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An SPS Dispute without Science? The Fukushima *Case and the Dichotomy of Science/Non-Science Obligations under the SPS Agreement*

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Abstract

The interface between science and law has been much debated in various fields of international law and the World Trade Organization (WTO) has been one of the main forums. Notably, WTO disputes, such as EC – Hormones *and* EC – Biotech*, have drawn controversies and criticisms over the role of science in WTO law.* Korea – Radionuclides *– also known as the* Fukushima *case – calls upon us to reconsider an under-analysed perspective regarding science and law. While the Fukushima accident marked the first massive radionuclide release into the ocean with significant uncertainties and complexities,* Korea – Radionuclides *did not touch upon any 'science-based' obligations under the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement). Thus, it stands out as a unique dispute in the 25 years of the SPS case law. This article unpacks* Korea – Radionuclides*, challenging and rethinking the assumed dichotomy between science-based and non-science-based obligations under the SPS Agreement. Our critical examination of* Korea – Radionuclides *suggests that science plays an important role even in the discussions of non-science-based obligations. In contrast to the conventional wisdom of the science/non-science dichotomy, we further argue that the normative integrity and* raison d'être *of the SPS Agreement in fact rest upon the inextricable nexus and integration between science-based and non-science-based obligations.*

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1 Introduction

The interface between science and law has been much debated in various fields of international law, and there is never a shortage of topics.[1] The World Trade Organization (WTO) law has been one of the focal points for intense debates over the dynamic and complex interactions between science and law. Notably, a number of WTO disputes, such as *EC – Hormones*, *EC – Biotech (GMOs)* and *US/Canada – Continued Suspension of Obligations in the EC – Hormones Dispute* have attracted controversies and criticisms over the role of science in WTO law.[2] While the discussions regarding science and law persist, trade measures involving scientific issues also proliferate.

Amid controversies concerning the legality of various measures taken by WTO members in response to the 2011 Fukushima Dai-ichi Nuclear Power Plant accident (the Fukushima accident), *Korea – Radionuclides* – also known as the *Fukushima* case – calls upon us to reconsider an under-analysed perspective regarding science and law.[3] Concerns over safety still remain today, a decade after the Fukushima accident. Japan has recently decided to release contaminated water that originated from the destroyed nuclear power plant into the ocean, which again introduces safety concerns domestically and globally with serious legal, economic and political ramifications.[4]

The *Fukushima* case concerns sanitary and phytosanitary (SPS) measures adopted by Korea against food potentially contaminated with radionuclides, including the total import bans on Japanese fishery products from certain affected sea areas. The Appellate Body circulated its report on 11 April 2019, a week after the circulation of the year's most controversial decision on the national security exception under the General Agreement on Tariffs and Trade (GATT), *Russia – Traffic in Transit*.[5] *Korea – Radionuclides*, therefore, has not received much attention outside of the disputing members of the WTO. However, in our view, *Korea – Radionuclides* stands out as an

1 See, e.g., 'Focus: Human Rights and Science', 31(2) *European Journal of International Law* (*EJIL*) (2020).

2 World Trade Organization (WTO), *European Communities – Measures Concerning Meat and Meat Products (Hormones) – Report of the Panel*, 13 February 1998, WT/DS26/R, WT/DS48/R, as modified by the *Report of the Appellate Body*, WT/DS26/AB/R, WT/DS48/AB/R; WTO, *European Communities – Measures Affecting the Approval and Marketing of Biotech Products – Report of the Panel*, 21 November 2006, WT/DS291/R, WT/DS292/R, WT/DS293/R; WTO, *United States/Canada – Continued Suspension of Obligations in the EC – Hormones Dispute – Report of the Panel*, WT/DS320/R, WT/DS321/R, as modified by the *Report of the Appellate Body*, 10 November 2008, WT/DS320/AB/R, WT/DS321/AB/R.

3 WTO, *Korea – Import Bans, and Testing and Certification Requirements for Radionuclides* (*Korea – Radionuclides*) *– Report of the Panel*, WT/DS495/R, as modified by the *Report of the Appellate Body*, 26 April 2019, WT/DS495/AB/R. *Korea – Radionuclides* is one of the few WTO cases in which a complaining party won at the panel level but lost completely on appeal. Arguably, the disputing members, including Korea, did not expect such outcomes.

4 'Fukushima: Japan Approved Releasing Wastewater into Ocean', *BBC News* (14 April 2021), available at www.bbc.com/news/world-asia-56728068. Releasing contaminated water into the ocean may affect Japan's 'bargaining' with Korea (as well as other Asian countries) in the future over their import bans and restrictive measures. Bown and Mavroidis, 'Is This the End?: The WTO Case Law of 2019', 20 *World Trade Review* (*WTR*) (2021) 383, at 386.

5 WTO, *Russia – Measures Concerning Traffic in Transit – Report of the Panel*, 26 April 2019, WT/DS512/R; General Agreement on Tariffs and Trade 1994 (GATT), 55 UNTS 194.

interesting case that merits scholarly investigation with regard to its ramifications for WTO case law, as it was the first SPS dispute that did not touch upon any 'science-based' obligations under the WTO's Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement).[6] Furthermore, the rulings of the Appellate Body were delivered – surprisingly – in an extremely opaque and ambiguous manner. What does an SPS dispute without science entail anyway?

This article aims to unpack the Appellate Body's decisions in *Korea – Radionuclides* and their underlying rationales, which are unique in two ways. First, the Appellate Body reversed the main findings of the Panel yet did not proceed to complete the analysis, thereby failing to settle the dispute. To be sure, there have been a number of cases where the Appellate Body has not completed its analysis due to the inherent constraints that limit its scope of adjudication to only matters of law. While commentators have considered this problem elsewhere,[7] the Appellate Body's restraints as such have usually left disputes only partly unresolved. However, in *Korea – Radionuclides*, the Appellate Body left intact Japan's main claims at the heart of the dispute, and, therefore, the dispute was substantively unsettled (although the Appellate Body found Korea's measures inconsistent with transparency obligations – namely, Annex B(1) and Article 7 of the SPS Agreement, which require WTO members to publish sufficient information), which made this 'incompletion of analysis' even more problematic. The Appellate Body should have been aware of the potential damage to its reputation and legitimacy for not completing its analysis. It begs the question why the Appellate Body decided to risk its reputation and legitimacy at the time of the WTO crisis and to handle *Korea – Radionuclides* in this way.

Second, *Korea – Radionuclides* proves to be exceptional in the 25 years of case law since Japan did not ground its complaint on science-based obligations under the SPS Agreement. Rather, it relied on non-science-based obligations under the agreement (in particular, GATT-style requirements of non-discrimination under Article 2.3 and the necessity test under Article 5.6), marking a clear deviation from all the past SPS disputes. The existing literature on the SPS Agreement relies on an orthodox dichotomy between these two types of obligations: science-based obligations and non-science-based obligations.[8] Science-based obligations have been regarded as existing at the centre of gravity of the SPS Agreement since it elaborates on the GATT obligations and allows members to exercise regulatory autonomy to protect human, animal

[6] Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) 1994, 1867 UNTS 493.

[7] See, e.g., Yanovich and Voon, 'Completing the Analysis in WTO Appeals: The Practice and Its Limitations', 9 *Journal of International Economic Law* (*JIEL*) (2006) 933.

[8] See, e.g., J. Scott, *The WTO Agreement on Sanitary and Phytosanitary Measures: A Commentary* (2007), at 81, 139 (using the expressions of 'science-based obligations' versus 'additional obligations'); L. Gruszczynski, *Regulating Health and Environmental Risks under WTO Law: A Critical Analysis of the SPS Agreement* (2010), at 219 (using the expressions 'science-based provisions' versus 'risk management disciplines'); P. Van den Bossche and W. Zdouc, *The Law and Policy of the World Trade Organization: Text, Cases, and Materials* (4th edn, 2017), at 955–961 (using the expressions 'obligations relating to risk assessment' versus 'obligations relating to risk management').

or plant life or health from various risks as long as the restrictive measures follow core requirements of risk assessment and scientific principles. As a matter of fact, all the past SPS disputes have been based on at least one of these science-based obligations. In *Korea – Radionuclides*, however, Japan did not follow this path but, rather, premised its claims entirely on non-science-based obligations. The Appellate Body's approach to this SPS dispute without science may open up a new path for case law, and it raises the question of what such an unconventional SPS dispute means anyway.

In our view, this question probes the under-appreciated and under-analysed relationship between science-based and non-science-based obligations, conventionally regarded as a dichotomy, which we challenge on both theoretical and practical grounds. As analysed in section 4, the SPS Agreement is designed to incorporate new elements such as scientific principles and evidence, risk assessment and scientific justification into the discrimination-based approach of the GATT in order to better test the rationality of SPS measures. While these new elements create a widely recognized dichotomy between science-based and non-science-based obligations under the SPS framework, we use *Korea – Radionuclides* as a vantage point to demonstrate that the SPS Agreement's institutional design is much more complex and dynamic and that there is no such a thing as simple dichotomy.

Yet what does the dynamic and complex institutional design entail? The process of locating an apt answer to this question, as we will argue in this article, sheds light on the 'normative integrity' of the SPS Agreement. The normative integrity lies in the inseparable relationship between science-based and non-science-based obligations, and such inextricable nexus is the *raison d'être* of the SPS Agreement. We argue that this 'normative integrity' is what gives the SPS Agreement meaning and defines the very identity and purpose of the agreement as a framework of legal rules and institutions. As will be demonstrated, an SPS dispute raised without science-based obligations does involve scientific inquiries, and, potentially, it can further involve the issues of scientific uncertainties and complexities, which are systematically overlooked in *Korea – Radionuclides*. At the end of the day, the Fukushima accident marks the first massive radionuclide release into the ocean and assumingly poses unprecedented scientific questions.

This article is organized as follows. Section 2 expounds the background of this case and discusses Japan's litigation strategies involved in raising an SPS dispute without science-based obligations. Section 3 then examines the Appellate Body's rulings on the major claims of the dispute – Articles 2.3 and 5.6 – and assesses the grounds on which the Appellate Body reversed the Panel's findings. In section 4, we consider the interactions between science-based and non-science-based obligations – how the *Fukushima* case inspired a theoretical reflection of the normative integrity of the SPS Agreement. Based on this theoretical foundation, we offer a critical evaluation of an alternative litigation scenario and, more broadly, the underlying rationales for the WTO's highest adjudicatory body to guard the integrity of the SPS Agreement and the legitimacy of the system at the cost of its reputation. Section 5 concludes.

