

THE SPS AGREEMENT: CAN IT REGULATE TRADE IN NANOTECHNOLOGY?

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ABSTRACT

Recent studies have shown that nanoparticles, which are approximately 1 to 100 billionths of a meter in size, present unique health and environmental risks. Nevertheless, products enhanced by nanoparticles, such as sunscreen, golf balls, and hard drives, are shipped daily in international trade. With these unique risks in mind, would measures regulating the trade in nanotechnology be subject to the WTO Agreement on Sanitary and Phytosanitary Measures? If they were, would the Agreement objectively balance the unique risks and benefits of trading in nanotechnology? Whether measures regulating the trade in nanotechnology are subject to the SPS Agreement depends on the purpose of such measures. This iBrief argues that because of recent scientific evidence, many such measures are likely to be subject to the SPS Agreement. In addition, since sanitary and phytosanitary measures must be based on scientific evidence, if Members apply the Agreement appropriately, the Agreement would objectively balance the benefits and risks of trading in nanotechnology.

INTRODUCTION

¶1 Despite all the hype regarding nanotechnology's commercial potential, defining nanotechnology is difficult. Nanotechnology originally meant molecular manufacturing but now encompasses a broad range of science and technology at the nanoscale,² which is approximately 1 to 100 billionths of a meter.³ Molecular manufacturing, crudely defined, is the ability to create anything molecule-by-molecule.⁴ Although manufacturing at this level is currently far from feasible, one

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² K. Eric Drexler, Nanotechnology: From Feynman to Funding, BULL. OF SCI., TECH. & SOC'Y, Vol. 24, No. 1, at 21-27 (Feb. 2004), available at <http://www.metamodern.com/d/04/00/FeynmanToFunding.pdf>.

³ Los Alamos National Laboratory, Nanoscience and Nanotechnology (Feb. 2004), at <http://www.lanl.gov/news/pdf/NanoscienceFact.pdf>.

⁴ Drexler, *supra* note 2, at 1.

area where nanotechnology is used today is to enhance products. In fact, products enhanced by nanoparticles are used daily by millions of people throughout the world. Such products include sunscreens, cosmetics, tennis balls, stain-free clothing and mattresses, and hard drives.⁵

¶2 Even though nanoparticles enhance products, recent scientific studies have shown that nanoparticles present unique and significant health risks. For example, nanoparticles are small enough to pass through the blood-brain barrier in fish.⁶ It follows that overexposure of nanoparticles to humans may lead to the accumulation of lethal quantities of nanomaterial in the brain much like asbestos accumulates in the lungs.⁷

¶3 Such potential health risks raise questions about how the international community should regulate trade in nanotechnology. It took the international community almost 100 years to establish regulations for asbestos.⁸ How long will it take for nanotechnology? Perhaps current international health and safety standards are already applicable to measures regulating trade in this new technology. If so, are they capable of balancing the unique risks and benefits of trading in nanotechnology? Or, are new international standards necessary? In addressing these issues, this iBrief analyzes the WTO Agreement on the Application of Sanitary and Phytosanitary Measures (“SPS Agreement”).⁹ It will also look at relevant WTO disputes, the most important being EC Measures Concerning Meat and Meat Products (“*Hormone Beef*”), the first WTO dispute to substantively deal with the SPS Agreement.¹⁰

¶4 Like any trade protective measure, whether the SPS Agreement applies to measures prohibiting trade in nanotechnology depends on the measure’s purpose.¹¹ The SPS Agreement applies to sanitary and

⁵ See Justin Gillis and Jonathan Krim, *If It’s Nano, It’s BIG*, Wash. Post, Feb. 22, 2004, at F01.

⁶ Eva Oberdörster, *Manufactured Nanomaterials (Fullerenes, C₆₀) Induce Oxidative Stress in the Brain of Juvenile Largemouth Bass*, ENVTL. HEALTH PERSPECTIVES, vol. 112, num. 10, at 1058-1062 (July 2004), available at <http://ehp.niehs.nih.gov/members/2004/7021/7021.pdf>.

⁷ See *id.*

⁸ See LONDON HAZARDS CENTRE, ASBESTOS HAZARDS HANDBOOK, chs. 12 & 13 (1995), at http://www.lhc.org.uk/members/pubs/books/asbestos/asb_toc.htm.

⁹ WTO Agreement on the Application of Sanitary and Phytosanitary Measures, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1A (1994) [hereinafter *SPS Agreement*], http://www.wto.org/english/docs_e/legal_e/legal_e.htm#import.

