TÜV Rheinland

Alliance for Water Stewardship Assessment Report

as per

AWS Standard Version 1.0

For

ECOLAB (TAICANG) TECHNOLOGY CO., LTD.

No. 7, Middle Xiexin Road, Taicang Port,

Development Zone, Taicang, Jiangsu, P. R.

China

Prepared by: TUV Rheinland
Cert. Number: AWS-01.0-INT-TUR-00-08-0001-0001
Version:0
Date: 29th August 2018

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Contents

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Client and Certification Details:

Client Name:	Ecolab(Taicang) Technology Co., Ltd
Audit location:	7 Middle Xiexin Road, Taicang Port Development Zone, Taicang City, Jiangsu Province
Country:	China
Activities/Processes:	Clean agent/disinfectant manufacturing
Contact person:	Jim Chen
Contact email:	Jim.chen@ecolab.com
Company website:	https://www.ecolab.com.cn/
AWS Reference Number:	AWS-01.0-INT-TUR-00-08-0001-0001
Type of audit:	Re-assessment
Audit date(s):	29th August 2018
Auditor Team	Lead Auditor – Barton Shi; Auditor – Ian Jiang
Audit Standard:	AWS
Proposed date of next audit:	29th August 2019
Audit report completed by:	Ian Jiang
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Executive Summary

The scope of service covers the conformity assessment of water management and usage for Ecolab(Taicang) Technology Co., Ltd The assessment was completed in compliance with the AWS Standard Version 1.0 dated on July 2015.

The Ecolab(Taicang) Technology Co., Ltd is a clean agent manufacturer, producing variety of food contact clean agent, hand wash or disinfector under the brand of ecolab. The whole facility occupied about 168,000 square meters, and has about 100 employees. The annual production capacity is about 70,000 tons. It located at the Taicang Port Economic and Developing Zone, Taicang City, Jiangsu Province, China. The main production process is mixing-filling-packing. Around the site are some factories including papermaking facility and power plants etc. The site only uses municipal water provided by local water company. The wastewater was pre-treated in the wastewater treatment plant, and then emitted to the municipal wastewater treatment plant for further treatment.

Findings summary:

- Total twelve findings were raised during the audit, including one minor non-conformity and eleven observations.

Certification level: Core
After thorough evaluation of the non-conformance and observations, in compliance with the AWS Certification Requirement v1.0 TUV Rheinland auditor team would recommend to reward Ecolab(Taicang) Technology Co., Ltd AWS Core Certified status. Surveillance audit should be conducted on an annual basis.

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Scope of Assessment

Client factories main products	Clean agent, disinfectant
Client factories production processes	Mixing-Filling-Packing
Assessment preparations activities include:	Document review, stakeholder comments collecting
Assessment on-site activities includes:	Document review, management interview, employee interview, onsite tour
Assessment follow-up activities includes (in any):	Non-conformity follow up