2 Litigation without Science: A Deviation from the SPS Case Law

Korea imposed several measures in response to the 2011 Fukushima accident.[9] The heaviest measure concerned Korea's import bans of 28 fishery products from eight prefectures in Japan, referred to as the 'blanket import ban' on fishery products. According to Japan's Ministry of Agriculture, Forestry and Fisheries, while 55 countries and regions imposed trade measures on various Japanese food products following the 2011 Fukushima accident, 41 have already lifted them (as of 10 October 2021).[10] However, import bans persist in China, Hong Kong, Macau, Korea and Taiwan.[11] These import bans vary, covering various food products from different Japanese prefectures. Japan has only brought a claim against Korea because Korea's import ban was mainly targeted at fishery products from a range of prefectures, which have had extensive impacts on the Japanese fishery industry.

After the 2011 Fukushima accident, Japan took regulatory steps by imposing a radiation dose limit of below 1 millisieverts per year (mSv/year) from food contaminated with radionuclides. Korea also adopted this limit, based on an annual dose limit adopted by the Codex Alimentarius Commission (Codex).[12] The Codex also set up a guideline for maximum levels of individual 'radionuclides' concerning radiation damage.[13] In this regard, Japan established a specific maximum level for caesium – the tolerance level for food (except for tea, infant food and milk) must be below 100 becquerel per kilogram (Bq/kg) of caesium – which is one-tenth of the Codex guideline

[9] Japan challenged three types of Korea's measures: (i) additional testing requirements on food products when trace amounts of caesium or iodine are detected; (ii) the product-specific import bans on Alaska pollock and Pacific cod from certain prefectures; and (iii) the blanket import ban on 28 fishery products from eight prefectures. See *Korea – Radionuclides – Report of the Panel*, *supra* note 3, paras 2.112–2.115.

[10] Japan Ministry of Agriculture, Forest and Fisheries (MAFF), Status of Countries and Regions Introduced Import Measures on Japanese Food after the TEPCO Fukushima Daiichi Nuclear Power Station Accident, available at www.maff.go.jp/j/export/e_info/attach/pdf/hukushima_kakukokukensa-26.pdf. For a timeline of the removal of import measures, see MAFF, 'List of Countries and Regions that Have Lifted Import Measures on Japanese Food Imposed after the TEPCO Fukushima Daiichi Nuclear Power Plant Accident' (as of 21 February 2022), available at www.maff.go.jp/j/export/e_shoumei/pdf/hukushima_kakukokukensa-t3.pdf.

[11] The USA had been imposing import bans on rice and mushrooms; however, it lifted these bans on 22 September 2021, which the MAFF emphasized as a great achievement through bilateral consultations based on science. MAFF, Press Release, 22 September 2021 (in Japanese), available at www.maff.go.jp/j/press/yusyutu_kokusai/chiiki/210922.html. While Taiwan had been maintaining severe import bans, it recently mitigated the measures. MAFF, Press Release, 21 February 2022 (in Japanese), available at https://www.maff.go.jp/j/press/yusyutu_kokusai/chiiki/220221.html. Reportedly, this might be related to Taiwan's application for membership in the Comprehensive and Progressive Agreement for Trans-Pacific Partnership 2018. 'Ending Ban on Fukushima Food Imports May Be Key for Taiwan's TPP Bid', *Japan Times* (24 September 2021), available at www.japantimes.co.jp/news/2021/09/24/business/taiwan-food-import-ban-tpp/; 'Taiwan Lifts Import Ban on Japan Food Linked to Fukushima Disaster', *Nikkei Asia* (21 February 2022), available at https://asia.nikkei.com/Economy/Trade/Taiwan-lifts-import-ban-on-Japan-food-linked-to-Fukushima-disaster.

[12] *Korea – Radionuclides – Report of the Panel*, *supra* note 3, para. 7.165.

[13] *Ibid.*, at 35, Table 2: Guideline Levels for Radionuclides.

level (1,000 Bq/kg).[14] Here, it is relevant to note the Panel's finding that 'by 2015 the levels of caesium concentration in Japanese food, generally, returned to levels below 100 Bq/kg'.[15]

Besides caesium, other radionuclides, such as strontium and plutonium,[16] were released at the 2011 Fukushima accident. However, since caesium was the only radionuclide still detected long after the accident (that is, the presence of the other radionuclides had diminished to below the detectable level),[17] Japan opted only to establish a specific maximum level for caesium. According to Japan, 'if the amount of caesium in a product is below 100 Bq/kg, the levels of the other radionuclides will be below the Codex limits'.[18] This was confirmed by the Panel: food products below the level of 100 Bq/kg of caesium 'would contain less than Korea's specific maximum levels for strontium, plutonium, and the other Codex radionuclides'.[19]

In terms of the relation between the level of 100 Bq/kg of caesium and the 1 mSv/year dose limit, the Panel found that the 100 Bq/kg limit for caesium 'would result in an effective dose below 1 mSv/year, and likely significantly lower, even if 100% of food consumed was of Japanese origin'.[20] We will discuss Korea's tolerance levels – its appropriate level of protection (ALOP) – in greater detail in section 3.B. At the outset, to anyone familiar with the SPS Agreement, an SPS dispute without science-based obligations is peculiar. While Japan included science-based obligations (Articles 2.2, 5.1 and 5.7) as legal bases in its request for consultation,[21] it did not refer to such obligations in its terms of reference for the Panel establishment. That is, Japan did not claim that Korea's import bans on Japanese fishery products containing caesium below 100 Bq/kg were inconsistent with Articles 2.2, 5.1 and 5.7 of the SPS Agreement. Rather, Japan made complaints based on provisions that are conventionally regarded as non-science-based obligations – Articles 2.3 and 5.6.[22]

More specifically, Japan decided to argue, based on Article 5.6, that Korea's blanket import bans were more trade restrictive than required to achieve Korea's ALOP. For Japan, Korea's ALOP was clearly set at a level of 1 mSV/year;[23] by comparison, Japan's limit of 100 Bq/kg of caesium was far lower and, thus, sufficient to meet Korea's ALOP. Furthermore, instead of relying on the science-based obligations of the SPS

[14] *Ibid.*, paras 7.168, 7.198.

[15] *Ibid.*, para. 7.309.

[16] In this case, six radionuclides were at issue (that is, Caesium 134, Caesium 137, Strontium 90, Plutonium 239, Plutonium 240 and iodine). *Ibid.*, para. 2.11.

[17] This was also confirmed in the Panel report. *Ibid.*, para. 7.243 ('at least since 2013, the data is sufficient to confirm that caesium levels are consistently below 100 Bq/kg and that strontium and plutonium have not been detected in levels even nearing their respective Codex guideline levels').

[18] *Ibid.*, para. 2.28.

[19] *Ibid.*, para. 7.249.

[20] *Ibid.*, para. 7.236; see also paras 7.244, 7.246.

[21] WTO, *Korea – Radionuclides – Request for Consultations by Japan*, 1 June 2015, WT/DS495/1, para. 15 (a).

[22] WTO, *Korea – Radionuclides – Request for the Establishment of a Panel by Japan*, 21 August 2015, WT/DS495/3, para. 18(a), (b), (c).

[23] *Korea – Radionuclides – Report of the Panel*, *supra* note 3, para. 7.161.

Agreement, Japan argued, based on Article 2.3, that the import bans constitute discrimination between food products from Japan and those from other origins because both products have similar contamination levels – namely, both contain caesium no higher than the level of 100 Bq/kg.[24]

Japan's litigation strategy of avoiding science-based obligations altogether may first seem a smart way to achieve a 'quick victory', as such obligations would not only involve difficulties in proving the safety of Japanese fishery products containing caesium below 100 Bq/kg but would also impose a large workload on the Panel to assess scientific evidence. We argue, however, that Japan's unconventional strategy of circumventing science-based obligations ultimately backfired for two reasons. First, contrary to conventional wisdom, Articles 2.3 and 5.6 are by no means 'non-science-based' obligations *per se*. Rather, as argued below, because of the inextricable nexus between science-based and non-science-based obligations, proper scrutiny under Articles 2.3 and 5.6 practically prompts the Panel and the Appellate Body to look into scientific inquiries and make scientific judgments. In terms of Article 5.6, the Panel examined the Japanese benchmark testing for 100 Bq/kg of caesium from various scientific aspects and assessed whether such a benchmark could achieve Korea's ALOP based on the advice of scientific experts.[25] For Article 2.3, the Panel's task was to determine whether Japanese products and non-Japanese products have similar potential for caesium contamination, with the assistance of scientific experts' opinions.[26] Second, the Appellate Body reversed the findings of the Panel, pointing out the Panel's errors under Article 2.3 and 5.6, but it did not complete the analysis. We surmise that what the Appellate Body did not articulate explicitly behind its 'incompletion of analysis' eventually touches upon a rethinking of the dichotomy between science-based and non-science-based obligations and further underlines the normative integrity of the SPS Agreement.

3 The Appellate Body's Ruling on the *Fukushima* Case

In this section, we analyse how Articles 2.3 and 5.6 – 'non-science-based' obligations – practically led the Panel and the Appellate Body to address scientific inquiries and make scientific judgments in *Korea – Radionuclides*. In essence, the Appellate Body reversed the findings of the Panel regarding Articles 2.3 and 5.6 but did not complete its analysis. Nevertheless, at both the Panel and Appellate Body levels, scientific knowledge, inquiries and judgments played a crucial role in determining compliance with Articles 2.3 and 5.6, albeit in different ways. How the Appellate Body reversed the Panel's findings in this case calls for a closer look at the nexus between science-based and non-science-based obligations under the SPS Agreement.

[24] *Ibid.*, para. 7.277.
[25] *Ibid.*, para. 7.179.
[26] *Ibid.*, paras 7.312–314.

