National Occupational Standard for

Manufacturing Vice President

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2 A COMPETENCY FRAMEWORK FOR INDIVIDUALS WORKING IN THE BIO-ECONOMY

2.1 What is a National Occupational Standard?

In Canada, National Occupational Standards are industry-developed and validated documents that identify and group tasks/competencies associated with a particular occupation. They also describe the knowledge and skills that a worker must demonstrate to be considered competent.

The former Alliance of Sector Councils (TASC) outlined 11 guiding principles for creating National Occupational Standards (NOS). NOS for the Canadian bio-economy meet all 11 principles and are developed to meet the current and future human capital management needs of the Canadian bio-economy.

2.2 How are we defining a competency?

We define a competency as ***a set of related behaviors that describe successful performance in a designated area. It is a behavioural expression of how people integrate knowledge, skills, attributes, and attitudes to produce a value-adding result in a defined situation.***

The competency statement includes a description that integrates skills, knowledge, and actions into a sequence of activities that deliver a value-added product or service.

Performance Indicators is the term we use for the behaviours grouped under each competency that describe the level of mastery the incumbent role must demonstrate when executing a task.

For this project, we have organized the competencies into four categories.

Core Competencies are those competencies that describe the "essence of the role" — that is, they are the one to three most critical competencies that may be applicable across multiple roles in a function or job family. All levels of personnel in this function would typically share them. These competencies may also act as qualifiers that differentiate the function from other functions.

Technical Competencies are those competencies related to specific roles or professions that enable an individual to work, function, and succeed in that role. They address the various responsibilities that job incumbents encounter in a role. For example, a surgeon's technical competencies would encompass multiple surgical tools, techniques, and conditions that could be part of the position.

Similarly, technical competencies for a lawyer would contain various legal situations that they encounter in the context of a particular field of practice.

Regulatory Competencies are those competencies that describe compliance with prescribed practices and mandated obligations under applicable laws, regulations, and industry standards. They ensure that critical work processes are implemented and integrated into all work activities. They are of absolute importance where economic behaviours can impact human conditions.

Personal/professional Competencies are those competencies that enable an individual to be successful working with others and fulfilling their responsibilities in a work context. Personal and professional competencies are not necessarily role specific.

2.3 Levels of complexity of work

It is important to recognize how the complexity of work varies along an organizational continuum. At one end of this continuum is low-complexity, clearly-defined, task-driven work. At the other end of the continuum is work that is higher in complexity, not as well-defined, and requires higher-level thinking and decision-making skills and a greater degree of autonomy. Results are recognised over a longer period of time and are more difficult to assess.

Figure 1: Demonstrates how the level of complexity changes with the role responsibilities

Complexity Level	Examples of Work at Different Complexity Levels	Typical Roles/Titles
Most Complex	Construct and pursue worldwide strategic plans in large corporations.	CEOs of the largest trans-global corporations
	Construct and pursue worldwide strategic plans.	C-suite executives at multi-national organizations
	Lead the accumulated impact of multiple business units.	C-suite executive at large, multi-location organizations
	Optimize the function of a single business unit or corporate support staff.	General manager; plant manager
	Manage multiple, interdependent projects; balance resources among departments.	Engineering manager
	Plan and carry out sequential projects while considering contingencies and alternatives.	Maintenance manager
	Accumulate information to diagnose and anticipate problems; proactive; notice trends.	Maintenance technician
Least Complex	Follow predefined procedures; seek help when encountering an obstacle. The ability to anticipate problems is not expected.	Maintenance labourer

We define the complexity levels within the profiles at four levels:

Foundational — performance focus is on the execution of procedures and tasks involving own job role.

Operational — performance focus includes some discretion in the planning and executing of work. The work typically includes assessing the quality of the work outcomes and taking corrective action to ensure quality.

Specialist — performance focus is on translating goals and standards to team members and ensuring that work done under the person's responsibility area complies with all corporate standards.

Strategic — performance focus is on leading work and the accumulated impact of work in an independent business unit or across a whole organization. The impact of work at this level is often not visible until the medium to longer term.