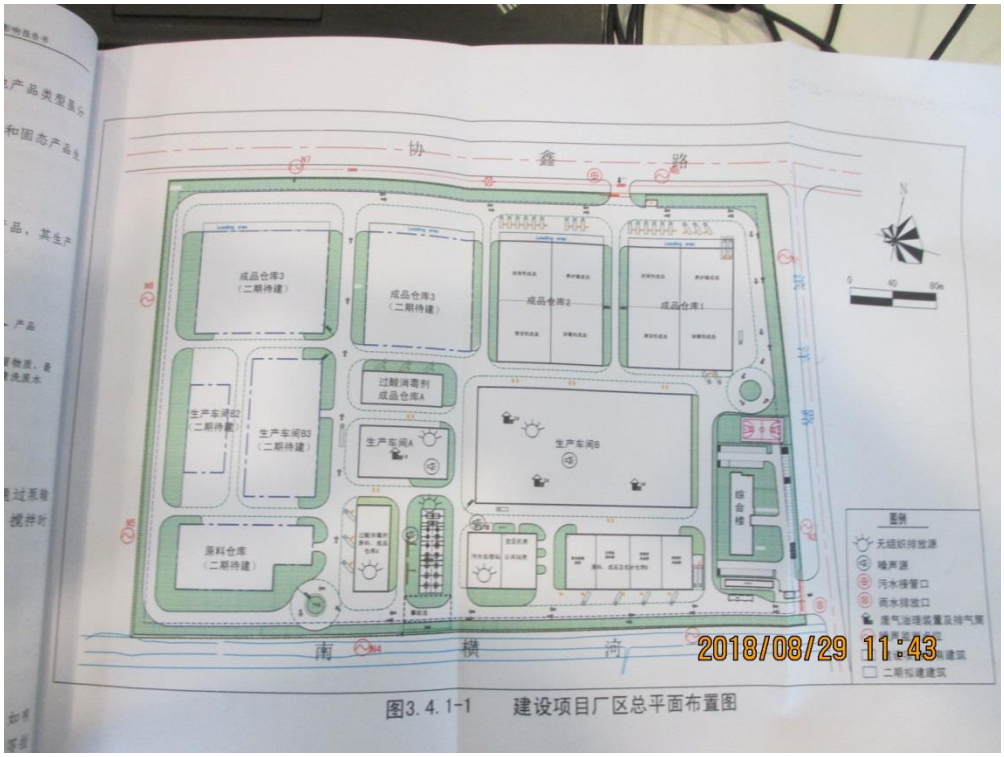
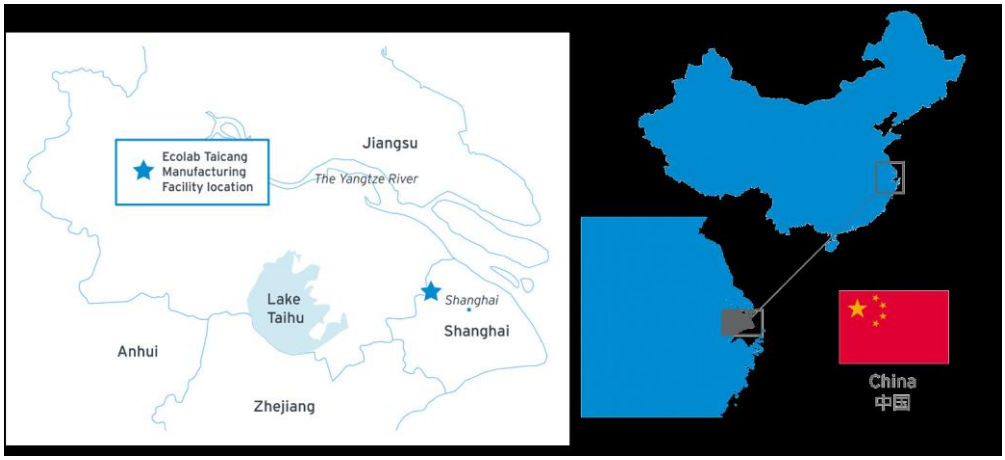


图3.4.1-1 建设项目厂区总平面布置图

Description of the Catchment

The plant is located at the Taicang Port Development Zone, part of the Taihu Basin, much of which is comprised of the Yangtze River delta. The total occupied area is about 40,000 hectares, defined by the upstream area that contribute to the location of the site, and the downstream area influenced by the site. The plant used the water all supplied by the municipal water from the local water company.



Summary of shared Water Challenges

The plant has identified the shared water challenges as below:

- Water pollution of the catchment,
- Water resource quality (Yangtse River),
- N/S water project: water resource reduction,
- Salty tide of Yangtse River,
- Inundation.

Water challenge	Relevance/ rationale for site	Rationale for prioritization
Water pollution	Important for water treatment	The water pollution will cause upgrade water standard and increase WW treatment cost, and will increase discharge fee of effluent WW
Water resource quality (Yangtse River)	Tap water quality, increased cost	Critical issue that adds malfunction cost
N/S water project: water resource reduction	increased cost	Minimum impact
Salty tide of Yangtse River	Tap water quality	The salty tide may happen in the middle of the year. During this period, the water quality is not suitable for production, and the Taicang Emergency water source will be used.
Inundation	Treat to production	The current facility can handle the inundation once-in-a-century