¹⁰ WTO Report of the Appellate Body on EC Measures Concerning Meat and Meat Products (Hormones) WT/DS26, 48/AB/R, [hereinafter *Hormone Beef*], http://www.wto.org/english/tratop_e/dispu_e/hormab.pdf (Jan. 16, 1998).

¹¹ SPS Agreement, *supra* note 9, Annex 1A.

phytosanitary measures (“SPS measures”), which are defined as measures whose purpose it is to protect animal, plant, or human health against certain risks associated with foreign goods.¹² These risks include, among others, risks caused by toxins, diseases, and pests.¹³ Since recent studies show that certain nanoparticles are toxic to fish,¹⁴ the purpose of some measures regulating trade in nanotechnology will be to protect animal, plant, or human health against such risks. In as much as they do, such measures would be subject to the SPS Agreement.

¶5 In showing whether the SPS Agreement applies to nanotechnology, it is important to first define what nanotechnology is. This iBrief then considers the current state of nanotechnology and the different organizations that set international standards for this emerging field. It then looks at the relevant trade law and how this law applies to nanotechnology. The WTO Appellate Body decision in *Hormone Beef* has strengthened the requirement that SPS measures must be based on scientific evidence.¹⁵ Accordingly, this iBrief concludes that if Members apply the SPS Agreement appropriately, the Agreement would objectively balance the benefits and risks of trading in nanotechnology.

I. NANOTECHNOLOGY

A. *Its Origins*

¶6 Nano means “extremely small” or “one-billionth” and is derived from the Greek word “nanos” meaning little old man or dwarf.¹⁶ In 1986, K. Eric Drexler coined the term nanotechnology in his book *Engines of Creation: the Coming Era of Nanotechnology*.¹⁷ In the glossary of the book, Drexler defines nanotechnology as “[t]echnology based on the manipulation of individual atoms and molecules to build structures to complex, atomic specifications.”¹⁸ In explaining nanotechnology, Drexler described an idea first expressed by renowned physicist Richard Feynman in his now classic 1959 address entitled *There’s Plenty of Room at the Bottom*.¹⁹ In the address, Feynman

¹² See SPS Agreement, *supra* note 9, at Annex A1.

¹³ Oberdörster, *supra* note 6.

¹⁴ See *id.*

¹⁵ See *Hormone Beef*, *supra* note 10.

¹⁶ THE AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE (4th ed., Houghton Mifflin Co. 2000), <http://dictionary.reference.com/search?q=nano>.

¹⁷ K. ERIC DREXLER, ENGINES OF CREATION: THE COMING ERA OF NANOTECHNOLOGY (4th ed. 1994), available at <http://www.foresight.org/EOC/index.html> (last visited May 7, 2005).

¹⁸ *Id.*

¹⁹ See RICHARD P. FEYNMAN, PLENTY OF ROOM AT THE BOTTOM, Address to the American Physical Society at the California Institute of Technology, PUBLISHED

discussed the possibility of manipulating matter on the smallest scale, or the ability to artificially create at the atomic level - much like cells have been doing since life began:

The principles of physics, as far as I can see, do not speak against the possibility of maneuvering things atom by atom . . . It would be, in principle, possible . . . for a physicist to synthesize any chemical substance that the chemist writes down. . . . How? Put the atoms down where the chemist says, and so you make the substance. The problems of chemistry and biology can be greatly helped if our ability to see what we are doing, and to do things on an atomic level, is ultimately developed - a development which I think cannot be avoided.²⁰

¶7 If possible, Feynman's idea would mean nations with this capability could build practically anything, molecule-by-molecule. In addition, some believe that this development could eventually lead to the end of the world: uncontrollable self-replicating nano sized robots would turn the earth into "gray goo." Drexler described one version of the "gray goo" concern where nano plants "with 'leaves' no more efficient than today's solar cells could out-compete real plants, crowding the biosphere with an inedible foliage."²¹

¶8 Despite Drexler's use of nanotechnology to express Feynman's original idea, the term nanotechnology now "embraces a broad range of science and technology working at a length scale approximately 1 to 100 nanometers, including the more specific goal [of molecular manufacturing] it originally denoted."²²

B. Current Developments

¶9 There are also at least 30 different countries developing initiatives to promote and exploit nanotechnologies.²³ For example, in 2003 Congress passed the 21st Century Nanotechnology Research and Development Act.²⁴ This Act created the National Nanotechnology Initiative ("NNI"), and the Act provides \$3.7 billion²⁵ for the next three years for the NNI to "coordinate the multiagency effort in nanoscale

ENGINEERING AND SCIENCE (Dec. 1959), available at <http://www.its.caltech.edu/~feynman/plenty.html> (last visited May 10, 2005).