The following example illustrates the different complexity levels within a profile.

Competency Name: Research Ethics **Competency Definition:** Exercises integrity and professionalism to ensure all research is performed responsibly in keeping with the ethical principles of beneficence and nonmaleficence. Competence at this level is demonstrated when the **Research Manager**:			
Performance Indicators			
Foundational	Operational	Specialized	Strategic
Diligently follows research procedures and protocols mandated by legitimate authorities and professional organizations.	Regularly monitors own actions and decisions to ensure they align with professional and organizational values.	Holds self and staff accountable to the organization's values, ensuring compliance with the policies and procedures related to scientific ethics and rules of conduct.	Fosters an organizational culture of integrity and ethical business practices by unwavering personal example.

2.4 Overview methodology for the development of national occupational standards

National occupational standards were developed using a multi-step process.

Step	Description	Result/Output
1	Identify critical roles in the bio-economy through primary and secondary research.	List of 50 key roles
2	Create draft profiles with critical competencies for the roles, performance, and knowledge indicators.	Draft profiles
3	Review the draft profiles with industry subject matter experts to refine the competencies, performance, and knowledge indicators.	Reviewed profile with design inputs from industry experts
4	Further validation and review by industry via online focus group.	Validated profiles by industry experts
5	Broader validation of the draft profiles via national online surveys.	Occupational Standards validated on a national level by experts from the different sectors
6	Addition of the Essential Skills and Canadian Language Benchmark (ES/CLB) ratings.	Nationally validated NOS profiles with ES/CLB profile for each NOS

3 VICE PRESIDENT MANUFACTURING IN BIO-ECONOMY COMPETENCY FRAMEWORK

3.1 Competency diagram for Vice President Manufacturing in Bio-Economy

Competencies		Complexity Level			
		1	2	3	4
Core Competency					
1	Executive Leadership				
2	Strategic Planning				
3	Technical Leadership				
Technical Competencies					
4	Capital Project Leadership				
5	Operations Management				
6	Quality Management				
7	Change Management				
8	Production Optimization/Continuous Improvement				
9	People Management				
10	Financial Management				
Industry Regulatory Competencies					
11	Health, Safety, and Environmental Management				
12	Product Safety Compliance Management				
Personal and Professional Competencies					
13	Team Leadership				
14	Collaboration				
15	Communication				

Complexity Level Legend

1. Foundational
2. Operational
3. Specialist/Manager
4. Expert/Executive

3.2 Definition of occupation

The Vice President (VP) of Manufacturing is responsible for providing strategic and technological leadership to the organization. They make strategic decisions on future capital and technological requirements for future production capacity, and have overall responsibility for current production, quality, and profitability goals. The VP Manufacturing will often oversee production at multiple facilities (both domestic and international), and across a portfolio of different product lines. They also provide leadership with respect to supply chain/logistics functions, outsourced manufacturing, and sub-contractor and supplier development activities.

The VP Manufacturing has overall responsibility for allocating human, technological, financial, and material resources to production activities across the firm. They provide leadership and development to their direct reports in the organization. The VP Manufacturing actively coordinates with other members of the organization's senior management team to ensure the overall performance of the organization, which they report to the President or CEO.

They may serve as a point of contact for the media and represent their organization at industry forums and events.

Applicable To	Bio-Health	Agri-Bio	Bio-Industrial	Bio-Energy

The level of complexity of the role is:

Span of Complexity Levels	Foundational	Operational	Specialist/ Management	Expert/Executive

3.3 Level of education, training or designations requirements

Typical Education Required	Secondary	College	Bachelor	Master	PhD
Typical Starting Experience	0–5 yrs.	5–10 yrs.	10–15 yrs.	15–20 yrs.	20+ yrs.

- Minimum bachelor's degree in an engineering discipline
- Advanced degree in Business (MBA) is typical
- Minimum ten years of experience in engineering, manufacturing, and supply chain is typical
- Internal company training (upskilling in addition to mentorship)

3.4 Core competencies list for VP Manufacturing in Bio-Economy

3.4.1 Executive Leadership

Represents their functional area as a member of the organization's executive leadership team, providing technical support and expertise relevant to their functional area in order to ensure effective decision-making and further the organization's goals.

