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UNMUZZLED SCIENTISTS AND SO MUCH MORE : THE NASCENT DND/CAF SCIENCE INTEGRITY POLICY ASSESSED FOR EFFECT

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By Major Everett Rose

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INTRODUCTION

On April 1, 2019, the Science Integrity Policy (SIP) and Instructions to the Department of National Defence (DND) Employees and Canadian Armed Forces (CAF) Members (henceforth referred to as the DND/CAF SIP) came into effect. The most widely known reason for the creation and endorsement of this policy has to do with the muzzling of scientists. Beginning in the Liberal Paul Martin era and continuing through the Stephen Harper's Conservative leadership, scientists were subjected to increasingly restrictive guidance on what they could and could not discuss[1]. The current Trudeau Liberals announced that scientists were free to speak, but the announcement's effect remained in question[2]. The DND/CAF SIP is meant to change this. However, the policy's scope is far wider reaching than just the freedom to speak. Broadly, it is meant to: create a culture supportive of scientific integrity; increase trust in research and scientific activities; ensure expectations of scientific activities are clear and well understood by employees; and promote awareness of the resources and tools to enable the DND/CAF SIP[3].

The release of this policy, as agreed upon via a Memoranda of Agreements between the Treasury board and the Professional Institute of the Public Service of Canada, is aimed at empowering scientists by defining integrity, but will it?[4] To determine the likely effectiveness of the DND/CAF SIP it is gauged against two distinct measures. First, the policy is compared with a like policy in use by the United States Environmental Protection Agency (US EPA). Second, it is assessed to determine if it contains variables found to correlate with the perceived

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[1] Lauren Vogel, *How free are Canada's unmuzzled scientists?* (Canadian Medical Association Journal 2016), 489.
[2] *Ibid*.
[3] Canada. *Science Integrity Policy and Instructions to DND Employees and CAF Members*, (1 April 2019), 4.
[4] Treasury Board of Canada. *Scientific Integrity Policies*,(November 7, 2018)

effectiveness of codes of ethics[5]. This analysis concludes that the CAF policy contains all of the key components of its American counterpart and will be effective in promoting free speech of scientists regarding their work and in promoting understanding of the responsibilities assigned to stakeholders concerning science integrity. Further, the DND/CAF SIP contains many of the important factors professed by the ethics code study, but not all. The DND/CAF SIP is found to be lacking in variables grouped under Code Purpose, Code Implementation, and Currency and External Code Communication. The current DND/CAF SIP establishes a solid starting point and will be effective in meeting its intent. However, the addition of missing pieces and continuous improvement through revision will maximize its effectiveness. The analysis will be presented in two sections that independently compare the policy against each measure. Overall findings are presented in the conclusion.

COMPARISON WITH US EPA SCIENCE INTEGRITY POLICY

It is observed that Canadian scientists are subjected to greater limitations when sharing research than their American colleagues, making related US policies a natural starting point for comparison[6]. The US EPA released its Science Integrity Policy in 2012 and conducts biennial reviews[7]. As a more mature policy with a similar scope to the DND/CAF SIP it provides an excellent measure.

The US EPA's SIP is divided into five sections; Purpose; Background; Policy Applicability; Scientific Integrity Policy; and the EPA's Scientific Integrity Committee[8]. All but

[5] Jang B Singh, *Determinants of the Effectiveness of Corporate Codes of Ethics: An Empirical Study*, (Journal of Business Ethics, 2011), 387.
[6] Vogel, *How free are Canada's unmuzzled scientists*…, 489.
[7] U.S. Environmental Protection Agency, *Scientific Integrity Policy*, (2012), 11.
[8] *Ibid.*, 1-15.

Background will be utilized as a point of comparison. The DND/CAF SIP was searched to determine if it spoke to relevant portions of the EPA SIP, beginning with the Purpose.