A *Non-discrimination under SPS Article 2.3: What Are We Really Comparing in Assessing the Potential for Food Contamination?*

Article 2.3 requires that measures 'not arbitrarily or unjustifiably discriminate between Members where identical or similar conditions prevail, including between their own territory and that of other Members'. Thus, it is often described in the literature, and also in past WTO disputes, that Article 2.3 is a 'non-discrimination' clause that addresses the most-favoured-nation treatment and the national treatment, prohibiting discrimination between different origins.[27] While Article 2.3 is a 'non-discrimination' clause, there is no 'like products' test (such as the GATT's non-discrimination clause) here; instead, a comparable assessment of similarity of (territorial) conditions between members is required.[28]

What are the 'relevant conditions' to be compared or, more substantively, what are the 'territorial conditions'? In the *Fukushima* case, the Appellate Body took a different approach from the Panel in the understanding of 'territorial conditions', which led it to reverse the Panel's decision. Moreover, the arguments and decisions over Article 2.3 in this case have revealed that an analysis under Article 2.3 cannot escape from a scientific analysis and consideration of SPS risks, although Japan did not invoke science-based obligations. To be precise, Article 2.3 contains two sentences: the first is concerned with 'arbitrary and unjustifiable discrimination' and the second concerns 'disguised restriction'. At the Panel level, Korea's measure was found to be both 'arbitrary and unjustifiable discrimination' and 'a disguised restriction';[29] however, at the Appellate Body level, the issue was, in the first place, whether 'identical or similar conditions (including 'territorial conditions')' exist between members.

Japan claimed that the conditions to be compared in this dispute were SPS risks in food products from different origins – risks in products from Japan and those from other origins.[30] Japan's approach to product-based comparisons reminds us of the 'like product' test under the GATT. Under Article III:4 of the GATT, comparisons are undertaken between domestic and imported products in terms of four criteria: the product's physical properties, end uses, consumer perceptions and tariff classification.[31] On this point, Japan might have regarded Article 2.3 of the SPS Agreement as simply creating the same obligations as Article III:4. On the other hand, Korea opposed such a product-based analysis and claimed that firm comparisons should be undertaken with regard to 'territorial' conditions between members (as Article 2.3 has the term 'territory').[32] Also, Korea was inspired by Article 5.2 of the SPS Agreement, which lists factors that should be considered in risk analysis. One of those factors is 'relevant

[27] WTO, *Australia – Measures Affecting Importation of Salmon* (*Australia – Salmon*) *– Report of the Appellate Body*, 6 November 1998, WT/DS18/AB/R, para. 251.

[28] Scott, *supra* note 8, at 141.

[29] *Korea – Radionuclides – Report of the Panel*, *supra* note 3, paras 7.349–7.350.

[30] *Ibid.*, paras 7.262–7.263.

[31] WTO, *European Communities – Measures Affecting Asbestos and Products Containing Asbestos* (*EC – Asbestos*) *– Report of the Appellate Body*, 5 April 2001, WT/DS/135/AB/R, paras 101–102.

[32] *Korea – Radionuclides – Report of the Panel*, *supra* note 3, para. 7.264.

ecological and environmental conditions'. Accordingly, Korea argued that territorial conditions include relevant ecological and environmental conditions in an exporting country.[33]

While the Panel took an approach similar to Japan's (a product-based analysis), the Appellate Body seemed to take an approach reconciling the approaches of both Japan and Korea. This point is well described in the Appellate Body's own words:

> [A] proper interpretation of Article 2.3 includes consideration of other relevant conditions, such as territorial conditions, to the extent that they have the potential to affect the products at issue. The analysis under Article 2.3 thus entails consideration of all relevant conditions in different Members, including territorial conditions that may not yet have manifested in products but are relevant in light of the regulatory objective and specific SPS risks at issue.[34]

Below, we examine how the Appellate Body explored and assessed 'relevant conditions, such as territorial conditions, to the extent that they have the potential to affect the product as issue' in a manner that breaks the conventional dichotomy between science-based and non-science-based provisions.

From the starting point of assessing 'the *relevant* conditions', the Panel and the Appellate Body both focused on the '*potential* for contamination' of food products containing caesium. In fact, the analysis of the '*potential* for contamination' of food products inevitably involves an analysis and comparison of SPS risks. The Appellate Body stated that, in identifying 'the *relevant* conditions', the specific SPS risks at issue should be considered in light of a regulatory objective of the measure pursued under the SPS Agreement.[35] The Panel also recognized that 'the starting point of an analysis of the relevant conditions is the objective of the measure and the risk being addressed'.[36] Here, the Panel noted that a regulatory objective of import bans by Korea is 'to protect human health from potential adverse effects arising from the presence of radionuclides in food and beverages' (on the basis of Annex A(1)(b) of the SPS Agreement).[37] Accordingly, the Panel decided to examine 'whether products from Japan and the rest of the world have a similar potential to be contaminated' with caesium.[38]

In our view, as the analysis of the '*potential* for contamination' of food products suggests, the discrimination clause of Article 2.3, conventionally regarded as a non-science-based provision, does involve a scientific consideration of SPS risks. It is also important to recall that 'potential' is a term used in the definition of 'risk assessment' in Annex A.4 of the SPS Agreement: '[T]he evaluation of the potential for adverse

[33] *Ibid.*

[34] *Korea – Radionuclides – Report of the Appellate Body*, *supra* note 3, para. 5.91; see also para. 5.63 ('[a]t the same time, we agree with the Panel's conclusion that the conditions referred to under Article 2.3 may be construed to "*include* those found in products and *not just* the territory of an exporting or importing Member"') (emphasis in original).

[35] *Ibid.*, para. 5.59 (emphasis added).

[36] *Korea – Radionuclides – Report of the Panel*, *supra* note 3, paras 7.280.

[37] *Ibid.*

[38] *Ibid.*, para. 7.283.

effects on human or animal health arising from the presence of additives, contaminants, toxins or disease-causing organisms in food, beverages or feedstuffs.'[39]

One important question is how, and to what extent, the 'potential' for food contamination should be assessed. The Appellate Body observed that the analysis under Article 2.3 involves 'consideration of all relevant conditions in different Members, including territorial conditions that may not yet have manifested in products'.[40] What factors are included in 'territorial conditions'? In other words, what factors bring about relevant territorial differences that may increase the potential for food contamination? In this regard, the Appellate Body, supporting Korea's claim, noted that 'ecological and environmental conditions' in Japan are to be included in the analysis of the potential for contamination of foods.[41] As previously noted, the concept of 'ecological and environmental conditions' was drawn from Article 5.2 of the SPS Agreement, which explains the factors that should be taken into account in the scientific process of risk assessment.

On this point, the Panel also acknowledged the 'ecological and environmental conditions' as one factor for consideration,[42] but it put more focus on the risk present in the products.[43] Certainly, this is one way of thinking: this case is about food contamination; thus, the focus should be more on the risks presented in foods (that is, contamination with caesium).[44] However, the Appellate Body did not support this view and stated that the Panel's conclusion did not '[account] for any *degree* of contamination or differentiating the *relative potential* for contamination in different territories'.[45] It is important to note that the Appellate Body considered the issue here as a matter of 'degree' that merits a scientific inquiry.

In particular, the Appellate Body criticized the Panel for not reflecting possible differences in environmental contamination caused by radionuclide release from the Fukushima accident, in contrast to contamination from other major releases worldwide before 2011, such as various past nuclear weapons tests and the 1986 accident at the Chernobyl nuclear power plant.[46] According to the Appellate Body, the Panel overlooked the likelihood (again, a risk assessment term) that 'specific release events or radionuclide sources may result in an incremental and localized *increase* in

[39] For discussion on the meaning of the term 'potential' in past WTO SPS cases, see note 116 below.

[40] *Korea – Radionuclides – Report of the Appellate Body*, *supra* note 3, para. 5.64.

[41] *Ibid.*, paras 5.63, 5.66; see also *Korea – Radionuclides – Report of the Panel*, *supra* note 3, para. 7.270.

[42] *Korea – Radionuclides – Report of the Panel*, *supra* note 3, paras 7.270, 7.273.

[43] *Ibid.*, para. 7.274 ('it is appropriate … to focus on the presence of a health hazard in certain products and not on an analysis of territories').

[44] In this regard, the European Union's (EU) third participant's submission offers a similar way of thinking to the Panel: '[I]n a case where food-related risks are at issue, the more general ecological and environmental conditions in a Member's territory may be of more limited or, potentially, even of no relevance.' WTO, *Korea – Radionuclides – Executive Summary of the European Union's Third Participant's Submission*, Annex C-2, 11 April 2019, WT/DS495/AB/R/Add.1, at 37, para. 6 (this view was expressed in the context of which factors in Article 5.2 are more relevant in the risk assessment if Korea would claim insufficient scientific evidence to conduct a risk assessment under Article 5.7).

[45] *Korea – Radionuclides – Report of the Appellate Body*, *supra* note 3, para. 5.73 (emphasis in original).

[46] *Ibid.*, para. 5.76.

contamination levels *and* potential for food contamination' because 'radionuclides can be more concentrated close to the source of contamination'.[47] Thus, the Appellate Body suggested that environmental contamination in Japan, which may ultimately increase the contamination of food products, may be higher since the radionuclide release from the Fukushima accident brought about 'localized and relatively recent territorial contamination'.[48] While the Panel and the Appellate Body have different views on territorial variances that may affect the potential for food contamination, it is worth noting that both approaches involve scientific analysis and the consideration of SPS risks, even under the non-discrimination obligation.

The second difference between the Panel and the Appellate Body concerns the assessment of the potential for contamination in Japanese food products as compared with non-Japanese food products. The Appellate Body stated that the Panel mistakenly equated 'the *potential* for caesium contamination with the observation of *actual* measurements below a quantitative tolerance level' of 100 Bq/kg.[49] The Appellate Body's criticisms of the Panel were as follows: 'The Panel's conclusion refers simply to "potential" to contain caesium below the 100 Bq/kg tolerance level in both Japanese and non-Japanese products, but does not address the relative degree of the potential for contamination, or at least whether such products have a *similar* potential for caesium contamination'.[50] The Appellate Body also stated: 'While the "potential to be contaminated" appears to concern a question of degree, taking into account Korea's regulatory objective, the other condition identified by the Panel appears to entail a more binary assessment of whether contamination levels would, or would not, fall below a given quantitative threshold'.[51]

Notice that, again, the Appellate Body emphasized the 'degree' of potential for contamination, criticizing the Panel's analysis as a 'binary assessment' – checking below or above the 100 Bq/kg level. Based on the expert's view expressed in the Panel's meeting, the Appellate Body admitted that 'the concentration levels in Japanese and non-Japanese foods would both be "very low and significantly lower than 100 Bq/kg"'.[52] In this regard, we can also note the Panel's finding that 'the majority of Japanese food products contained between 0 and 25 Bq/kg of caesium' in the first two quarters of 2016.[53] Nonetheless, the Appellate Body suggested the need for further comparison of the potential for contamination below the 100 Bq/kg level.[54] This view was based on the expert's statement in the Panel that 'concentrations of caesium in Japanese foods *are likely to be higher than in non-Japanese foods*' even below the 100 Bq/kg level.[55]

47 *Ibid.*, para. 5.75 (emphasis in original).
48 *Ibid.*, para. 5.76.
49 *Ibid.*, para. 5.79 (emphasis added).
50 *Ibid.*, para. 5.85 (emphasis in original).
51 *Ibid.*, para. 5.86.
52 *Ibid.*, para. 5.84.
53 *Korea – Radionuclides – Report of the Panel*, *supra* note 3, para. 7.308.
54 *Korea – Radionuclides – Report of the Appellate Body*, *supra* note 3, para. 5.85.
55 *Ibid.*, para. 5.83 (emphasis in original) (referring to the *Korea – Radionuclides – Report of the Panel*, *supra* note 3, para. 7.313).