Competency in this role is demonstrated when the individual:

- Actively engages peers to facilitate executive team decision-making.
- Actively participates in organization-level strategic planning.
- Provides information to their peers that will allow decision-making which benefits the greater organization, even if it is disadvantageous to their particular function or division.
- Once decisions are made at the executive level, vigorously implements and executes the decision within their functional area.
- Presents a united and consistent executive voice to the organization.

Knowledge required for competency at this level:

- Expert technical knowledge of their functional area
- Expert business acumen related to the overall business
- Broad knowledge of leadership principles (motivation, integrity, strategic thinking, etc.)
- Emotional Intelligence
- Understanding of system thinking principles and processes

3.4.2 Strategic Planning

Ensures the development of functional strategic plans and participates in organization-level strategic planning, ensuring integration and alignment to corporate purpose and ensuring maximum functional contribution to overall organizational objectives.

Competency in this role is demonstrated when the individual:

- Engages with peers in the executive team to coordinate the development of comprehensive organizational strategic plans.
- Engages with subordinate leaders and other functions to ensure all relevant information is collected and incorporated into plans.
- Maintains awareness of current trends and market intelligence in order to aid in decision-making.
- Oversees planning activities and ensures they are fully integrated with higher-level strategy and plans.
- Develops forward-looking projections for the factors of production (human resources, capital (equipment, machinery), supply chain relationships, etc.) required to meet organizational strategy.

Knowledge required for competency at this level:

- Knowledge of strategic planning practices, standards, and tools
- Expert technical knowledge of their functional area
- Expert business acumen related to the overall business and the production/manufacturing function
- Understanding of system thinking principles and processes

3.4.3 Technical Leadership

Uses occupational expertise to provide technical leadership for both their function and the overall organization in order to ensure organizational objectives are met.

Competency in this role is demonstrated when the individual:

- Develops and implements strategies related to manufacturing and production technologies.
- Serves as the organizational resource on matters related to technology and its impact on the productive capacity and value chain of the organization.
- Ensures technical competencies are maintained throughout the production function.

Knowledge required for competency at this level:

- Expert knowledge of manufacturing practices and technologies
- Expert knowledge of value chain economics

3.5 Technical competencies list for VP Manufacturing in Bio-Economy

3.5.1 Capital Project Leadership

Oversees and provides policy direction and leadership to all production-related capital projects in the organization, ensuring they are aligned with corporate strategy and achieve cost and performance targets.

Competency in this role is demonstrated when the individual:

- Develops a corporate capital project strategy for production improvements
- Engages with corporate engineering and accounting staff on the planning and selection of future capital improvements to plant machinery and equipment.
- Ensures consistency in the application of capital project management across all production facilities.
- Holds subordinates accountable for the implementation and results of capital project efforts.

Knowledge required for competency at this level:

- Knowledge of financial and accounting processes
- Basic knowledge of engineering processes
- Knowledge of value chain optimization principles and practices

3.5.2 Operations Management

Oversees total production, liaising with individual production facilities/managers as well as parallel managers in other organizational functions to ensure production targets are achieved.

Competency in this role is demonstrated when the individual:

- Ensures that the overall production process (inputs, processing, and outputs) is effectively executed in accordance with the organizational plan.
- Monitors overall production, including raw material and work-in-progress inventories, quality issues, maintenance issues, and external factors, as well as ensuring that production schedules are adjusted or re-balanced as required.
- Ensures that current Good Manufacturing Practices (cGMPs - pharma) and/or Good Manufacturing Practices (most other sectors) and ISO standards are implemented across all production environments.
- Ensures that all applicable regulations are adhered to in production/manufacturing facilities
- Holds subordinate managers in the production function accountable for achieving safety, quality, productivity, and cost metrics.