Stakeholder List and engagement

Stakeholder (Name/Group)	Type of stakeholder	Water-related concerns	Level of interest	Ability to influence-be influenced	Engagement to date
Environmental Protection Bureau,Taicang Industrial development zone	Government	Water pollution in catchment	Moderate	Moderate–Moderate	Quarterly environmental meeting of Industrial development zone
Village committee lead-Xu Weiguo	Community	Tap water quality	Low	Low – High	IM working group
Fuqiao Town deputy - Lu Lijing	Community	Tap water quality	Low	Low – High	IM working group

Neighbour plant	Neighbour Plant	Upgrade of effluent waste water standard	Moderate	Low – Moderate	Industrial development zone environmental meeting
Waste water treatment plant (Taicang Municipal Water Treatment Plant)-Mr. Fan	WWT Plant (Municipal)	Upgrade of effluent waste water standard	Moderate	Low – High	Services contract (every two month)
Water Supply Company (Taicang Municipal Water Plant)	Tap water supplier (Municipal)	water resource quality (Yangtze River)	Moderate	Low – Moderate	Services contract
Taicang water bureau	Government-Water	Water pollution in catchment	Moderate	Low – Moderate	Government notice from water bureau
		water resource quality (Yangtze River)	Moderate		
Industrial Park Committee-Taicang Industrial development zone	Government-Environment	Water pollution in catchment	Moderate	Moderate – Moderate	Quarterly environmental meeting of Industrial development zone
Economy and Information Department	Government-Environment	water saving in catchment	Moderate	Low – Moderate	Government notice from Economy and Information Department
Suppliers (main ones)	Supplier - Raw material	water saving in indirect water consumption	Low	Moderate – Moderate	annually water related investigation
3rd party staff / contractors for waste water treatment – Yan Zheng	Supplier - WWT service	recycle waste water quality	High	high - Moderate	daily operation
Ecolab Taicang plant all staff	employee	cleaning drinking water	High	high - high	daily operation
		water saving in Taicang plant	Moderate		
		effluent waste water quality	Moderate		
		production water quality	Moderate		
Waste water effluent downstream stakeholder	downstream stakeholders	Water pollution in catchment	Moderate	Low – Moderate	Quarterly environmental meeting of Industrial development zone
Water source upstream stakeholder	upstream stakeholders	water resource quality (Yangtze River)	Moderate	Low – Moderate	Quarterly environmental meeting of Industrial development zone

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Indicators Checklists

Per requirements set from the AWS certification requirements v1.0, below is a checklist of all the CORE AWS indicators. The documents reviewed/ processes reviewed are also indicated.

STEP	Criteria/ Indicators	Documents/Process reviewed
COMMIT	1.1 Establish a leadership commitment on water stewardship: 1.1.1 Signed and publicly disclosed statement that explicitly covers all requirements	☒Statement in place, Signed on July 19,2018 by new plant manager Mr. Xiaohui Cao, which covered AWS requirements and met HQs' guidelines. ☐Other :
	1.2 Develop a water stewardship policy: 1.2.1 Publicly available policy that meets all requirements	☒Water stewardship policy posted public area and conducted within plants. ☐Other :
GATHER & UNDERSTAND	2.1 Define the physical scope: 2.1.1 Documentation or map of the site's boundaries 2.1.2 Names and location of water sources, including both water service provider (if applicable) and ultimate source water 2.1.3 Names and location of effluent discharge points, including both water service provider (if applicable) and ultimate receiving water body 2.1.4 Geographical description or map of the catchment(s)	☒Documentation/map of the site's boundaries. The map and layout of water supply and discharge is available ☒ Names and location of water sources defined, and geographical description is clear. ☒ Names and location of effluent discharge points were permitted and followed. ☐Other :
	2.2 Identify stakeholders, their water-related challenges and the site's sphere of Influence: 2.2.1 List of stakeholders, descriptions of prior engagements and summaries of their water-related challenges 2.2.2 Description of the site's sphere of influence	☒List of stakeholders was defined and updated on July 1, 2018 ☒Water-related challenges were that the Water pollution and water resource quality (Yangtze River), which was updated now. ☒Other : the influence of water related was identified and controlled.