The EPA's SIP's Purpose clearly and concisely states that it,

> "…provides a framework intended to ensure scientific integrity throughout the EPA and promote scientific and ethical standards, including quality standards; communications with the public; the use of peer review and advisory committees; and professional development. It also describes the scope and role of a standing committee of Agency-wide scientific integrity officials to implement thus policy."[9]

DND/CAF's SIP does not explicitly state a purpose, but includes many of the same ideas under Objectives and Expected Results[10]. The DND/CAF SIP is assessed to directly mirror its measure's intent on the topics of scientific integrity, communications and review. Further, while the same words are not used, it is derived that there is also similar intent regarding standards and professional development. Missing from the related DND/CAF SIP section is mention of a standing committee[11]. This will be considered when assessing Section V, specific to this topic. Acknowledging the differences in language and structure, it is assessed that there is correlation between the policies considering the EPA's Purpose.

Next in line for comparison is Policy Applicability. This section is particularly important because it categorically states who is subject to the policy's direction and when. The EPA provides to following,

> "…all Agency employees, including scientists, managers and political appointees, are required to follow this policy when engaging in, supervising, managing, or influencing scientific activities; communicating information in an official capacity about Agency scientific activities; and utilizing scientific information in making Agency policy or management decisions. In addition, all contractors, grantees, collaborators and student volunteers…are expected to uphold the standards established by this

[9] U.S. Environmental Protection Agency, *Scientific Integrity Policy*…, 1.
[10] Canada. *Science Integrity Policy and Instructions to DND Employees and CAF Members*…, 4
[11] U.S. Environmental Protection Agency, *Scientific Integrity Policy*…, 1.

> policy and may be required to do so as part of their respective agreements with the EPA."[12]

The DND/CAF SIP matches well by having its own Application section[13]. It clearly states that it applies to DND employees and CAF members as well as others conducting science or related activities, with examples being contractors, visiting scientists and students, collaborators, and clients. Unsurprisingly, not all the same terms are used, but it is assessed that all of the EPA's personnel categories are included in the DND/CAF version. Regarding the applicable actions, the DND/CAF SIP misses out on specifying supervision and influence, but matches the EPA when listing managing, communicating, and utilizing scientific information. It is assessed that the Application section targets of the DND/CAF SIP effectively match that of the EPA's, so represents a positive indicator of its predicted effectiveness.

The fourth section in the EPA's document is titled Scientific Integrity Policy[14]. This section represents the meat of the document. It includes a preamble, four subsections and several sub-subsections, while filling a full seven pages. For clarity of presentation and conciseness of information, it was distilled into critical parts and compared with the DND/CAF SIP as represented in Table 1. The DND/CAF SIP does not have an equivalent section, so the complete document is considered when searching for equitable content.

Upon scrutiny the Canadian document is found to contain all of the themes covered in the preamble of its US contemporary. The use of principles is common to both. Broadly, principles were concerned with stakeholder trust, integrity of the scientific process, and the proper use of scientific information in decision making[15/16]. Specifically, important topics are elaborated.

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[12] U.S. Environmental Protection Agency, *Scientific Integrity Policy*…, 2
[13] Canada. *Science Integrity Policy and Instructions to DND Employees and CAF Members*…, 5
[14] U.S. Environmental Protection Agency, *Scientific Integrity Policy*…, 2-10
[15] Canada. *Science Integrity Policy and Instructions to DND Employees and CAF Members*…, 5
[16] United States Environmental Protection Agency. *EPA's Scientific Integrity Policy: A Framework for Scientific and Ethical Standards.* (Congressional Digest, www.CongressionalDigest.com, May 2015), 12

These include objective work, accountability for integrity, fabrication or falsification, accurate representation of own work, plagiarism, attribution, conflict of interest, responsibility to report breaches of the principles, and peer review.

Table 1 – Comparison of the DND/CAF SIP against the EPA Scientific Integrity Policy Section.