Accordingly, the Appellate Body found the Panel had erred in its interpretation and application of Article 2.3, and it reversed the Panel's decision. However, it did not move to complete the analysis to address whether there are (dis)similarities in the potential for contamination between Japanese and non-Japanese food products.[56] Section 4 considers what the Appellate Body did not articulate explicitly and the systematic implications therein; yet, one thing that is certain is the fact that the relevant arguments are all highly scientific – to reiterate, a non-discrimination obligation under the SPS Agreement inevitably involves scientific arguments and assessments.

B *Ruling under SPS Article 5.6: A Classic Problem of Identifying a Respondent's ALOP?*

The other 'non-science-based' claim raised by Japan is Article 5.6 of the SPS Agreement, which requires WTO members to 'ensure that [SPS] measures are not more trade-restrictive than required to achieve their appropriate level of sanitary or phytosanitary protection (ALOP), taking into account technical and economic feasibility'. The footnote to Article 5.6 elaborates and provides more detailed requirements: '[A] measure is not more trade-restrictive than required unless there is another measure, reasonably available taking into account technical and economic feasibility, that achieves the [ALOP] and is significantly less restrictive to trade'. From this provision, a three-cumulative criteria test is established to examine whether there is an alternative measure that (i) is reasonably available considering technical and economic feasibility; (ii) achieves a responding party's ALOP; and (iii) is significantly less restrictive to trade than the respondent's SPS measure at issue.[57] Accordingly, some simply refer to Article 5.6 as the 'necessity test', while others have considered Article 5.6 to be a 'least-trade-restrictive alternative requirement'[58] or a 'weak proportionality requirement'[59] since it imposes upon WTO members an obligation to evaluate SPS measures that can achieve their ALOP.[60]

[56] Probably, the most difficult issue that Japan would encounter is that there is always a potential risk of higher contamination levels in Japanese food products produced in contaminated areas (compared to non-Japanese food). However, the Appellate Body emphasized that what is of concern is the 'degree' of potential for contamination. Therefore, Japan can explain how the potential for contamination is minimized by showing how low contamination levels, significantly lower than 100 becquerel per kilogram, have been managed and sustained in the contaminated area.

[57] *Australia – Salmon – Report of the Appellate Body*, *supra* note 27, para. 194; WTO, *Japan – Measures Affecting Agricultural Products – Report of the Appellate Body*, 19 March 1999, WT/DS76/AB/R, para. 126.

[58] Gruszczynski, *supra* note 8, at 248.

[59] Scott, *supra* note 8, at 158; see also Marceau and Trachtman, 'A Map of the World Trade Organization Law of Domestic Regulation of Goods: The Technical Barriers to Trade Agreement, the Sanitary and Phytosanitary Measures Agreement, and the General Agreement on Tariffs and Trade', 48 *Journal of World Trade (JWT)* (2014) 351, at 368–369.

[60] Other studies have reframed Article 5.6 as an 'excessivity test', which is a distinct and self-standing obligation separate from the traditional necessity test under Article 2.2 of the SPS Agreement. See Schebesta and Sinopoli, 'The Potency of the SPS Agreement's Excessivity Test: The Impact of Article 5.6 on Trade Liberalization and the Regulatory Power of WTO Members to Take Sanitary and Phytosanitary Measures', 21 *JIEL* (2018) 123; see also Dawar and Ronen, 'How "Necessary"? A Comparison of Legal and Economic Assessments – GATT Dispute Settlements under: Article XX(B), TBT 2.2 and SPS 5.6', 8 *Trade, Law and Development* (2017) 1. We do not address these issues since the Appellate Body's ruling on Article 5.6 in this dispute centred on the determination of the appropriate level of protection (ALOP).

Jeffery Atik has stated that the SPS Agreement appears to be an 'illusion' because it relies on the very vague notion of an ALOP.[61] Here, we focus on a fundamental condition before conducting the three-cumulative test of Article 5.6 – that is, the determination of the WTO member's ALOP. It has been noted that 'the requirement to achieve [the ALOP] is the most extensively analyzed and most difficult to prove' aspect in the three-cumulative test.[62] However, before applying this difficult test, there is a more fundamental question – what is the respondent's ALOP from the outset?

In practice, under an Article 5.6 claim, a complaining party has to identify an alternative measure that is reasonably available, considering technical or economic feasibility. A panel is then expected to compare this alternative with the SPS measure adopted by the responding party. On this point, the Appellate Body has stated: 'A crucial element in this analysis is that comparison between [the ALOP] of the respondent and [the ALOP] that would be achieved by the proposed alternative measure.'[63] However, Article 5.6 gives the respondent a systematically favourable position.

This is largely because, from the outset, the respondent enjoys significant discretion in setting its ALOP.[64] The SPS Agreement does not explicitly obligate WTO members to determine an ALOP. Rather, the obligation to determine an ALOP is, as stated by the Appellate Body in *Australia – Salmon*, 'implicit in several provisions of the SPS Agreement, in particular, in paragraph 3 of Annex B, Article 4.1, Article 5.4 and Article 5.6 of the SPS Agreement'.[65] At the same time, the Appellate Body also affirmed that it is a 'prerogative' of WTO members to determine the ALOP.[66] Moreover, the ALOP can be determined in either quantitative or qualitative terms,[67] which gives 'considerable flexibility' in setting the ALOP.[68]

Thus, in general, a panel is not expected to take a hard look at how and why such an ALOP is determined.[69] However, if a respondent fails to determine its ALOP with

[61] Atik, 'On the Efficiency of Health Measures and the Appropriate Level of Protection', in G. Van Calster and D. Prévost (eds), *Research Handbook on Environment, Health, and the WTO* (2013) 116, at 138; see also Rovnov, 'Appropriate Level of Protection: The Most Misconceived Notion of WTO Law', 31 *EJIL* (2020) 1343, at 1363; Lee, 'Regulatory Autonomy under the WTO Agreement on Sanitary and Phytosanitary Measures: Implications of *Korea – Import Bans*, and Testing and Certification Requirements for Radionuclides', 20 *WTR* (2021) 321, at 322–333.

[62] Schebesta and Sinopoli, *supra* note 60, at 133.

[63] WTO, *India – Measures Concerning the Importation of Certain Agricultural Products – Report of the Appellate Body*, 19 June 2015, WT/DS430/AB/R, para. 5.223.

[64] Gruszczynski, *supra* note 8, at 226.

[65] *Australia – Salmon – Report of the Appellate Body*, *supra* note 27, paras 205–206.

[66] *Ibid.*, para. 199.

[67] *Ibid.*, para. 206 ('[w]e do not believe that there is an obligation to determine the appropriate level of protection in quantitative terms'); see also SPS Committee, Guidelines to Further the Practical Implementation of Article 5.5, Doc. G/SPS/15, 18 July 2000, A. Application of the Concept of the Appropriate Level of Protection (A.1. 'The statement of the appropriate level of protection may be qualitative or quantitative').

[68] Atik, *supra* note 61, at 137.

[69] WTO, *Australia – Measures Affecting the Importation of Apples from New Zealand (Australia – Apples) – Report of the Appellate Body*, 17 December 2010, WT/DS367/AB/R, para. 355 ('[t]he Panel's task was not to review a determination made by a national authority on that question or any other, but to rule on whether the alternative measures proposed by New Zealand would achieve Australia's appropriate level of protection').

sufficient precision, the panel may establish the ALOP on the basis of the level of protection reflected in the SPS measure actually applied.[70] The case of 'insufficient precision' of the ALOP is the only case where a panel can adjust a WTO member's ALOP. But, as a cautionary note, the Appellate Body has stated that the determination of the ALOP and the maintenance of the SPS measure should be treated separately:

> It is the appropriate level of protection which determines the SPS measure to be introduced or maintained, not the SPS measure introduced or maintained which determines the appropriate level of protection. To imply the appropriate level of protection from the existing SPS measure would be to assume that the measure always achieves the appropriate level of protection determined by the Member. That clearly cannot be the case.[71]

This statement suggests that a determined ALOP may be higher than the level of protection that is actually achieved by an SPS measure. Accordingly, it has been argued that, by setting a high (or complex or tricky!) ALOP, responding parties are arguably better placed to make a counter-argument against claims brought under Article 5.6.[72] With this background, a respondent largely dictates its ALOP, and a complainant seems systematically disadvantaged in an Article 5.6 claim.

In the *Fukushima* case, the Panel determined Korea's ALOP to be the level below the 1 mSv/year dose limit (which will be discussed in greater detail below), and, on this basis, it examined whether the 'alternative measure [proposed by Japan] can achieve an ALOP that is below 1 mSv/year'.[73] Japan claimed that an alternative measure to meet the Article 5.6 requirements is to test the 100 Bq/kg contamination level of caesium, which the Panel ultimately found to be reasonably available, technically and economically feasible, significantly less trade restrictive and satisfactory to meet Korea's ALOP.[74] Applying the cumulative test under Article 5.6, the Panel set out four considerations: (i) the identification and characterization of the contaminants; (ii) the levels of contaminants in Japanese food products; (iii) the extent of exposure of Korean consumers to radionuclides through the alternative measure suggested by Japan; and (iv) risk characterization.[75] Clearly, these considerations necessarily entail scientific inquiries and judgments, which again reinforces our argument – science does play a role in the discussions of non-science-based obligations.