STEP	Criteria/ Indicators	Documents/Process reviewed
	2.3 Gather water-related data for the catchment: 2.3.1 List of relevant aspects of catchment plan(s), significant publicly led initiatives and/or relevant water-related public policy goals for the site 2.3.2 List, and description of relevance, of all applicable water-related legal and regulatory requirements, including legally defined and customary water rights and water-use rights 2.3.3 Catchment water balance by temporally relevant time unit and commentary on future supply and demand trends 2.3.4 Appropriate and credibly measured data to represent the physical, chemical and biological status of the site's water source(s) by temporally relevant time unit, and commentary on any anticipated future changes in water quality 2.3.5 Documentation identifying Important Water-Related Areas, including a description of their current status and commentary on future trends 2.3.6 Existing, publicly available reports or plans that assess water-related infrastructure, preferably with content exploring current and projected sufficiency to meet the needs of water uses in the catchment, and exposure to extreme events	☒Water-related public policy goals has been launched. ☒Applicable water-related legal and regulatory requirements was gathered and assessed once every 6 months. ☒Documentation identifying Important Water-Related Areas are Taicang port, Yangtze River and industrial zone. ☒ Other : Domestic water discharge agreement with Taichang water treatment Co. on Jan 4, 2011 Zero liquid industrial waste water discharge is on-going.

STEP	Criteria/ Indicators	Documents/Process reviewed
	2.4 Gather water-related data for the site: 2.4.1 Copies of existing water stewardship and incident response plans 2.4.2 Site water balance (in Mm^3 or m^3) by temporally relevant time unit and water-use intensity metric (Mm^3 or m^3 per unit of production or service) 2.4.3 Appropriate and credibly measured data to represent the physical, chemical and biological status of the site's direct and outsourced water effluent by temporally relevant time unit, and possible pollution sources (if noted) 2.4.4 Inventory of all material water-related chemicals used or stored on-site that are possible causes of water pollution 2.4.5 Documentation identifying existing, or historic, onsite Important Water-Related Areas, including a description of their status 2.4.6 List of annual water-related costs, revenues and description/quantification of social, environmental or economic value generated by the site to the catchment	☒ Water stewardship and incident response plans （应急001) was issued on Nov 6, 2013 ☒ Site water balance (in Mm^3 or m^3) by defined time and peak consume tendency. ☒ physical, chemical and biological status of the site's direct and outsourced water effluent were defined as COD, TP, NH3-N, PH etc. ☐Other :

STEP	Criteria/ Indicators	Documents/Process reviewed
	2.5 Improve the site's understanding of its indirect water use: 2.5.1 List of primary inputs with their associated embedded annual (or better) water use and (where known) their country/region/or catchment of origin with its level of water stress 2.5.2 List of outsourced services that consume water or affect water quality and both (A) estimated annual (or better) water withdrawals listed by outsourced services (Mm3 or m3) and (B) appropriate and credibly measured data to represent the physical, chemical and biological status of the outsourced annual (or better) water effluent	☒List of primary inputs was updated as per investigation results ☒List of outsourced services was available by investigating supply chain water use. ☐Other :
	2.6 Understand shared water-related challenges in the catchment: 2.6.1 Prioritized and justified list of shared water challenges that also considers drivers and notes related to public-sector agency efforts	☒List of shared water challenges was defined and updated on July 1, 2018 but not follow the actual situations ☐Other :
	2.7 Understand and prioritize the site's water risks and opportunities: 2.7.1 Prioritized list of water risks facing the site, noting severity of impact and likelihood within a given time frame 2.7.2 Prioritized list of water-related opportunities for the site 2.7.3 Estimate of potential savings/value creation	☒List of water risks facing the site is updated on July 1, 2018 and available ☒List of water-related opportunities should be more in detail. ☒ Other: Estimate of potential savings/value was issued on regular program cycle.
PLAN	3.1 Develop a system that promotes and evaluates water-related legal compliance: 3.1.1 Documented description of system, including the processes to evaluate compliance and the names of those responsible and accountable for legal compliance	☒Documented description of system ☒ Other : water-related legal compliance was updated on May 25, 2018