Knowledge required for competency at this level:

- Knowledge of production planning practices, standards, and tools
- Knowledge of technology transfer strategies such as coordination, planning, and processes (high level)
- Detailed knowledge of the organization’s products and the processes and technologies involved in producing them
- Knowledge of the underlying science involved in the company’s products and processes
- Understanding of plant and equipment maintenance and engineering requirements

- Understanding of Human Resources requirements, including collective agreements and/or employee standards for working hours, pay, and benefits, labour standards in the applicable jurisdiction, and safety/competency compliance requirements applicable to the production department
- Knowledge of change management principles

3.5.3 Quality Management

Oversees the production quality management program for multiple production facilities, holding individual production managers accountable for correctly implementing the program to ensure quality standards are maintained.

Competency in this role is demonstrated when the individual:

- Establishes and monitors product standards and responds to variances.
- Holds troubleshooting meetings with subordinates, maintenance, engineering staff, and Quality Management System (QMS) specialists to uncover and correct quality/rework issues at an organizational level.
- Ensures the implementation of cGMP in the organization's production facilities.
- Ensures the implementation of the organization's QMS in production facilities.
- Oversees that sampling and testing programs are carried out to ensure quality standards are met.
- Ensures traceability requirements for products are maintained as per applicable regulations and standards.
- Ensures the accountability of subordinates for maintaining quality standards and following the QMS.

Knowledge required for competency at this level:

- Knowledge of organization's QMS
- Knowledge of Six Sigma processes
- Knowledge of GMP
- Knowledge of risk management methodologies and procedures
- Knowledge of testing protocols, procedures, and tools

3.5.4 Change Management

Proactively manages project-wide strategic and operational changes in all manufacturing departments in order to minimize disruption and ensure that desired results are achieved.

Competency in this role is demonstrated when the individual:

- Works cooperatively with other senior executives to execute change management strategies at the enterprise and division level.
- Provides leadership within their own functional area for change and innovation initiatives.
- Actively seeks opportunities to improve organizational effectiveness at an enterprise level.
- Works with subordinates to fully understand their concerns and constraints and incorporate these into a change management plan.
- Provides clear and consistent communication to the organization on the need, scope objectives, and performance metrics of change initiatives.
- Helps subordinates within their functional area to effectively deal with the anxiety and disruption of change.
- Fosters a culture of change readiness in the organization that is supported by systems, processes, and competencies in order to enable innovation improvement.

Knowledge required for competency at this level:

- Knowledge of effective communication principles
- Knowledge of leadership principles
- Knowledge of change management principles

3.5.5 Production Optimization/Continuous Improvement

Initiates activities across production facilities to improve overall corporate metrics for safety, quality, productivity, and cost in order to achieve higher profitability and competitiveness.

Competency in this role is demonstrated when the individual:

- Monitors production metrics to uncover opportunities for improvement.
- Engages with subordinates, other managers/functions, and internal/external specialists to improve processes.
- Implements corporate continuous improvement program for production/manufacturing facilities.
- Holds subordinates accountable for the implementation of and results from continuous improvement programs.

Knowledge required for competency at this level:

- Knowledge of Lean/Six Sigma methodologies and processes
- Understanding of value chain optimization principles and practices
- Understanding of process/production engineering principles
- Knowledge of team/group facilitation techniques
- Knowledge of company policies related to continuous improvement
- Knowledge of change management principles

3.5.6 People Management

Oversees corporate manufacturing operations, monitoring human resources so that sufficient qualified personnel are available to ensure production quality and quantity standards are followed.

Competency in this role is demonstrated when the individual:

- Ensures consistent application of company HR practices in the production department.
- Ensures subordinate managers are properly trained and continuously developed.
- Ensures sufficient numbers of trained personnel are available to meet production requirements.
- Ensures that discipline and performance issues in production facilities are promptly dealt with in accordance with the company policies and procedures.
- Where applicable, liaises with union representatives, HR departments, and company Industrial Relations personnel to ensure the effective implementation of collective agreements.
- Regularly conducts performance reviews with direct reports/subordinates.

- Ensures subordinate leaders are conducting regular performance reviews with their own subordinates.
- Actively mentors/coaches subordinate leaders and direct reports.