However, the Appellate Body reversed the Panel's findings on the grounds that the Panel had erred in understanding Korea's ALOP and did not go any further to consider the cumulative test under Article 5.6. On appeal, both Korea and Japan noted that the Panel had accepted the formation of the ALOP claimed by Korea as comprising three elements.[76] Namely, the radioactivity levels in food consumed by Korean consumers are to be maintained at or below (i) the levels that exist in the ordinary environment;

[70] *Australia – Salmon – Report of the Appellate Body*, *supra* note 27, para. 207.
[71] *Ibid.*, para. 203.
[72] Scott, *supra* note 8, at 39; see also Gruszczynski, *supra* note 8, at 250.
[73] *Korea – Radionuclides – Report of the Panel*, *supra* note 3, paras 7.172–7.173.
[74] *Ibid.*, para. 7.253.
[75] *Ibid.*, para. 7.178.
[76] *Korea – Radionuclides – Report of the Appellate Body*, *supra* note 3, n. 99.

(ii) a level as low as reasonably achievable (ALARA); and (iii) the 1 mSv/year radiation dose limit.[77] The Appellate Body regarded Korea's ALOP as having a 'multi-faceted' character, with 'both qualitative and quantitative aspects'.[78] The 'quantitative' threshold is the 1 mSv/year dose limit, while the 'qualitative' elements are the level that exists in the ordinary environment and the ALARA level.

In this respect, it is worth making two observations. First, Japan seemed to understand Korea's ALOP only in quantitative terms (that is, the 1 mSv/year dose limit). Japan understood the ALOP in this way because of information from Korea.[79] Second, however, it turned out that Korea's ALOP was more complex than Japan had understood, including both quantitative and qualitative terms. Even though the determination of an ALOP can be either quantitative or qualitative, there had been no WTO SPS case before addressing an ALOP that included both quantitative and qualitative terms. For Japan, this situation was probably a nightmare – a respondent articulated a higher (or trickier!) ALOP than the level of protection actually applied by the respondent's SPS measure.

The Panel recognized the complexity of Korea's ALOP, stating that 'Korea's ALOP is not quantified at 1 mSv per year but is rather a qualitative ALOP that reflects Korea's adherence to the ALARA principle and its desire not to increase radiation exposure beyond what is in the ordinary environment'.[80] Also, the Panel explicitly acknowledged Korea's argument that 'its ALOP is not a fixed quantitative threshold'.[81] Noting this nuance, the Panel perceived the 'qualitative' aspects of the ALOP as designed 'to maintain radioactivity levels in food consumed by Koreans "at levels that exist in the ordinary environment – that is, in the absence of radiation from a major nuclear accident – and thus maintain levels of radioactive contamination in food that are [ALARA]"'.[82] However, in the end, the Panel took the view that 'the qualitative ALOP is reflected and inherent in the measures Korea applies to food products – which seek to limit overall consumption to below 1 mSv/year'.[83] Accordingly, the Panel effectively determined Korea's ALOP to be the level below the 1 mSv/year dose limit, which served as its benchmark for comparison under Article 5.6.

However, the Appellate Body criticized the Panel's approach, stating that the Panel put 'a predominant focus on exposure below 1 mSv/year as a decisive indicator of whether Japan's proposed alternative measure would meet Korea's ALOP'.[84] The

[77] *Ibid*., para. 5.26

[78] *Ibid*., paras. 5.26–5.27.

[79] *Korea – Radionuclides – Report of the Panel*, *supra* note 3, para. 7.161 ('Japan avers that Korea's ALOP is 1 mSv/year. Japan derives its conclusion from a document (issued by Korea in 2013) and explanatory material (issued by MFDS in 2014 and 2015), all of which described 1 mSv/year as the dose limit for the general public. Korea also informed Japan by letter on 15 September 2014 that "its ALOP for exposure to radiation from the ingestion of food contaminated with radionuclides is based on the Codex Standards"').

[80] *Korea – Radionuclides – Report of the Panel*, *supra* note 3, para. 7.247.

[81] *Ibid*., paras 7.163, 7.171.

[82] *Ibid*., para. 7.162.

[83] *Ibid*., para. 7.247.

[84] *Korea – Radionuclides – Report of the Appellate Body*, *supra* note 3, para. 5.28.

Appellate Body also stated that 'the Panel's emphasis on one element of the ALOP … raises the question of the precise relationship that exists between the various elements, both quantitative and qualitative, of that ALOP'.[85] It was therefore unclear to the Appellate Body 'whether [the Panel] considered the alternative measure to satisfy *all* of the elements of the ALOP it had identified'.[86]

The relationship between the qualitative and quantitative aspects of Korea's ALOP was one of the most problematic issues in the *Fukushima* case. The problem was rooted in the complexity and difficulty, as pointed out in the European Union's third participant's submission: 'The key issue in this respect is the relationship between [the 1 mSv/year benchmark] and the qualitative elements of the ALOP: are the latter made operative by the quantitative benchmark, or are they additional to it?'[87] If we take a closer look at the Panel's reasoning, it nonetheless seems to explore the relationship between the quantitative and qualitative aspects of the ALOP formed by Korea. For instance, the Panel underscored Korea's explanation for the relationship between 'qualitative' and 'quantitative' aspects: 'Korea acknowledges that it has adopted the Codex benchmark of 1 mSv/year radiation exposure limit, in order to quantify the highest radiation exposure it is willing to accept, keeping in mind the two objectives of not exceeding the levels in the ordinary environment and abiding by the ALARA principle'.[88] This statement seems to support the view that the qualitative elements of Korea's ALOP are made 'operative' by the quantitative 1 mSv/year benchmark.

A different, but related, question would be about the relationship between the two qualitative elements of Korea's ALOP. The Panel consulted experts about the ALARA principle[89] and the definition of the ordinary environment, but it likely gained no insight into explaining the relationship between these qualitative elements.[90] The Panel's frustration can be found in a footnote:

> The Panel makes this conclusion in light of the prerogative for Members to determine their own ALOP. However, the Panel notes that although Korea referred the Panel to the Korea Food Code where Korea expresses its adherence generally to the ALARA principle, Korea has not provided the Panel with any evidence that this ALOP, as articulated, pre-existed the onset of this proceeding. The Panel has received no documentation of how Korea developed its ALOP or where this ALOP is set forth in its internal legislation or regulations.[91]

[85] *Ibid.*, para. 5.29.

[86] *Ibid.*, para. 5.36 (emphasis in original).

[87] *Korea – Radionuclides – Executive Summary of the European Union's Third Participant's Submission*, *supra* note 44, at 38, para. 8.

[88] *Korea – Radionuclides – Report of the Panel*, *supra* note 3, para. 7.165.

[89] The as low as reasonably achievable (ALARA) principle is one of the principles in the establishment of maximum levels of contaminants in food and feed under the Codex standards. Codex, General Standard for Contaminants and Toxins in Food and Feed, Doc. CODEX STAN 193-1995 (1995). This was also noted by the Panel: 'We note that both the ICRP and Codex applied the ALARA principle when arriving at the dose limit for all radionuclides (1 mSv/year) and the guideline levels for the individual radionuclides'. *Ibid.*, para. 7.171.

[90] While the Panel seemed to accept the ALARA principle, it stated: 'The experts were not familiar with Korea's definition of the "ordinary environment" being the levels of radiation absent a major nuclear accident.' *Ibid*, paras 7.167–7.168, para. 7.170.

[91] *Ibid.*, n. 716.

In the end, the Panel established that the quantitative limit in effect was equal to the operational SPS measure as applied because products that went over the quantitative limit would not be accepted into the market. As explained by the Panel, '[p]rior panels have referred to the SPS measures applied to confirm the ALOP that is inherently reflected therein. In our view, if a Member is applying a particular measure with an express quantitative limit for contaminants, that is an indicator that products containing levels of contaminants below that limit will satisfy its ALOP'.[92] In our view, while we are sympathetic to the Panel's difficulties in tackling the ALOP's multiple elements, the Panel made a significant error by concluding, without sufficient explanation (which may again entail scientific inquiries and judgments), that the SPS measures applied can confirm that the ALOP is inherently reflected therein. As noted, the Appellate Body had previously ruled not to assume the ALOP from the existing SPS measure, except in the 'insufficient precision' case. The Panel in *Korea – Radionuclides* might have thought that Korea's ALOP was insufficiently precise.[93] However, the Appellate Body did not think so: Korea's ALOP was clearly composed of three elements, including both qualitative and quantitative terms. For the Appellate Body, the problem was that the Panel had not resolved the complexity of the ALOP's several components.[94] The Appellate Body stated:

> Where a panel considers that a respondent's ALOP differs from that articulated by the respondent, the panel must clearly explain what it has determined the respondent's ALOP to be, along with the reasons and evidentiary basis for the panel's determination. Reasons for such a determination may include whether the respondent has expressed its ALOP in a manner that it is insufficiently precise or that would otherwise render impossible the application of the disciplines of Article 5.6.[95]

The different approaches between the Panel and Appellate Body reflect a typical Article 5.6 dilemma: while the SPS Agreement treats the determination of the ALOP as the prerogative of WTO members, this prerogative defers too much to respondents. We can identify at least a 'double deference' to the responding parties: first, a respondent can claim an ALOP that differs from the ALOP reflected in the SPS measure applied and, second, a respondent can claim its ALOP as it pleases (with complexity) at the time of a dispute.[96]

[92] *Ibid.*, para. 7.172.

[93] *Ibid.*, para. 7.171 ('[a]lthough the SPS Agreement does not oblige Members to put forth a quantitative ALOP, their ALOPs must also not be so vague or equivocal as to evade their obligations').

[94] *Korea – Radionuclides – Report of the Appellate Body*, *supra* note 3, para. 5.35.

[95] *Ibid.*, para. 5.34.

[96] In this regard, Gruszczynski argued that it makes more sense for a panel to regard the ALOP reflected in, and achieved by, the measure actually adopted '[as] equal to or at least as high as' the ALOP claimed to be determined by a responding party. Gruszczynski, *supra* note 8, at 250. Recall that Article 5.6 seeks SPS measures not to be more trade restrictive than necessary. Therefore, what is most relevant is the SPS measure actually applied and the ALOP reflected in the measure. In this way, we can prevent a situation like the one in *Korea – Radionuclides* where a respondent argues during a panel proceeding that its ALOP is higher (or more complex) than, or different from, the level of protection that is reflected in the SPS measure at issue, thereby surprising and frustrating a complainant and panel.

The Article 5.6 rulings in *Korea – Radionuclides* presented a classic problem of identifying the ALOP in a dispute, thereby indicating that it would not be easy for a complainant to win an Article 5.6 claim without entailing a scientific inquiry. At the same time, in *Korea – Radionuclides*, one may feel that the Appellate Body gave too much deference to Korea generally. In the next section, we discuss in detail what the Appellate Body did not articulate explicitly within its ruling and the systemic implications therein.