STEP	Criteria/ Indicators	Documents/Process reviewed
	3.2 Create a site water stewardship strategy and plan: 3.2.1 Available water stewardship strategy 3.2.2 Available plan that meets all component requirements and addresses site risks, opportunities and stakeholder shared water challenges	☒ The site has developed the Water stewardship strategy addressing the identified shared water challenges. ☒ The site has established the water stewardship plan for 2018, which was adjusted according to the plan of 2017. ☐Other :
	3.3 Demonstrate responsiveness and resilience to water-related risks into the site's incident response plan: 3.3.1 A description of the site's efforts to be responsive and resilient to water-related issues and/or risks in an appropriate plan	☒In the plan, the site has incorporated the risk of potential leak, temporary water suspend and other scenarios. ☒Other : Water stewardship and incident response plans （应急001) was issued on Nov 6, 2013
	3.4 Notify the relevant (catchment) authority of the site's water stewardship plans: 3.4.1 Documented evidence of communicating the site's plan to the relevant catchment authority/agency	☒The site communicate the plan with the zone management authority. ☒Other : Registered by Taicang EPB on Oct 24, 2017 (No. 32058520170089-M),
IMPLEMENT	4.1 Comply with water-related legal and regulatory requirements: 4.1.1 Documentation demonstrating compliance 4.1.2 (Catchments with stakeholders who have an unmet human right to safe drinking water and sanitation) Documentation of efforts to work with relevant public sector agencies to fulfil human right to safe drinking water and sanitation.	☒The applicable laws and regulations were collected and updated via the communication with the zone management authority. Based on research, no violation happened since last three years. ☐Other :

STEP	Criteria/ Indicators	Documents/Process reviewed
	4.2 Maintain or improve site water balance: 4.2.1 Measurement-based evidence showing that targets have been met 4.2.2 (Water scarce catchments only) Evidence of continual decrease or best practice 4.2.3 (Sites wishing to increase withdrawals in water scarce catchments only) Evidence of no net increase in water scarcity	☒ The site has implemented some water reduction projects to improve the water balance, including condensation water recycle, cooling water saving and multiple use of the water etc. ☒Based on the document check, both the total water consumption and water consumption per ton product were reduced. ☐Other :
	4.3 Maintain or improve site water quality: 4.3.1 Measurement-based evidence showing that targets have been met 4.3.2 (Water quality-stressed catchments only) Evidence of continual improvement or best practice 4.3.3 (Sites wishing to increase effluent levels of water quality parameters of concern in water quality-stressed catchments only) Evidence of no net degradation in water quality in the catchment	☒The site has implemented below measure to monitor the water quality: online testing system, manual testing, and third party testing. Based on the document, the effluent quality is in compliance with the legal requirements. ☒ Based on the search on the local water bureau, the water quality of the catchment is maintain in 2017 and 2018. ☐Other :
	4.4 Maintain or improve the status of the site's Important Water-Related Areas: 4.4.1 Documented evidence showing that targets have been met 4.4.2 (Degraded Important Water-Related Area catchments only) Evidence of continual improvement or best practice	☒The site continuous pay attention to the IWRA including water supplier and municipal wastewater treatment plant. So far, the operation of them is normal. ☐Other :
	4.5 Participate positively in catchment governance: 4.5.1 Documented evidence of the site's ongoing efforts to contribute to good catchment governance 4.5.2 (Weak water governance catchments only) Evidence of continual improvement or best practice	☒The site has participated the meeting held by local authority. Also the site joined in the IM group of zone authority and surround factories, for routine water topics and other issues. ☐Other:

STEP	Criteria/ Indicators	Documents/Process reviewed
	4.6 Maintain or improve indirect water use within the catchment: 4.6.1 List of suppliers and service providers, along with the actions they have taken as a result of the site's engagement relating to indirect water use	☒A list of suppliers, mainly raw materials and packing materials were provided for review. ☒ The site has conduct the water use investigation on the supplier, like questionnaires filling, to get an overview of the suppliers. ☐Other :
	4.7 Provide access to safe drinking water, adequate sanitation and hygiene awareness (WASH) for workers on-site: 4.7.1 List of actions taken to provide workers access to safe water, effective sanitation and protective hygiene (WASH) on-site	☒The site monitor the water quality by checking the disclosed information of the water suppliers, also, the site has conducted potable water testing to ensure the safety of the water. ☐Other :
	4.8 Notify the owners of shared water-related infrastructure of any concerns: 4.8.1 List of individuals contacted and key messages relayed	☒The site has report the water management plan and concerns to the zone management authority. ☐Other :
EVALUATE	5.1 Evaluate the site's water stewardship performance, risks and benefits in the catchment context: 5.1.1 Post-implementation data and narrative discussion of performance and context (including water risk) 5.1.2 Total amount of water-related costs, cost savings and value creation for the site based upon the actions outlined in 3.2 (drawn from data gathered in 2.4.6) 5.1.3 Updated data for indicator 2.4.7 on catchment shared value creation based upon the actions outlined in 3.2	☒The total water consumption reduced from the 67650 tons of year 2016 to 59625 tons of year 2017. The total water related cost was roughly 900,000 RMB. ☐Other :

STEP	Criteria/ Indicators	Documents/Process reviewed
	5.2 Evaluate water-related emergency incidents and extreme events: 5.2.1 Documented evidence (e.g., annual review and proposed measures)	☒ The emergency respond plan was established and registered by local bureau. The sites conducted the drill annually. The secondary containers were equipped to prevent accidently leak. Secondary tanks were built to cope with the malfunction of the wastewater treatment plant. ☐Other :
	5.3 Consult stakeholders on water-related performance: 5.3.1 Commentary by the identified stakeholders	☒The site obtained the commentary from the zone management authority, the result was satisfied. ☐Other :
	5.4 Update water stewardship and incident response plans: 5.4.1 Modifications to water stewardship and incident response plans incorporating relevant information	☒Water stewardship plan was updated based on the review of the implementation of 2017. New emergency plan was under compiling and planned to issue at the end of 2018. ☐Other :
COMMUNICATE & DISCLOSE	6.1 Disclose water-related internal governance: 6.1.1 Disclosed and publicly available summary of governance at the site, including those accountable for compliance with water-related laws and regulations	☒ The site has disclosed the water-related governance and organization chart to zone management authority, but it is not public available. ☐Other :
	6.2 Disclose annual site water stewardship performance: 6.2.1 Disclosed summary of site's water stewardship results	☒ The sites release the Sustainable Development Report annually. The water stewardship performance is included in the report. ☐Other :
	6.3 Disclose efforts to address shared water challenges: 6.3.1 Disclosed and publicly available description of shared challenges and summary of actions taken to engage stakeholders (including public-sector agencies)	☒ The site has participated the initiative, seminar held by NGO and zone management authority. ☐Other :

STEP	Criteria/ Indicators	Documents/Process reviewed
	6.4 Drive transparency in water-related compliance: 6.4.1 Available list of water-related compliance violations with corresponding corrective actions	☒ No violation has been identified via the internet research and stakeholder engagement. ☐Other :
	6.5 Increase awareness of water issues within the site: 6.5.1 Record of awareness efforts (dates and communication) and, if possible, level of awareness	☒The site has implemented actions to raise the internal awareness of water issues, such as training, communication, bulletin, and award to good example. ☐Other :

Assessment Non-conformities:

Major non-conformities:

- No Major non-conformity has been raised during the audit.

Minor non-conformities:

NO.	AWS criteria's/indicators	Description of non-conformity	Client's response and Documentation provided	Auditors' assessment
1	6.1.1 Disclosed and publicly available summary of governance at the site, including those accountable for compliance with water-related laws and regulations	The site has disclosed the water-related governance and organization chart to zone management authority, but it is not public available.	Will provide accordingly after internal Corrective Action Plan meeting	Minor non-conformity, will review the CAP provided once ready.