Knowledge required for competency at this level:

- Knowledge of company HR/personnel policies and procedures
- Knowledge of mentoring/coaching techniques
- Emotional Intelligence
- Knowledge of collective agreements and labour relations processes
- Knowledge of change management principles

3.5.7 Financial Management

Guides the development and administration of operating budgets across the production function, ensuring that current production expenses are properly calculated and reported and that financial resources are available to cover the costs associated with and anticipated by production schedules.

Competency in this role is demonstrated when the individual:

- Develops and implements annual operating and capital budgeting process.
- Monitors performance of individual production facilities against budgeted targets.
- Addresses financial variances across production facilities.
- Holds subordinate managers accountable for administering financial management and control processes at their respective facilities.

Knowledge required for competency at this level:

- Knowledge of financial accounting and budgeting processes
- Knowledge of managerial accounting practices
- Knowledge of company accounting policies
- Understanding of fiduciary responsibilities under financial rules

3.6 Industry regulatory competencies list for VP Manufacturing in Bio-Economy

3.6.1 Health, Safety, and Environmental Management

Ensures the implementation of the company health, safety, and environmental (HSE) management program in the production function in accordance with company, jurisdictional, and industry standards and requirements in order to ensure the organizational HSE performance meets expectations.

Competency in this role is demonstrated when the individual:

- Holds subordinate leaders accountable for HSE performance.
- Ensures HSE programs are implemented and monitored across all production facilities.
- Addresses variances in HSE performance, as required.
- Liaises with other departments/functions and external resources on HSE best practices.

Knowledge required for competency at this level:

- Knowledge of organization's HSE policies and procedures
- Knowledge of organization's HR and performance/discipline policies and practices
- Knowledge of industry best practices for HSE performance
- Knowledge of jurisdictional requirements and standards for HSE performance

3.6.2 Product Safety Compliance Management

Plans and ensures the implementation of corporate policies and processes in order to ensure compliance with applicable product safety regulations.

Competency in this role is demonstrated when the individual:

- Holds subordinate managers accountable for the product safety compliance management.
- Monitors operations to ensure requirements for ingredient/component traceability are enforced company-wide.
- Monitors the results of product safety compliance audits and ensures that discrepancies and variances are addressed.

- Liaises with other departments/functions and external resources to understand and implement product safety and traceability best practices across the organization.

Knowledge required for competency at this level:

- Knowledge of product safety, labeling, and traceability regulations

3.7 Personal and professional competencies list for VP Manufacturing in Bio-Economy

3.7.1 Team Leadership

Oversees the production function and provides guidance and accountability to subordinates to ensure that the production function operates successfully and performance targets are achieved.

Competency in this role is demonstrated when the individual:

- Ensures all subordinates understand their roles, responsibilities, and accountabilities.
- Holds subordinate leaders accountable for performance targets.
- Ensures subordinate leaders hold their teams accountable.
- Fosters an engaged and productive working environment.
- Actively engages with team members to ensure they are improving their skills and capacity.
- Applies appropriate motivational techniques to optimize team performance within the constraints of company policies and legal requirements
- Delegates to subordinate managers and holds them accountable for delegated actions

Knowledge required for competency at this level:

- Understanding of leadership principles
- Understanding of effective delegation and assigning/assuming ownership
- Knowledge of organizational policies and procedures for discipline, performance, and accountability
- Knowledge of motivational techniques

3.7.2 Collaboration

Actively participates in or leads multi-disciplinary, inter/intra-departmental teams to generate ideas and solutions, solve problems, and improve overall organizational performance.

Competency in this role is demonstrated when the individual:

- Actively engages with others to seek and honour their expertise and opinions.
- Applies active listening and emotional intelligence techniques to ensure others are valued.
- Encourages broad discussion and sharing of ideas in order to generate innovative solutions.
- Openly gives credit to the ideas and participation of others.
- Assumes responsibility if things go wrong.