4 Between Dichotomy and Integrity: Rethinking the Relation between Science-based and Non-science-based Obligations

There is already substantial SPS literature on science and law. A range of issues has been raised over the role of science in WTO law – for instance, the extent to which scientific evidence can supply objective criteria when the WTO adjudicators review the rationality (or irrationality) of an SPS measure and whether the WTO, as an international tribunal composed of trade lawyers and diplomats, is capable of reviewing the rationality of SPS measures in light of scientific principles and evidence. An extensive body of literature is devoted to these issues, alongside the development of SPS case law.[97] While science has been the normative anchor of the SPS Agreement, the debates in the existing literature largely agree that there is the limitation of the role of science in the decision-making process of the WTO adjudicators, especially in circumstances of scientific uncertainties and complexities. Since such understanding is generally shared within the community of international economic law, it is incorrect to say that the WTO has transformed into a 'science court' that exclusively relies on scientific principles and evidence as the sole benchmark to discipline SPS measures adopted by WTO members.[98]

Hence, how would the Appellate Body react when it faces an SPS dispute that involves no science-based obligations whatsoever? Premised upon our analysis on

[97] The focus of this article does not allow us to look into these issues; however, to select some, see, e.g., Howse, 'Democracy, Science, and Free Trade: Risk Regulation on Trial at the World Trade Organization', 98 *Michigan Law Review* (2000) 2329; Walker, 'The Myth of Science as a Neutral Arbiter for Triggering Precautions', 26 *Boston College International and Comparative Law Review* (*BCICLR*) (2003) 197; Guzman, 'Food Fears: Health and Safety at the WTO', 45 *Virginia Journal of International Law* (2004) 1; Footer, 'Post-Normal Science in the Multilateral Trading System: Social Science Expertise and the EC-Biotech Panel', 6 *WTR* (2007) 281; Herwig, 'Whither Science in WTO Dispute Settlement?', 21 *Leiden Journal of International Law* (2008) 823; Arcuri, 'Law and Economics of the SPS Agreement: A Critical Perspective', in G. Van Calster and D. Prévost (eds), *Research Handbook on Environmental, Health and the WTO* (2013) 164; Wagner, 'Law Talk v. Science Talk: The Languages of Law and Science in WTO Proceedings', 35 *Fordham International Law Journal* (2016) 151; Du, 'Re-Conceptualizing the Role of Science in International Trade Disputes', 52 *JWT* (2018) 697.

[98] As Howse has commented, the Appellate Body has 'found more subtle and indirect ways of avoiding the WTO judiciary being turned into a science court for domestic regulations'. Howse, 'The World Trade Organization 20 Years On: Global Governance by Judiciary,' 27 *EJIL* (2016) 9, at 57.

Korea – Radionuclides above, this section challenges the conventional understanding of the SPS Agreement and reconceptualizes the relation between science-based and non-science-based obligations in the agreement. The focus here is not directly on the role of science in the SPS Agreement but, rather, on the inextricable nexus between science-based and non-scientific obligations, which has not been addressed in the existing literature. As noted, all the past SPS disputes have been raised on the basis of science-based obligations, but Japan did not follow this trend. As a procedural matter, a complainant can well bring an SPS dispute without science-based obligations, as they are not a condition for raising an SPS dispute.

However, *Korea – Radionuclides* – an SPS dispute without claims based on science-based obligations – prompts us to rethink the dichotomy between science-based and non-science-based obligations under the SPS Agreement. As will be explained in more detail below, the dichotomy has been recognized in the SPS regime with regard to the novelty of science-based obligations, which in practice operates to favour complainants. This may go some way towards explaining why complainants have always brought claims based on science-based obligations. However, when a complainant does not rely on science-based obligations, what implications can we draw from such a dispute? Moreover, this section considers what the Appellate Body did not state explicitly in making the report – in our view, the Appellate Body might have acted (that is, by reversing the Panel's findings but not completing the analysis) to safeguard the normative integrity of the SPS Agreement.

A *Science-based and Non-science-based Obligations: An Intertwined Relationship*

The dichotomy between science-based and non-science-based obligations has been widely recognized in the SPS regime. This dichotomy was created because of the history of the SPS Agreement, which newly introduced notions to the trade regime: 'science principles', 'sufficient scientific evidence', 'scientific justification', 'assessment of risks' and 'insufficient' scientific evidence (these notions are found in Articles 2.2, 3.3, 5.1 and 5.7). In essence, the SPS Agreement requires WTO members to base the SPS measures on scientific principles and risk assessment. Commentators have described these science-based obligations as 'a radical departure from the predominantly discrimination-based approach of the GATT'[99] or have stated that the SPS Agreement was 'introducing novel science-based requirements into global trade law … regardless of whether the measures concerned are discriminatory in nature'.[100]

Indeed, before the adoption of the SPS Agreement, the GATT rules concerning non-discrimination (Articles I, III and XX) were applied to SPS measures,[101] and such provisions played a major role in detecting and disciplining protectionist decisions. However, since the advent of the SPS Agreement, a measure can violate the SPS Agreement even if it is not discriminatory. In light of the burden of proof, it is

[99] Scott, *supra* note 8, at 77.

[100] J. Peel, *Science and Risk Regulation in International Law* (2011), at 171.

[101] Note that both the SPS Agreement and the GATT can be applied to an SPS measure.

explained that '[t]his shift clearly works in favor of complainants in SPS disputes'.[102] Robert Hudec described this shift as 'post discrimination', which means 'going beyond discrimination'.[103]

By 'going beyond discrimination', the SPS Agreement's science-based obligations have been considered to test 'the rationality of regulations' or 'the rationality of a regulatory judgement at the national level' based on scientific evidence instead of using trade law disciplines.[104] Accordingly, the SPS Agreement's science-based obligations have long been treated separately from non-science-based obligations, whereby the latter includes non-discrimination and necessity requirements that mirror classic trade law disciplines. Therefore, the new science-based obligations have been regarded as playing a unique role, differently from non-science-based obligations.

However, interestingly, Hudec, who described the SPS Agreement's science-based obligations as 'post-discrimination', seems to have believed that the SPS Agreement's science-based obligations would play a role similar to the GATT's non-discrimination obligations. When comparing the two, he observed that the SPS Agreement's science-based obligations would operate imperfectly but well enough, similarly to the GATT's non-discrimination obligations.[105] Furthermore, he suggested that the question that should be addressed is 'whether science can provide any relevant evidence on the question whether a particular measure has any other credible regulatory purpose other than that of protectionism'.[106] The implication of Hudec's thought is that the analysis of the SPS Agreement's science-based obligations may provide insight into the determination of non-discrimination.

Referring to Hudec's thought, Bernard Hoekman and Joel Trachtman also have argued that '[the Article 2.2/5.1/5.7 complex of the SPS Agreement] seems to evaluate directly the extent and quality of the non-protectionist aim: by asking whether the measure is based on a risk assessment, it asks whether an agreed predicate for non-protectionist SPS measures has been satisfied. It might alternatively be understood as establishing a presumption of a protectionist aim where the risk-assessment criterion has not been met'.[107] Accordingly, '[the] distinction between discrimination regulation and post-discrimination regulation is … nuanced'.[108]

[102] J.H.B. Pauwelyn, A.T. Guzman and J.A. Hillman, *International Trade Law (Aspen Casebook)* (3rd edn, 2016), at 582.

[103] Hudec, 'Science and "Post-Discriminatory" WTO Law', 26 *BCICLR* (2003) 185, at 188.

[104] Hudec, *supra* note 103; Peel, *supra* note 100, at 178; Gruszczynski, *supra* note 8, at 147; see also Regan, 'What Are Trade Agreements For? Two Conflicting Stories Told by Economists, with a Lesson for Lawyers', 9 *JIEL* (2006) 951, at 968 ('[t]he features of the SPS and TBT agreements that go beyond suppressing protectionism can be understood as attempts to suppress or discourage policies that are domestically irrational. … So, both the SPS and the TBT agreements can be fully explained by a natural extension of the protectionism story').

[105] Hudec, *supra* note 103, at 195.

[106] *Ibid.*

[107] Hoekman and Trachtman, 'Continued Suspense: *EC – Hormones* and WTO Disciplines on Discrimination and Domestic Regulation', 9 *WTR* (2010) 151, at 176.

[108] *Ibid.*, at 175.

Similarly, Lukasz Gruszczynski has argued that 'science may be regarded as a sophisticated instrument for detecting and sorting out those measures which have a protectionist rather than a health protective character'.[109] In other words, he observed that, '[i]n the absence of scientific evidence confirming the existence of risk, in theory one can assume that a measure was adopted due to other, presumably protectionist purposes rather than as a response to health or environmental risks'.[110] The existing scholarship provides a theoretical foundation for understanding the nexus between science-based and non-science-based obligations. To be sure, we do not deny the unique role of the SPS Agreement's science-based obligations in the trade law regime; rather, we underline the long overlooked relationship between science-based obligations and traditional non-discrimination obligations.[111] The relationship between the two has conventionally been regarded as a dichotomy, probably because it was convenient to label the SPS obligations as such and to foreground the novelty of the SPS Agreement.

However, the *Fukushima* case inspires a theoretical reflection and more nuanced understanding of the relationship between science-based and non-science-based obligations. We argue that the inextricable nexus between the science-based and non-science-based obligations precisely reflects the normative integrity of the SPS Agreement. As our analysis of *Korea – Radionuclides* in section 3 shows, it is critical to acknowledge that science practically plays an inevitable and a significant role in assessing the compliance of the non-science-based obligations under the SPS Agreement. Rather than treating the two as a simple dichotomy, we argue that the complex, dynamic and mutually reinforcing interactions between science-based and non-science-based obligations cannot be overlooked. It is exactly this normative integrity – the inseparable relationship between science-based and non-science-based obligations – that gives the SPS Agreement meaning. Brushing aside this normative integrity utterly, just like Japan did in formulating its claims in *Korea – Radionuclides*, frustrates the identity and very purpose of the SPS Agreement as a framework of legal rules and institutions.

B *Science in the* Fukushima *Case*

As stated, Article 2.3 of the SPS Agreement is conventionally understood as a non-discrimination obligation involving a comparative analysis on similarities. In this regard, we can easily imagine that the GATT's non-discrimination obligation, and, in fact, the spirit of the discipline, is the same. However, a distinct feature of Article 2.3 of the SPS Agreement *vis-à-vis* its GATT counterpart is that it concerns 'the similarity of the *risks* rather than the similarity of the *products*'.[112] This difference, as *Korea – Radionuclides*

[109] Gruszczynski, *supra* note 8, at 147.