US EPA Scientific Integrity Policy Section	**Comparison Points**	**Assessed DND/CAF SIP equivalent**
PREAMBLE:		
- Principles of Scientific Integrity	Work is of the highest integrity: - performed objectively without predetermined outcomes using appropriate techniques; - employees are responsible and accountable for the integrity and validity of their work; - fabrication or falsification of work results will not be tolerated.	-Scientific Integrity Principles: 6.1, 6.2 -Responsible conduct of research 7.8.1, 7.8.2
	-Represent their own work fairly and accurately. -Represent the work of others fairly and accurately.	-Scientific Integrity Principles: 6.5 -Responsible conduct of research 7.8.1
	-Represent and acknowledge the intellectual contributions of others. - Refrain from taking credit for work with which they were not materially involved.	-Scientific Integrity Principles: 6.5, 6.8 -Responsible conduct of research 7.8.1
	-Avoid financial conflicts of interest and ensure impartiality in the performance of duties.	-Scientific Integrity Principles: 6.6
	-Be cognizant of and understand the programmatic statutes that guide work.	-Scientific Integrity Principles: 6.1
	-Accept the affirmative responsibility to report breaches of these principles.	-Scientific Integrity Principles: 6.9
	-Welcome differing views and opinions on scientific and	-Scientific Integrity Principles: 6.7

	technical matters as part of the process.	
PROMOTING A CULTURE OF SCIENTIFIC INTEGRITY AT THE EPA:		
	-Promoting a Culture of Scientific Integrity	-Objectives: 4.1, 4.2 -Requirements: 7.2.1 -Responsibilities 8
	-Support a culture of scientific integrity	-Objectives: 4.1, -Requirements: 7.2.2; 7.3.3; 7.8.2
	-Enhance transparency	-Scientific Integrity Principles: 6.3 -Requirements: 7.3; 7.3.4; 7.8.1
	-Assure protection of Agency scientists	-Objectives/Expected Results: 4.8 -Scientific Integrity Principles: 6.1, 6.2, 6.9 -Requirements: 7.3; 7.2.2.1-4 -Responsibilities: 8
RELEASE OF SCIENTIFIC INFORMATION TO THE PUBLIC:		
	-General	-Requirements: 7.3
	-Scientists and Managers	-Scientific Integrity Principles: 6.5; 6.7; -Requirements: 7.3; 7.4 all; 7.5.4; 7.8.1
	-Policy Officials	-Authorities: 3.6
	-Public Affairs Staff	-Requirements: 7.4.9
PEER REVIEW AND THE USE OF FEDERAL ADVISORY COMMITTEES:	-Peer Review	-Dissemination of research and scientific findings:7.5.6
PROFESSIONAL DEVELOPMENT OF GOVERNMENT SCIENTISTS:	-Collaboration with peers, industry, government, non-government. -Involvement in/as meetings, boards, panels, societies, bodies, publications, presentations, editor.	-Objectives: 4.4, 4.5 -Scientific Integrity Principles: 6.8 -Requirements: 7.1.1, 7.1.3, 7.2.1.1; 7.2.1.2, 7.2.1.3; 7.6.1-4

Sources: US EPA Scientific Integrity Policy, 2-10, and the Science Integrity Policy and Instructions to the Department of National Defence Employees and Canadian Armed Forces Members, 4-16.

The idea of a science integrity culture is also common[17/18]. This section speaks to both promoting and supporting cultures of scientific integrity. Themes include open discussion, adherence to processes that ensure quality, prohibition of suppression or alteration of results, impeding timely release, and avoidance of misconduct, among others. Transparency represents the second focus. This part covers timely generation and dissemination of findings, and the importance of independent peer review. The inclusion of transparency in the DND/CAP SIP adds further to its strength.