Knowledge required for competency at this level:

- Emotional Intelligence principles
- Knowledge of teamwork and collaboration principles
- Knowledge of group problem-solving and decision-making principles
- Understanding of group dynamics
- Thorough understanding of roles and responsibilities of other department staff and the interplay between all of them
- Knowledge of effective communication principles

3.7.3 Communication

Uses appropriate written, verbal, and non-verbal communication and listening techniques to clearly communicate upwards, downwards, and laterally within the organization in order to ensure understanding and enable execution that achieves the organizational goals and performance metrics.

Competency in this role is demonstrated when the individual:

- Follows through on communications to ensure understanding.
- Actively questions to ensure mutual understanding.

- Uses appropriate medium for communication to ensure understanding and action.
- Applies written and oral communication devices (analogy, metaphor, symbolism, etc.) to increase understanding.

Knowledge required for competency at this level:

- Knowledge of writing techniques
- Knowledge of oral communication and presentation principles and techniques
- Knowledge of questioning principles and techniques

3.8 Essential Skills for VP Manufacturing in Bio-Economy

Essential Skills (ES) are foundational skills required for all types of work. They are not technical skills, but the core skills people need to acquire knowledge and complete workplace tasks and daily activities.

Understanding the ES requirements for a role can allow individuals to compare their skills to those required, assist training/learning providers in developing appropriate supports to ensure ES levels are developed during training, and provide employers with an additional tool for determining who/how to place in particular roles.

Human Resources and Skills Development Canada has defined Essential Skills as follows:

- Reading
- Document Use
- Numeracy, which is further divided into:
  - Money math; Scheduling, budgeting, and accounting math; Measurement and calculation math; Data analysis math.
  - Several different factors related to estimations, including the presence of a set procedure, the number of items being estimated, the consequences of errors in estimation, the amount of information missing, and the accuracy required.
- Writing
- Oral Communication
- Thinking Skills, which are further divided into:
  - Problem Solving

- Decision Making
- Critical Thinking
- Job Task Planning and Organizing
- Finding Information
- Significant Use of Memory

- Digital Skills
- Working with Others
- Continuous Learning

Most of the ES have levels based on complexity, and a role can be analyzed to determine the appropriate levels of ES. The exceptions are noted below:

- "Working with Others" does not have a complexity rating: it simply describes the ways in which the role would be required to interact with other people, either internally within the organization or externally (i.e., with clients, customers, or the public).
- "Continuous Learning" does not have a complexity rating: it describes the types of learning expected in the context of the role (e.g., on the job, being mentored by others, formal training as part of the job, etc.).

NOTE: as of January 2020, ESDC was undertaking a comprehensive review of ES with the intent of adding additional skills, refining existing ones (particularly digital skills) and better aligning ES with similar approaches used in other countries. However the detail was not finalized in time to be used, therefore the profiles developed for this project follow existing standards as of December 2019.

3.9 Canadian Language Benchmark for VP Manufacturing in Bio-Economy

Canadian Language Benchmarks (CLB) are a 12-point scale for task-based language proficiency descriptors which were originally developed as a guide for measuring the teaching and assessment of English as a Second Language (ESL) learners in Canada. Since they

were originally developed, the Canadian Centre for Language Benchmarks (CCLB) has continued to refine CLB, and it now includes scales for both English and French language proficiency. [1]

The CLB has been validated against both the Common European Framework for Language (CEFL) and the American Council for the Teaching of Foreign Languages (ACTFL) benchmarks and is considered accurate for high-stakes evaluation[2].

The ES levels for Oral Communication were developed with reference to the Canadian Language Benchmarks[3]. Comparative work to determine the alignment between the CLB and other Essential Skills has been ongoing, with recent work providing additional alignment with the ES for Oral Communication in both spoken and listening domains, Reading, Writing, and Document Use.[4]

CCLB has developed a set of crossover tables that align CLB ratings with ES ratings for reading, writing oral communication and document use.

