SKILLS FRAMEWORK FOR BIOPHARMACEUTICALS MANUFACTURING
TECHNICAL SKILLS & COMPETENCIES (TSC) REFERENCE DOCUMENT

TSC Category	Engineering and Maintenance					
TSC	Utilities Management					
TSC Description	Develop plans to meet manufacturing utilities and energy requirements while conserving and managing the use of energy and utilities by the facility					
TSC Proficiency Description	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**
			BPM-ENM-3013-1.1	**BPM-ENM-4013-1.1**	**BPM-ENM-5013-1.1**	
			Analyse utilities and energy requirements of manufacturing processes	Review utilities and energy usage to identify methods to conserve use	Formulate energy and utilities management procedures to ensure manufacturing and organisational requirements are met and contingency plans are in place	
Knowledge			• Current Good Manufacturing Practices (CGMPs) • Methods of reading and collecting data on utilities and energy usage • Uses of utilities and energy in biopharmaceuticals manufacturing • Types of physical measurement instruments • Types of energy measurement instruments • Techniques used to track inputs to and outputs of manufacturing processes • Techniques to project utilities and energy requirements for manufacturing processes • Environmental implications of manufacturing processes	• Methods of scheduling manufacturing processes to optimise utilities and energy use • Types of equipment and system faults which can result in utilities and energy waste • Elements of costs associated with supply of utilities and energy • Methods of evaluating utilities and energy suppliers	• Methods of managing utilities and energy use in a biopharmaceuticals manufacturing facility • Methods of contingency planning • Long-term lifecycle cost of utilities and energy • Corporate and social responsibility policies related to conservation of utilities and energy	

Abilities			• Consolidate data on utilities and energy usage • Interpret utilities and energy usage readings • Map the usage patterns of utilities and energy in manufacturing processes • Monitor utilities and energy usage rates • Analyse historical data and production forecasts to project utilities and energy requirements for manufacturing processes • Identify variances against allocated budget and performance standards • Consider environmental factors associated with manufacturing utilities and energy requirements • Document analysis and findings	• Identify factors that affect the efficient use of utilities and energy during manufacturing processes • Identify sources of utilities and energy waste • Develop improvement initiatives for utilities and energy use • Develop methods to manage utilities and energy more efficiently whilst meeting manufacturing requirements • Implement procedures to support efficient utilities and energy utilisation, in collaboration with relevant stakeholders • Identify existing and potential suppliers of utilities and energy • Implement criteria to select utilities and energy suppliers • Manage contingency procedures in the event of supply failure to reduce disruptions and ensure the continuity of manufacturing processes	• Formulate utilities and energy management procedures and guidelines • Devise criteria for selecting utilities and energy suppliers • Formulate contingency procedures in the event of failure of supply of utilities or energy • Establish additional contingency plans and procedures as necessary taking into account Current Good Manufacturing Practices (CGMPs) • Advise on the most efficient scheduling of manufacturing to meet the dual objectives of production outcomes and energy and utilities efficiency • Lead energy conservation and improvement projects • Establish committees and consultative mechanisms to support continuous improvement of manufacturing processes related to utilities and energy conservation	