Perhaps the most important subject in this section is the protection of scientific employees, which takes three forms. First, protection from intimidation or coercion to alter data, findings or opinion as well as from misrepresentation. Second, a method to express and resolve differing opinions in a respectful and safe manner. The third, encompasses both protection from backlash related to reporting of a suspected breach of conduct and a due process for the reported member. This aspect underpins the expectations presented in the other scientific integrity principles by providing guidance and methods to address suspected or actual wrongdoing.

This section concludes with professional development. Both policies encourage scientists to engage with peers across the spectrum of opportunities to include industry, other government organizations, non-government organizations, and academia. The parallel here indicates concern for scientific currency and continuous improvement of the scientific community.

As a whole, the facets included in Section IV of the EPA SIP were also found in the DND/CAF version. This correlation points positively to the DND/CAF SIP being a well-informed policy.

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[17] U.S. Environmental Protection Agency, *Scientific Integrity Policy*…, 3-4.
[18] Canada. *Science Integrity Policy and Instructions to DND Employees and CAF Members*…, 4-16.

Section V in the EPA's policy is dedicated to its Science Integrity Committee. This standing committee implements, reviews and revises the other four sections of the EA SIP and is chaired by the Scientific Integrity Official. While the DND/CAF SIP mentions the Governance Committee for Implementation of Government-Wide Scientific Integrity, it is not equivalent. As per its terms of reference, this committee is positioned above the government departments and is charged with the creation of a framework for the development of government-wide science integrity policies and monitoring the progress towards this goal[19]. In contrast, the US EPA's committee's roles and responsibilities include leadership for the agency, policy implementation, policy compliance promotion, and addressing integrity policy concerns, among others. Included in the committee's purview is scientific misconduct, science integrity training for scientists, annual reporting on violations, lessons learned and continuous improvement, and biennial review of the SIP[20]. The DND/CAF SIP does direct that the Chief of the Defence Staff, through the Assistant Deputy Minister (Science & Technology), appoint a Science Integrity Lead[21], but that is its extent. In summary, despite the lack of a dedicated committee, the DND/CAF SIP addresses the themes contained in the US EPA SIP's Section V.

The EPA SIP is a mature policy that has undergone review and amendment since its inception in 2012. This allows its contributors, represented by a committee charged with the policy's upkeep, time to learn what parts have and have not worked, and to make relevant changes. Further, this policy specifically addresses science integrity across a broad scope of topics, from science procedures, to information release to the public, to misconduct reporting, and resolution. For these reasons it is considered a good measure against which the DND/CAF

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[19] Canada. *Terms of Reference: Governance Committee for Implementation of Government-Wide Scientific Integrity*, (2018), 1.
[20] U.S. Environmental Protection Agency, *Scientific Integrity Policy*…, 10-11.
[21] Canada. *Science Integrity Policy and Instructions to DND Employees and CAF Members*…, 7

SIP can be assessed. The singular point of discrepancy is the lack of a Science Integrity Committee to oversee the workings and evolution of the policy. While these responsibilities are addressed in the DND/CAF SIP, it is not considered to be a similarly robust approach. It must also be considered that the DND/CAF SIP has yet to publish a full set of procedures, the monitoring plan being a prime example[22]. However, assuming that all planned additions are seen to completion, the DND/CAF SIP addresses the main points covered by its EPA counterpart. This suggests that it is appropriately broad in scope and detailed in its direction to be effective.

COMPARISON AGAINST SINGH'S INDEPENDENT VARIABLES

In the Journal of Business Ethics, Jang B. Singh identifies "eighteen independent variables that explain 58.5% of the variance in the perceived effectiveness of corporate codes of ethics."[23] His study is based on a survey of large Canadian corporations. While the subject of this study, codes of ethics, is not the same as a science integrity policy, no information was found during research that spoke specifically to integrity policy effectiveness. However, it is determined that there is strong correlation between the intent of the ethics variables and the SIP, resulting in a valuable comparison. Further, because the study is based on a survey of Canadian corporations, it is assessed that the results would hold true generally for intra-Canadian governance. Based on these conclusions, it was decided to use Singh's variables as the second measure to determine the likely effectiveness of the DND/CAF SIP.