VP Manufacturing in Bio-Economy ES/CLB Profile

Essential Skills	Equivalent CLB Level	ES Level				
Reading	Reading: 11–12	1	2	3	4	5
Document Use	Reading: 11–12 Writing: 11–12	1	2	3	4	5
Writing	Writing: 9	1	2	3	4	5
Oral Expression	Speaking: 11–12 Listening: 11–12	1	2	3	4	
Numeracy	n/a	1	2	3	4	5

[1] Centre for Canadian Language Benchmarks. Theoretical Framework for The Canadian Language Benchmarks And *Niveaux De Compétence Linguistique Canadiens.* CCLB. Ottawa 2015. p8
[2] Centre for Canadian Language Benchmarks. Canadian Language Benchmarks: English as a Second Language for Adults, CCLB. Ottawa 2012 p.II
[3] Essential Skills Research Group. Readers Guide to the Essential Skills. ESDC. Ottawa ND. p57
[4] Canadian Centre for Language Benchmarks. Relating Canadian Language Benchmarks to Essential Skills: A Comparative Framework. 2015, p3

Essential Skills	Equivalent CLB Level	ES Level				
Thinking Skills – Problem Solving	n/a	1	2	3	4	
Thinking Skills – Decision Making	n/a	1	2	3	4	
Thinking Skills – Job/Task Planning and Organizing	n/a	1	2	3	4	
Thinking Skills – Significant Use of Memory	n/a	Types 1,2,3				
Thinking Skills – Finding Information	n/a	1	2	3	4	
Digital Skills	n/a	1	2	3	4	5
Working with Others	n/a	See Below				
Continuous Learning	n/a	See Below				

Explanation of the Essential Skills and the Canadian Language Benchmark for VP Manufacturing in Bio-Economy

Reading: ES 5 CLB: 11–12

VPs Manufacturing in Bio-Economy are required to read and interpret highly complex business, financial, engineering, and scientific analyses and reports and synthesize the information to develop strategies, make decisions, and set priorities that will impact all levels of the organization with respect to technology, productive capacity, safety, quality, and cost/profitability.

Document Use: ES 5 CLB: 11–12

VPs Manufacturing search through a variety of complex technical source information, data, documents, and graphical representations and then interpret the information in order to better lead the manufacturing organization both now and for the future.

Writing: ES 4 CLB: 9

VPs Manufacturing are required to write manufacturing strategic plans and policies that align with corporate goals and performance targets. They must be able to clearly communicate complex information through writing in a way that is suitable for a variety of internal and external stakeholders and audiences, with widely varying degrees of technical expertise.

Oral Expression: ES 4 CLB: Speaking: 11–12, Listening: 11–12

VPs Manufacturing are required to present complex technical information, plans, policies, and strategies to a variety of internal and external stakeholders in a manner that ensures clear understanding and inspires action. In many cases the information is not concrete, but requires creating vivid imagery in the mind of the audience. They must also listen clearly to create mutual understanding. Their communication can be one-on-one or to larger groups. They are also actively involved in coaching and mentoring others, where their ability to express themselves to ensure understanding, compliance, and action is critical.

Numeracy: ES 4+ (Money Math: 4–5, Scheduling, Budgeting and Accounting: 5, Measurement & Calculation: n/a, Data Analysis: 4–5)

VPs Manufacturing apply skills in financial and accounting mathematics to manage capital costs, create budgets, allocate resources, monitor performance metrics, and optimize production in order to meet profit targets. They must be able to use mathematical models to predict future results and then use this information for decision-making. They consume and interpret large and complex data sets to develop forecasts, budgets, and projection of expenses. Mathematical problems are often complex, with many variables, and there may not be defined algorithms or processes for solving them.

Thinking Skills:

Thinking skills are subdivided into five domains:

- Thinking Skills — Problem Solving
- Thinking Skills — Decision Making
- Thinking Skills — Job/Task Planning and Organizing

- Thinking Skills — Finding Information
- Thinking Skills — Significant Use of Memory
- Thinking Skills — Problem Solving: 4

VPs Manufacturing solve complex problems involving multiple variables. Often, all the variables are not known, or the relationships between the variables is unclear or unknown. Problems are solved in a climate of uncertainty, and they must use probabilistic models to make predictions on the future with incomplete information. The adequacy of the solutions to problems may not be measurable until well into the future.