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Observations:

NO.	Description of Observation	Client's response and Documentation provided	Auditors' assessment
1	Suggest updating and prioritizing water-related challenges list according status quo, e.g.), N/S water project: water resource reduction could be change from 4 to 5, and Salty tide of etc could be revised from 3 to 4.	(TBC)	Observation
2	Suggest obtaining more investigation on the outsourced services that consume water or affect water quality.	(TBC)	Observation
3	Suggest making the list of water-related opportunities in detail to make related responsible persons to understand and prioritize the site's water risks and opportunities.	(TBC)	Observation
4	Suggest tracking and regularly reviewing the target, such as the target of 2017 about water saving from 8050T to 4050 on cooling tower. The review of project can be described in following review report.	(TBC)	Observation
5	Suggest moving the waste tank with liquid from the supplier to the place far from the rainwater outlet to avoid potential chemical leakage risk.	(TBC)	Observation
6	The four effect evaporator equipment was newly set, suggest to label the water pipe with proper color and flowing directions and stipulated the control requirement of the related meter.	(TBC)	Observation
7	In DI workshop, the supplied water quality warning alarm triggered 24hr ago, but no promptly response.	(TBC)	Observation
8	The conductivity in DI workshop is indicated at 0.5, but currently no regulation about conductivity. Suggest to defined it because it is significant related to the water consumption.	(TBC)	Observation
9	Suggest to post the notification of water saving in water shower room. And the tap and the flush toilet could be equipped with water saving labeled ones.	(TBC)	Observation
10	The site has disclosed some water stewardship performance in the corporate sustainable development report. Suggest to disclose the comprehensive performance via other method, like website.	(TBC)	Observation
11	During 2017~2018, the site has no water-related violation, suggest to disclosed this information via public approach.	(TBC)	Observation

Summary and Conclusion of the Assessment

In assessment of the water stewardship performance of the Ecolab (Taicang) Technology Co., Ltd, it is apparent that the sites put considerable effort to adopt the AWS standard into the management system.
One minor-conformity was raised during the assessment. Ecolab has requested to make some improvement to address the Non-conformity to fully compliant to the standard.

Eleven observations were issued during this audit, auditors have pointed out the areas that to be considered for improvement in the following implementation, however, no action is demanded during the audit cycle.

All evidences provided to TUV Rheinland to address the non-conformity was reviewed and evaluated to ensure the compliance to the AWS standard. All actions were accepted as sufficient to close the non-conformity.

In conclusion, the Ecolab(Taicang) Technology Co., Ltd met the AWS standard- Core Level.

Opportunity for Improvement and significant Impacts achieved

Because of the cultural characteristic, normally it is difficult to communicate with the local resident about the water issue. While the zone management authority may acts as the bridge between the site and bridge, it is recommend that site may develop a formal method to consulted with the local resident representatives for any potential water issues.

In addition to the work done inside the plant, the process of implementing the water stewardship plan resulted in greater understanding of ongoing, external, government-related initiatives that support efforts to manage operating risks, including:

- **Storm water management,** preventing untreated runoff to discharge into the river. All manufacturing plants have been asked to build storm water tanks.
- **River Sediment Management:** Local government cleans up river sediment every three to five years, helping return to the water to its natural state. The Nan Hun River, the small river near Ecolab's plant, had sediment removed in 2014.
- **River reconnectivity management:** Reconnection of river sections within the industrial park to restore the natural conditions of the rivers.
- **Sewage main pipe network:** A sewage collection main pipe network for the industrial park (completed in 2014) that allows wastewater discharge from plants to be collected and sent to a local wastewater treatment plant.
- **One plant, one pipe:** All plants in the development zone are required to discharge wastewater through a dedicated pipe that connects to the main network. An online device will be installed to monitor the quality of wastewater discharged from individual plants, including Ecolab's plant.
- **Optimizing Intermediate Bulk Container cleaning process.** This was achieved through increasing the pressure of the cleaning water, changing the shower heads and shortening cleaning time.
    - Reduced cleaning frequency and cleaning time of product holding tanks and fillers (from 41 minutes to 36 minutes).
    - Reused process wash water, achieved by establishing a standard and installing tanks for reused water.
    - Replaced wastewater treatment plant defoamer product to improve membrane performance.

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Conclusion and Recommendation

With the satisfactory evidence reviewed during the audit at Ecolab(Taicang) Technology Co., Ltd, No. 7, Middle Xiexin Road, Taicang Port, Development Zone, Taicang, Jiangsu, P. R.China, TUV Rheinland recommend that Ecolab(Taicang) Technology Co., Ltd to be rewarded AWS Core Certified Status with a surveillance audit interval of annual frequency.