[110] *Ibid.*, at 148.

[111] See also Pauwelyn, Guzman and Hillman, *supra* note 102, at 615 ('[SPS] rules make the assumption that if a measure is based on science it is not protectionist and therefore permitted'). However, we should also note that a reverse question – '[c]ould there be measures that are not based on science, yet not protectionist?' – can be also raised (*ibid.*).

[112] Van den Bossche and Zdouc, *supra* note 8, at 951 (emphasis in original).

shows, necessitates a critical evaluation of how, and to what extent, scientific knowledge and analysis has played a role in determining Article 2.3 compliance.

One good example of this distinct feature is that, under the SPS Agreement, 'different animals may be carriers of foot-and-mouth disease and should thus be subject to similar measures where this risk is present'.[113] In contrast, under the GATT's non-discrimination obligation (for example, Article III:4), which is concerned with the similarity of products, different animals (such as cattle, swine, sheep and goats) are not usually subject to comparison. Under Article III:4 of the GATT, comparisons are made between domestic and imported products in terms of four criteria: the product's physical properties, the end uses, consumer perceptions and tariff classification.[114]

Of course, it can be argued that, even in this 'like-product' test under the GATT, 'risk' matters. Under the criterion of physical properties, the risk of the product is evaluated. For instance, in *EC – Asbestos*, the Appellate Body found that asbestos fibres were associated with a carcinogenic risk to health compared with other fibres (in light of the evidence on the product's properties).[115] Thus, the GATT's non-discrimination obligation also considers risks as one factor in the 'like-product' test. In contrast, Article 2.3 of the SPS Agreement is always and more directly concerned with risks. While Article 2.3 is traditionally treated as a non-science-based obligation, science and risk are inherent in Article 2.3. As seen in section 3 of this article, the discussion in the Panel and the Appellate Body on Article 2.3 was concerned with risks (that is, caesium contamination). Yet, while the Panel focused more on risks present in food products, the Appellate Body was more concerned with risks in the territory of Japan.

In the *Fukushima* case, one argument that apparently worked in favour of Korea was linking 'relevant ecological and environmental conditions' in Article 5.2 with the concept of territorial conditions in Article 2.3. However, one may question why factors in Article 5.2 (concerning risk assessment, one of the science-based obligations) should be associated with the term of 'territory' in Article 2.3 (the non-science-based obligations). One explanation could be that Article 2.3 concerns risks and, therefore, that it is natural to link this with Article 5, which deals with risk assessment. This again evidences how science-based and non-science-based obligations must interact and co-exist under the SPS Agreement.

Moreover, when we consider the hypothetical question of how litigation would have gone if Japan had invoked science-based obligations in *Korea – Radionuclides* (for instance, Article 5.1), we can highlight below that questions and discussions under Article 5.1 would have been strikingly similar to those under Article 2.3. Article 5.1 requires WTO members to conduct a risk assessment. If Japan had based its claim on Article 5.1, the question would have been whether Korea's import bans – blocking all Japanese foods that contain caesium less than the 1 mSv/year dose limit – were based

[113] *Ibid.*

[114] *EC – Asbestos – Report of the Appellate Body*, *supra* note 31, paras 101–102.

[115] *Ibid.*, paras 135–136.

on risk assessment.[116] Thus, in the current case, Korea would have to conduct a risk assessment that could present the 'potential' risk on human health, which does not imply as high a degree as 'likelihood'.

Another important issue in Article 5.1 is what factors should be considered in the risk assessment. Article 5.2 of the SPS Agreement provides the list of factors. Korea would claim again that, in its risk assessment, it was important to take into account a factor of 'relevant ecological and environmental conditions' written in Article 5.2. We can assume that, here again, the Appellate Body would consider the factor of 'relevant ecological and environmental conditions' in its risk assessment. Clearly, the factor of 'relevant ecological and environmental conditions' is listed in Article 5.2, so it should be considered. Interestingly, we can assume that, if Japan had made a claim under Article 5.1, the discussions in the Panel and the Appellate Body would have proceeded in a somewhat similar process to how they did under Article 2.3. Japan has to prove under Article 5.1 that Korea's measure was not based on risk assessment – the evaluation of the 'potential' for adverse effects on human health arising from caesium contamination in Japanese food products, considering 'environmental contamination and territorial conditions'. This is the exact discussion that occurred in the context of Article 2.3. Thus, Articles 5.1 and 2.3 are interconnected. Findings in Article 5.1 can inform evaluations under Article 2.3. What then was the point of Japan avoiding the science-based obligations altogether from the outset?

C *Lessons for Future SPS Disputes*

Two lessons can be drawn from this case. First, the normative integrity of the SPS Agreement – that is, the intertwined relationship between the science-based and non-science-based obligations – cannot be overlooked. A WTO member should be aware of and sensitive to the role played by scientific evidence and science-related argument, even if it makes no 'science-based' claims in the terms of reference and bases its entire case on the non-discrimination and necessity obligations. Because of the nature of the SPS Agreement, there is rarely (if any) an SPS dispute that can be solely about non-discrimination or necessity, without touching upon risks and the underlying science. As we have argued above, the science-based obligations inevitably intertwine with non-science-based obligations in the SPS Agreement,[117] and this normative integrity

[116] Risk assessment is defined in Annex A.4 of the SPS Agreement, which introduces two variants of risk assessment: one is 'the likelihood of entry, establishment or spread of a pest or disease' and the other is 'the evaluation of the potential for adverse effects on human or animal health arising from … the contaminants … in food'. The relevant risk assessment for the current case is the latter type, which adopts the term 'potential' in comparison with the term 'likelihood' (in the former type). Past WTO cases already discussed the difference between 'potential' and 'likelihood' as a threshold of risk. According to the Appellate Body, the meaning of 'likelihood' is 'probability', which requires 'a higher degree or threshold of potentiality' than the term 'potential', which merely implies 'possibility'. *Australia – Salmon – Report of the Appellate Body*, *supra* note 27, para. 123 (referring to *EC – Hormones – Report of the Appellate Body*, *supra* note 2, para. 184).

[117] On a relevant note, the WTO SPS Committee adopted the guidelines on the implementation of Article 5 of the SPS Agreement, which explicitly notes that 'the absence of a scientific justification' for an SPS measure 'applied allegedly to achieve the appropriate level of protection' is a 'warning signal' that indicates discrimination or a disguised restriction on trade, therefore a violation of Article 5.5. See Committee

is what gives the SPS Agreement meaning. The assessment of science-based obligations may crucially inform (if not condition) the determination of non-discrimination. Therefore, when a WTO member brings a complaint based on substantive rights and obligations under the SPS Agreement, it would be judicious not to omit science-based obligations altogether. That is, citing science-based obligations in the SPS Agreement generally helps the complaining party in bringing a stronger case in front of the Panel / Appellate Body than in citing none.

Presumably, what the Appellate Body did not articulate explicitly was that it might not have allowed Japan to win based exclusively on Articles 2.3 and 5.6, without adjudicating issues under the relevant science-based obligations of Articles 2.2, 5.1 and 5.7. On this point, we argue that, in *Korea – Radionuclides*, the Appellate Body consciously (albeit implicitly) acted to safeguard the normative integrity of the SPS Agreement. That is, letting a complainant bring and win an SPS dispute based solely on the non-science-based obligations without touching upon the underlying risks and science, in the Appellate Body's eyes, may ultimately undermine the *raison d'être* of the SPS Agreement. The agreement's *raison d'être* rests on the nexus and interaction between science-based and non-science-based obligations – not on the separation of the two. So, in cases like *Korea – Radionuclides*, where the complaining party cites no science-based obligations and relies exclusively on GATT-style non-discrimination and necessity obligations, the Appellate Body may have considered that such claims would frustrate the identity, purpose and relevance of the SPS Agreement. If WTO members start bringing SPS disputes based solely on non-science-based obligations, it will take us back to conventional GATT disputes, which will eventually render SPS science-based obligations superfluous.

The second and related lesson is concerned with the Appellate Body's reputation and unresolved disputes. In our view, the Appellate Body might opt to risk its reputation by not completing the analysis if there are important legal theories and principles that the Appellate Body wants to preserve. In this case, the interlinked and mutually reinforcing relationship between science-based and non-science-based obligations – the normative integrity of the SPS Agreement – appeared to be what the Appellate Body aimed to safeguard. On this point, the Appellate Body, just like other international judicial/quasi-judicial bodies, can be seen as 'long-term strategic actors that seek to maximize their reputations'.[118] It has been noted, particularly in the early years of the WTO, that the Appellate Body was sensitive about its reputation as a newly created dispute settlement system.[119] It became internationally recognized as

on Sanitary and Phytosanitary Measures, Guidelines to Further the Practical Implementation of Article 5.5, Doc. G/SPS/15, 18 July 2000, at 3. This development echoes our argument on the interlinked relationship between science-based and non-science-based obligations under the SPS Agreement.

[118] S. Dothan, *Reputation and Judicial Tactics: A Theory of National and International Courts* (2014), at 3.

[119] For instance, not to issue a separate opinion seems to be one of the tactics of the Appellate Body to increase legitimacy. Dunoff and Pollack, 'The Judicial Trilemma', 111 *American Journal of International Law* (2017) 225, at 265–266, citing Ehlermann, 'Reflections on the Appellate Body of the WTO', 97 *ASIL Proceeding* (2003) 77, at 78.

one of the 'high-reputation courts',[120] given the high ruling-compliance rates by WTO members[121] and the international recognition of its 'extensive' authority[122] (although the 'extensiveness' of the Appellate Body's authority has been debated among commentators).[123] It should be noted, nevertheless, that *Korea – Radionuclides* was decided in April 2019, a time when the authority (and reputation) of the Appellate Body was under siege, particularly in light of the complex political economy related to the USA's frustration towards the Appellate Body's rulings over the years.[124]

In this regard, the Appellate Body was by no means immune from, or unaware of, the potential damage to its judicial reputation in *Korea – Radionuclides.* Indeed, the rulings have received fierce criticisms (in particular, those voiced by WTO members) for not completing its analysis.[125] In a broad context, the Appellate Body's reluctance, or failure, to complete the legal analysis has been one of the recurring procedural and systemic issues raised in the WTO's Dispute Settlement Body (DSB) meetings;[126] thus, the Appellate Body was well aware of the fact that incomplete legal analysis in *Korea – Radionuclides* would face serious criticism by WTO members, thereby affecting its reputation. However, the Appellate Body knowingly decided to incur such costs to its

[120] We borrowed this term from Dothan, *supra* note 118, at 10–11.