- Thinking Skills — Decision Making: 4

Decisions made by VPs Manufacturing have far-reaching implications, and may be difficult to reverse without significant time and expense. They must use probabilistic models and risk assessments to make predictions on the future with incomplete information and factor this into their decisions.

- Thinking Skills — Job/Task Planning and Organizing: 4

VPs Manufacturing have wide discretion over their work. They determine their own priorities, sequence work according to their own judgement, and to a large degree measure their own results. They plan and direct the work of others in the organization, setting priorities and monitoring the environment to determine when to replan and rescope.

- Thinking Skills — Finding Information: 4

Information sources are varied, not always obvious, and VPs Manufacturing must not only find information but also make determinations as to the quality and reliability of information before they use it.

- Thinking Skills — Significant Use of Memory: Types 1, 2, 3

VPs Manufacturing are required to memorize procedures, regulations, policies, and practices through one or all of the following methods:

  - Purposeful memorization of procedures, codes, parts numbers, memorization through repetition (Type 1)
  - Remembering information for brief periods, e.g., minutes or hours (Type 2)
  - Unique events in which learning occurs from exposure (Type 3)

Digital Skills: ES 3

VPs Manufacturing use computers for general administration, but also may perform complex data analysis and modeling. They are required to select and effectively use a variety of software applications for multiple purposes in the course of their jobs. They are users of these systems – the development, management, and maintenance of these systems is the work of specialists.

Working with Others: Work Contexts 2, 3, & 4

The following work contexts and functions are relevant to the VP Manufacturing role:

- Works independently (Work Context 2)
- Works jointly with a partner or helper (e.g., with other VPs, Board members, executive team members, etc. to develop policy) (Work Context 3)
- Works as a member of a team (e.g., with other leaders for inter-departmental/corporate initiatives/projects) (Work Context 4)

They may also be involved in supervisory or leadership activities, as follows: Functions 1–3, 7 & 10–12

- Participate in formal discussions about work processes or product improvement (S/L Function 1)
- Have opportunities to make suggestions on improving work processes (S/L Function 2)
- Monitor the work performance of others (S/L Function 3)
- Make hiring decisions (S/L Function 7)
- Assign new or unusual tasks to other workers (S/L Function 10)
- Identify training that is required by or would be useful for other workers (S/L Function 11)
- Deals with other workers' grievances or complaints (S/L Function 12)

Continuous Learning: Types of Learning 1, 2 & 3 How Learning Occurs: 1, 2, 3, 4, 5, 6

The VP Manufacturing Bio-Economy is expected to continuously learn as a requirement of the role.

Type of learning may include:

- Training in job-related health and safety (Type 1)
- Obtaining and updating credentials (Type 2)
- Learning about new equipment, procedures, products, and services (Type 3)

The learning may occur:

- As part of regular work activity (Context 1)
- From coworkers (Context 2)
- Through training offered in the workplace (Context 3)
- Through other forms of self-study (Context 4):
    - At work
    - On worker's own time
    - Using materials available through work
    - Using materials obtained through a professional association or union
    - Using materials obtained through worker's own initiative
- Through off-site training (Context 5):
    - During working hours at no cost to the workers
    - Partially subsidized
- With costs paid by the worker (Context 6)

4 REFERENCES

Gathering the data

The development of the National Occupational Standards started with a review of existing information for the role. This review process included: referencing books, job postings, websites, articles, and BioTalent Canada's existing skills profiles to create the first draft. After several iterations via written feedback, focus groups and a national survey with subject matter experts, the National Standards were developed. The following are sources consulted during the creation of the VP Manufacturing in Bio-Economy profile:

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During the research period, several job posting boards were reviewed for this profile.

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- Essential Skills Fundamentals
  - Introduction to the Bio-economy, Reading, Writing, Numeracy, Document Use, Communication, Collaboration, Problem Solving
- Technical Skills Fundamentals
  - Scientific Report Writing, GLP, GCP, GMP, QA/QC

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