<sup>rd</sup> Ed).

4. Dispensing systems

- All tested and fully operational. Chlorine flush still detectable in first sample of water, as expected, in Dispenser 1 (full chemical analysis of Dispenser 1 only). Dispenser 1 & 3 both within acceptable limits for bacterial count.

5. Wastewater

- Operational.

6. Power

- Electrical components and associated wiring installation completed. Testing completed satisfactorily.

7. General unit management.

- Inter-tank transfer balancing is now complete.
- Repaired pump now installed and operational.
- All audit points now actioned. Awaiting delivery of custom fabricated drip-tray and pipe cover (Audit status attached below).

PRE-COMMISSIONING AUDIT CARRIED OUT ON THE KAPESE TKBV-REVERSE OSMOSIS FACILITY							
AUDITORS		Osuna Innocent (TKBV-FOS)		ATTENDEES		(BASIS AFRICA) Winfred Rogony	
		John Sambura (TKBV -EHS Advisor)				(BASIS AFRICA) Elijah Kimutai	
DATED:		10 July 2015					
No	OBSERVATION/ITEM DESCRIPTION	RATING	ACTION REQUIRED	ACTION PARTY	DUE DATE	FEED BACK/ REMARKS/ACTION CLOSURE	STATUS AS AT 03 AUGUST 2015
1	Lack of a water meter on the incoming raw water line. This is required to determine/ measure how much water is processed through the RO system	Medium	3/4 -inch water meter should be installed on the incoming raw water line upstream of the 2x10,000 L reception tanks	Basis Africa	18 July 2015	The meter has been bought to be installed when the shipment arrives from Nairobi	No longer relevant
2	The RO -20FT container and all its portable water discharge points are exposed to dust blown by wind from the adjacent car park. This is an avenue for contamination of the water points	High	Shed netting should be placed all around the facility with an entrance to minimise dust ingress	TKBV	18 July 2015	No need - each dispenser point does not hold water. Regular unit cleaning to be done every two hours	Issue has been managed
3	The water supply line into the 2x10,000L reception tanks is exposed (not burried) at the point of approach to the tanks hence becoming a trip hazard to the plant operators. This as well makes the pipeline prone to human damage	Low	Pipeline should be burried	Basis Africa	18 July 2015	The line has been burried	Done
4	The discharge pipeline from the 2x10,000L reception tanks is installed to run on the top surface of the slab hence becoming a trip hazard to the plant operators. This as well makes the pipeline prone to human damage sinne its crossing a walk way	Low	Provide a hard cover over the fragile pipeline and furnish the cover with hazard warning colours as a caution	Basis Africa	15 July 2015	A protective cover for the pipe has been designed and is being fabricated	Non-slip pannel has been put next to pipes to minimise exposure until cover is transported
5	Entry of the water pipes into the RO-20FT container is via holes drilled throught the wall of the container. These holes have some clearance that can allow for passage of vermin into the RO unit	Low	Provide sealant to fill in the clearances around the pipes at entry holes into the container	Basis Africa	15 July 2015	Plastic re-inforcement and form have been put in the holes	Done
6	The pipe net work was observed not labelled. Labelling is required for easy identification , trouble shooting and repairs	Low	Pipelines should be labelled for easy identification of raw water, reject water, chemical and waste water lines	Basis Africa	18 July 2015	Proper labelling has been put in place	Done
7	The raw water suction pump-motor set was observed installed directly on the floor with out any rigid mounting. This will lead to vibration of the pump-motor set hence leading to pipe leaks, loosening of electrical terminas and faster motor-pump failure	Medium	Pump-motor assembly should be mounted above the ground surface on a rigid base plate	Basis Africa	15 July 2015	Mounting for the pump has been designed and is being fabricated	Done
8	The chlorine dosing pump rate is not synchronised with the infeed water flow rates. This creates a possibility of over or under dosing of the water with chlorine	Medium	Provide for mechanism to sychronise water flow rate with chlorine dosing rates so that accurate ppm is dosed into the water stream & maintained consistent/homogenous	Basis Africa	16 July 2015	This will be an improvement for the source water system. We will manually operate the system until will we find the optimum operating conditions	Done
9	The pH adjustor dosing pump rates was not synchronised with the water flow rates. This creates a possibility of over or under dosing of the water with pH adjustor	Medium	Provide for a pH analyser on the water pipeline to be synchronised with the pH adjustor dosing pump. So that accurate pH adjustor ppm can be dosed into the water stream consistently.	Basis Africa	17 July 2015	This will be an improvement for the system. We will manually operate the system until will we find the optimum operating conditions	Done
10	There were no safety signage on the facility i.e. Cautioning on electrical hazards, chemical hazards, PPE requirements, fire fighting equipment	Medium	Need to furnish the facility with appropriate EHS safety signage	Basis Africa	18 July 2015	Signs are on site and will be installed once all the systems have been set up	All signage on site.Waiting for final retach
11	There was no system flow chart, process flow diagrams/drawings or equipment labels/name tags. This is useful for the end user/client to know the equipment and be able to audit it on routine basis	Medium	Labelling of equipment/ name tag vessels and provide for a system flow diagram inside the premise	Basis Africa	18 July 2015	Labels have been put on. Drawings, flow charts and P & ID will be hung once they have been approved	Done
12	There is poor space management with in 20FT container, the area is congested with limited operator space. The design is not ergonomic as a number of isolation valves, guages and pump sets are inaccessible to the operator during normal operation. The sytem would require major overhaul in order to replace the plastic secondary permeate tank	Medium	Develop a lessons learned assessment and a design proposal that captures all the elements of ergonomics, space management, repair and maintainance considerations. Submit to client proposal to place system in 40FT container	Basis Africa	18 July 2015	Space will be considered for subsequent projects.	Will be applied to design of version 2
13	There was no emergency lighting installed in the 20FT unit which is required Incase of a power black out	Medium	Install emergency lighting	Basis Africa	18 July 2015	The light has been bought, consultatation on the source of power for the light is ongoing.	Done
14	Pipelines inside the 20FT unit were not secured appropriately and were sagging	Medium	Strap all piping appropriately to avoid sagging	Basis Africa	18 July 2015	Pipes are now properly secured	Done
15	The chemicals storage cabinet was made of weld mesh and did not have drip trays	Medium	Provide for drip trays in the chemicals storage cabinet	Basis Africa	18 July 2015	Drip trays have been designed and is being fabricated	To be trucked up from Nairobi
16	The waste water sump tank was burried close to the ground surface & any personnel mistakenly passing over it would fall through. Barrier tape was placed around it and this is not sustainable	Medium	Provide hard barrier (sustainable) around the tank	Basis Africa	18 July 2015	The sump has been buried and temporary barrier put in place. Further improvements for the area will be done	Done
17	The waste water underground sump tank did not have a full closing cover over its top. This would allow snakes to crawl into it.	Medium	Provide a full sealing cover over the sump tank	Basis Africa	18 July 2015	Full sealing has been put in place and covered	Done
18	Portable water outlets did not have labels, usage instruction/ operating instructions hence new users would find difficulty operating them	Medium	Labels and usage instructions should be posted on the portable water points	Basis Africa	18 July 2015	Labels are on site and will placed in once the sytem is ready	Waiting for touch-up painting
19	System was tested and run without evidence of inspection from the TKBV electrical authority	Medium	TKBV electrical authority has been be booked to inspect the installation	TKBV	13 July 2015	The inspection has been done and the system is now safe to operate.	Done