Singh defines each variable and groups them into five factors. The DND/CAF SIP, is assessed against these factors in a similar fashion to the previous comparison, as summarized in

[22] Canada. *Science Integrity Policy and Instructions to DND Employees and CAF Members*…, 14.
[23] Singh, *Determinants of the Effectiveness of Corporate Codes of Ethics: An Empirical Study*…, 385.

Table 2. Parsing each factor into its constituent parts, it is possible to determine how many similarly themed ethics code variables are included in the DND/CAF SIP.

Of the eighteen variables, two are determined to be not applicable to the context of the DND/CAF SIP and are not considered. Specifically, the variables concerning the policy affecting the bottom line and that suppliers should be informed of the policy are excluded. Certainly, these ideas are not completely foreign to government departments, however, because they are not as direct a link as in corporate business, they were excluded.

Table 2. Comparison of the DND/CAF SIP against independent variables.

Factors	Policy Effectiveness Variables	DND/CAF SIP Assessment and referred section if applicable.
Code Purpose	Code should guide strategic planning	TBD once policy has been in place for a time.
	Code assists with ethical dilemmas	TBD if the SIP will be used practically to resolve integrity related issues.
	Code assists our bottom line	Not applicable.
	Should conduct ethical evaluation	Partially met. Under development as per 7.9.1.
	Criterion for employee appraisal	Partially met in 4.8.
Code Implementation	Support of Whistleblowers	Met in 7.2.2.4.
	Ethics training for all staff	Met in 4.5; 7.1.2; 7.2.1.2-3; 7.7.4; 8.
	Have an ethics ombudsman	Not met.
	Have a standing ethics committee	Met as the Governance Committee for Implementation of Government-Wide Scientific Integrity Policy.
	Have an ethics training committee	Not met.
Internal Code Communication / Enforcement	Should inform new employees	Met in 7.1.1, 7.1.3.
	Communicated to all employees	Met in 7.1.1.
	Consequences for violation	Partially met in 7.2.2.2, 7.2.2.3.
Currency and External Code Communication	Customers should be informed	Partially met in 5.
	Suppliers should be informed	Not applicable.
	Displayed for all to view	Met. Posted on line. Email notification.
	Revise a code at least every 2 years	Partially met in 7.9.
Recency of Code Utility	Greater need in the last 6 months	Met, ongoing.

Sources: Singh, “Determinants of the Effectiveness of Corporate Codes of Ethics”, 387 and Science Integrity Policy and Instructions to the Department of National Defence Employees and Canadian Armed Forces Members, 1-16.

Code Purpose contains five of the eighteen variables, four that are assessed. Of these, the DND/CAF SIP has no final products that cover these areas. However, this is partially due to SIP being new and partially because the item is covered elsewhere. First, it is unclear whether or not the SIP will be used in strategic planning, or if it will be used to resolve integrity-based dilemmas. It is structured in such a way that it could and should be used for these actions, but only after the SIP has been in effect for a period of time can it be determined if it will be used in this way. Also in this vein, is the conduct of an integrity evaluation. This is planned for inclusion in the SIP, but is not currently in force. Second, concerns the use of the SIP as a criterion for employee appraisal. The SIP covers what to do in case of breach and how a breach is to be handled, but not specifically integrity-based employee appraisal. Public servants are evaluated using a Public Service Performance Agreement and CAF members with Personnel Evaluation Report and Personnel Development Reports. All provide avenues to report on failure or success regarding integrity. Though, in the end, the SIP does not.

The second factor, Code Implementation, is also made up of five variables. This time there is better correlation with the SIP and somewhat better representation. Three variables are directly relatable to the SIP and are provided for. Protection of whistle blowers, training for all staff and a standing committee are each well covered in the SIP, leaving no doubt that these criterion are met. On the other hand, there is no integrity ombudsman, nor is there an ethics training committee. An integrity lead is appointed, but that is all[24].