[121] Although it is difficult to measure compliance rates of rulings, this view depends on the WTO: 'The compliance rate with dispute settlement rulings is very high, at around 90%.' WTO, '2015 News: WTO Disputes Reach 500 Mark', available at www.wto.org/english/news_e/news15_e/ds500rfc_10nov15_e.htm. This news report, which was a brief analysis of the use of the WTO dispute settlement system, was publicized on the occasion when the 500th dispute was submitted to the WTO in 2015.

[122] It is explained that 'extensive' authority exists 'when a larger field of actors, including other government officials, domestic and international courts, legal professionals, firms, civil society, and academics, follow and argue over the law's interpretation and practice, and accept the [international court]'s rulings as authoritative and requiring a meaningful response'. Shaffer, Elsig and Puig, 'The World Trade Organization's Dispute Settlement Body: Its Extensive but Fragile Authority', in K.J. Alter *et al.* (eds), *International Court Authority* (2018) 300, at 302.

[123] See, e.g., Pauwelyn, 'The WTO 20 Years On: "Global Governance by Judiciary" or, Rather, Member-driven Settlement of (Some) Trade Disputes between (Some) WTO Members?', 27 *EJIL* (2016) 1119.

[124] Space limit does not allow us to discuss the WTO's dispute settlement crisis. The point here is that reputation and authority cannot always be maintained at the same level – they may decline or improve through various actions of state parties. Such prominent action can take the form of compliance/non-compliance with rulings or expressing 'support' or 'criticism' towards rulings. Dothan, *supra* note 118, at 90. The 'perceived legitimacy of international judicial bodies', understood as how members perceive the Appellate Body's authority as broadly legitimate (or not) beyond a specific dispute, is also of significant relevance here. Creamer and Godzimirska, '(De)Legitimation at the WTO Dispute Settlement Mechanism', 49 *Vanderbilt Journal of Transnational Law* (2016) 275, at 283. In particular, WTO members have been accustomed to express views beyond the context of a specific dispute settlement and touch upon broader perspectives – or 'procedural and systemic concerns' – relevant to the overall legitimacy of the WTO dispute settlement system. Creamer, 'From the WTO's Crown Jewel to Its Crown of Thorns', 113 *AJIL Unbound* (2019) 51, at 52.

[125] A total of 14 statements, including by Japan and Korea, were made in the Dispute Settlement Body's meeting upon the adoption of the Appellate Body's report on *Korea – Radionuclides*, 11 of which were concerned with the Appellate Body's incomplete legal analysis. WTO, Dispute Settlement Body, Minutes of Meeting, 26 April 2019, WT/DSB/M/428, at 25–35.

[126] Creamer and Godzimirska, *supra* note 124, at 318.

reputation in *Korea – Radionuclides*, even at the time of the WTO's dispute settlement crisis. In this regard, one possible explanation is that the Appellate Body intentionally did not complete its legal analysis because it was sensitive to and conscious of Korea's right to food safety. Relatedly, one may think that the dispute settlement crisis made the Appellate Body more cautious than usual; therefore, it was an unlucky time for Japan. We disagree.

Rather, the Appellate Body did not complete the analysis because it may have concerned the normative integrity of the SPS Agreement between science-based and non-science-based obligations, as we have argued.[127] We may infer this from the wording of the decision of the Appellate Body when it did not complete the analysis in this case. After finding the Panel's legal error regarding the interpretation of Article 2.3, the Appellate Body simply stated: 'We do not address in this appeal whether evidence before the Panel could … support a conclusion that the potential for contamination in Japanese and non-Japanese food products is sufficiently similar or dissimilar.'[128] It did not explain why it was unable to complete the analysis. It did not even consider whether it could complete the analysis or not. Why was the Appellate Body so reluctant to complete the analysis? Leaving the dispute unresolved, the Appellate Body had known that it would receive serious criticism by WTO members later at the WTO's DSB meeting.

Some may argue that the Appellate Body might have thought that there was a lack of sufficient findings and undisputed facts in the Panel report and was thereby unable to complete the analysis.[129] However, as noted previously, the Panel had made considerable factual findings based on scientific evidence, with the agreement of the scientific experts that the Panel had consulted. The Appellate Body could have taken at least one more step to assess the sufficiency of the Panel's findings. Recent practice has shown that the Appellate Body would nevertheless demonstrate its endeavour to complete the analysis even if it could not. However, in the *Fukushima* case, the Appellate Body was reluctant to go into the scientific evidence written in the Panel's report. In our view, the Appellate Body might have been concerned with the interlinked relationship

[127] In our view, existing case reviews on *Korea – Radionuclides* have not sufficiently evaluated the implications of Japan's litigation strategy not relying on science-based obligations whatsoever. See Hamada and Ishikawa, 'Are Korea's Import Bans on Japanese Foods Based on Scientific Principles? Comments on Reports of the Panel and the Appellate Body on Korean Import Bans and Testing and Certification Requirements for Radionuclides (WT/DS495)', 11 *European Journal of Risk Regulation* (2020) 155, at 166, n.60 (citing Kawase, 'Revisiting *Korea – Radionuclides*: Some Thoughts on the Appellate Body Report', *RIETI Column*, 17 April 2019 (in Japanese), available at www.rieti.go.jp/jp/special/special_report/105.html). Regarding the Appellate Body's incomplete legal analysis, the case reviews usually were concerned that the Appellate Body does not have independent fact-finding power to address potential problems that emerge from a panel's decision. See Brewster and Fischer, 'Fishy SPS Measures? The WTO's *Korea – Radionuclides* Dispute', 20 *WTR* (2021) 524, at 530–531. We have attempted to consider the Appellate Body's intention behind this incomplete legal analysis, linking with Japan's litigation strategy as well as the normative integrity of the SPS Agreement.

[128] *Korea – Radionuclides – Report of the Appellate Body*, *supra* note 3, para. 5.90.

[129] The absence of sufficient findings / undisputed facts is one of the major reasons that the Appellate Body does not complete its analysis. See Yanovich and Voon, *supra* note 7, at 942–946.

between science-based and non-science-based obligations and, hence, preferred to address the SPS measures directly under the science-based obligations rather than under the non-science-based obligations alone.

The Appellate Body might have believed that the purpose of sending Japan a message by way of a sudden stop after reversing the Panel's main findings was served. The message was to suggest the normative integrity of the SPS Agreement and to discourage future cases alike. Thus, we do not take the view that Japan lost this case because, in a time of crisis for the WTO's dispute settlement system, the Appellate Body was sensitive and conscious about a WTO member's right concerning food safety and regulatory autonomy. In our opinion, even if we turned the clock backwards a decade or so to a time when the multilateral trading system was relatively stable, the results of *Korea – Radionuclides* would have been the same.

5 Conclusion

There have been intense debates over the role of science in WTO law, in general, and over the interpretation and evolvement of science-based obligations in the SPS Agreement, in particular. While the debates as such have generated a growing body of literature, they have largely focused on the limits of the role of science in the WTO adjudicators' decision-making process, especially in the face of uncertainties and complexities. The *Fukushima* case offers another, under-analysed perspective concerning the place and space of science in WTO law. A litigation that cites no science-based obligations in the history of the SPS Agreement, *Korea – Radionuclides*, at first glance may not appear to involve the issue of the role of science. Nevertheless, as we have analysed, the discussion in the Panel and the Appellate Body under Article 2.3 was concerned with risks (that is, the potential for food contamination caused by radionuclides released from the Fukushima accident). In our view, *Korea – Radionuclides* sharply demonstrated how science does play a role in the discussions of non-science-based obligations.

We have argued that the conventional dichotomy between science-based and non-science-based obligations is overrated in Japan's litigation strategy. In *Korea – Radionuclides*, Japan opted to rely exclusively on Articles 2.3 and 5.6 rather than on science-based obligations such as Articles 2.2, 5.1 and 5.7. This litigation strategy backfired.[130] While not wrong from a legal point of view, this litigation strategy made it extremely difficult for Japan to win because, as we have argued, the non-science-based obligations under the SPS Agreement in any case call upon the Panel or the Appellate Body to undertake scientific inquiries. On this point, the Appellate Body rightly stated in *Australia – Apples* that 'science plays throughout the *SPS Agreement* in maintaining "the delicate and carefully negotiated balance in the *SPS Agreement*

[130] While the Appellate Body did not criticize or even mention Japan's litigation strategy in its report, in our view, the reversal was induced by Japan's litigation without science-based obligations.

between the shared, but sometimes competing, interests of promoting international trade and of protecting the life and health of human beings"'.[131]

Premised upon a critical analysis of *Korea – Radionuclides*, we have argued that the inextricable nexus between science-based and non-science-based obligations is tied to the normative integrity of the SPS Agreement. Dismissing this normative integrity frustrates the identity, purpose and meaning of the SPS Agreement as a framework of legal rules and institutions. Clearly, scientific inquiries and judgments regarding the potential for food contamination do involve the issues of scientific uncertainties and complexities, much more so in *Korea – Radionuclides*. When the Appellate Body examined the Article 2.3 claim, it stressed the degree of the potential for contamination, with a focus on ecological and environmental conditions, in addition to the risks present in food. This implies that it was not an easy task for the WTO to assess the potential for food contamination caused by massive (and unprecedented) levels of radionuclides released into the ocean.

We also have considered how the Appellate Body would have raised concerns about its reputation by delivering a ruling with an 'incompletion of analysis' regarding Japan's main complaints based on non-science-based obligations. While the Appellate Body did not articulate explicitly, it suggested the *raison d'être* of the SPS Agreement, based on the inseparable relationship between science-based and non-science-based obligations. Therefore, it was crucial for the Appellate Body to send a message to WTO members about the agreement's normative integrity by reversing the Panel's findings, even without completing the analysis. Of course, by not resolving the disputes, the Appellate Body put its reputation at risk, particularly at the time of the WTO crisis. However, the Appellate Body knowingly decided to incur such costs to its reputation in the *Fukushima* case to guard the normative integrity of the SPS Agreement and the legitimacy of the system.

[131] *Australia – Apples – Report of the Appellate Body*, *supra* note 69, para. 364. In *Australia – Apples*, the Appellate Body also stated: '[W]e cannot conceive of how a complainant could satisfy its burden of demonstrating that its proposed alternative measure would meet the appropriate level of protection under Article 5.6 *without* relying on evidence that is scientific in nature.' *Ibid.*