Next is internal Code Communication/Enforcement. Here the SIP comes closest to a perfect mark with portions that allow for informing all new employees of the policy, communicating the policy to all employees, and consequences of violation. While the first two

[24] Canada. *Science Integrity Policy and Instructions to DND Employees and CAF Members*…, 7

are clearly included, consequences are less so. The SIP demands investigation into alleged breaches, but does not define consequences.

Currency and External Code Communication represent the fourth factor, consisting of informing customers, displaying the policy for all to view, and revising the code every two years, with informing suppliers, which is excluded. It is important for government departments, allies and other users to know that there is an integrity policy in place that strives to ensure unbiased processes, unaltered findings, and timely communication. Display of the policy shows that it is important and supported. Accomplished through on-line posting, it is widely available. Last in this factor is biennial revision. The DND/CAF SIP partially meets this variable by committing to regular review[25].

The final factor, Recency of Code, has the singular variable of need in the last six months[26]. The perception being that if the policy has been used recently, then its effectiveness is perceived to be greater. This factor plays out in that the SIP was created due to recency of need. It cannot be predicted if the policy will continue to be used regularly, so this variable falls into the same category as the others that are pending evaluation.

Taken all together, of the sixteen variables assessed to be applicable, the SIP covers seven clearly, five are partially met, two will have to be evaluated over time and two are not met. In other terms, in its present form the SIP has potential to meet fourteen of the sixteen critical variables.

CONCLUSION

The DND/CAF SIP was introduced after much ado about muzzled scientists. Its scope in reality is farther reaching and is intended to bring integrity to the fore across the breadth and

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[25] Canada. *Science Integrity Policy and Instructions to DND Employees and CAF Members*…, 14
[26] Singh, *Determinants of the Effectiveness of Corporate Codes of Ethics: An Empirical Study*…, 389.

depth of the science profession. Having only been released on April 1, 2019, it is too early to tell if it will be effective in achieving its intended outcomes. At this stage, it is possible to compare its content against measures to determine if there are correlations that indicate an effective policy. The US EPA SIP was instituted in 2012 and, according to its own direction, has undergone three review cycles[27]. This makes it a more mature product and so, a relevant touchstone for the DND/CAF SIP. It is encouraging to find that the comparison drew strong parallels between the two similarly focused documents. Especially poignant are the areas regarding protection of scientists against external influence to alter their results and scientists' freedom to speak openly about their work. The missing attribute of the DND/CAF SIP that is found in the US EPA's is the presence of an overarching committee charged with leading and monitoring the policy. However, the overall correlation between these documents indicates that the DND/CAF SIP is founded in strong themes and will be an effective document from the onset.

Further, encouraging signs are found within the DND/CAF SIP when it was assessed against the independent variables found by Singh to increase perceived effectiveness of a policy. The use of a dissimilar measure was necessary as research did not turn up work aimed at integrity policies. The DND/CAF SIP is found to contain, fully or partially, twelve of the variables with a further potential for two more, depending on how the policy is used. Again, the findings indicate that this policy has a strong likelihood of success.

Based on the measures used in this study, it is possible to identify specific areas that can be improved to add effectiveness to the DND/CAF SIP. First, it is recommended that it be amended such that a review is completed every two years, as found in the US EPA SIP and recommended by Singh. Second, the use of the SIP should be monitored against the four

[27] U.S. Environmental Protection Agency, *Scientific Integrity Policy*…, 11.

variables that could not be assessed due to the policy's newness. This will determine if there is room for its broader use in relevant areas. Finally, at the first amendment cycle Singh's variables should each be considered for inclusion in the policy. Developed in this way, the DND/CAF SIP's effectiveness will be maximized in the most expedient manner.

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