²⁰ Engines of Creation, *supra* note 17, at 215.

²¹ *Id.*

²² Drexler, *supra* note 2.

²³ M.C. Roco, Government Nanotechnology Funding: An International Outlook, National Science Foundation (June 30, 2003), at <http://www.nano.gov/html/res/IntlFundingRoco.htm>.

²⁴ 21st Century Nanotechnology Research and Development Act, Pub. L. No. 108-153 (S. 189), §§ 1-10 (2003) (codified at 15 U.S.C. §§ 7501-09).

²⁵ *Id.* (§ 6 appropriations add up to approx. \$3.7 billion).

science, engineering and technology.”²⁶ In addition to the NNI, there are at least 52 different nanotechnology research and education centers throughout the United States.²⁷

¶10 Although most U.S. and foreign nanotechnology initiatives are created to study the commercial uses of nanotechnology, some groups are realizing the need to study the potential health risks, as well. For example, the Environmental Protection Agency (“EPA”) recently gave \$4 million to 12 different universities to study the potential environmental and health risks of nanomaterials.²⁸ In its announcement, the EPA said that there is currently “very limited scientific information on the effects of nanomaterials on human health and the environment.”²⁹

¶11 Toxicologist Dr. Eva Oberdörster has provided important contributions to this limited set of scientific information with studies showing that certain nanoparticles are harmful to forms of aquatic life.³⁰ One study showed that modest concentrations of fullerenes, synthetic, soccer ball-like, nanosized carbon molecules, in water eventually killed water fleas.³¹ Another Oberdörster’s study showed that fullerenes caused brain damage in largemouth bass.³² This study led Oberdörster to believe that the nanoparticles may have also killed beneficial bacteria in the water where the fish were tested.³³ Oberdörster’s research is unique because it is the first research to examine the possible effects of releasing synthetic nanoparticles into the environment.³⁴ Other studies have also shown that nanoparticles have toxic effects on living matter: for example, in 2003, researchers found that nanotubes, a specific type of nanoparticle, damaged lung tissue in mice.³⁵

¶12 In light of these studies, some industries have urged scientists and policy makers to proceed with caution on the quest for harnessing

²⁶ NNI, About the NNI, at http://www.nano.gov/html/about/home_about.html (last visited Mar. 19, 2005).

²⁷ NNI, Links, at <http://www.nano.gov/html/res/links.html> (last visited Mar. 19, 2005).

²⁸ Press Advisory, Environmental Protection Agency, \$4 million in Grants to Research Environmental Impact of Nanotechnology (Nov. 12, 2004), at <http://www.epa.gov/cgi-bin/epaprintonly.cgi>. Fullerenes are often called “buckyballs” because they look like the “famous geodesic dome of R. Buckminster Fuller, the visionary architect and scientist.” Gills, *supra* note 5.

²⁹ *Id.*

³⁰ Oberdörster, *supra* note 6.

³¹ *Id.* at 1059-61.

³² *Id.*

³³ *Id.* at 1059.

³⁴ *Id.*

³⁵ Bob Holmes, *Buckyballs Cause Brain Damage in Fish*, NEW SCIENTIST (Mar. 29, 2004), at <http://www.newscientist.com/news/news.jsp?id=ns99994825>.

nanotechnology.³⁶ In May 2004, Swiss Re, one of the world's largest insurance companies, published a report on the risks of nanotechnology containing a list of potential issues that it thought needed to be addressed before significant developments in nanotechnology should continue.³⁷ However, in July 2004, a report³⁸ commissioned by the United Kingdom concluded that many new nano-sciences and -technologies do not present unique risks to health, safety or the environment.³⁹

¶13 Whether such reports are taken into consideration in establishing U.S. nanotechnology policy depends on a number of federal agencies. The U.S. Department of Agriculture ("USDA") works with the three main international bodies responsible for setting standards relating to the SPS Agreement: (1) the Codex Alimentarius Commission, responsible for food safety;⁴⁰ (2) the Office Internationale des Epizooties, responsible for animal health;⁴¹ and (3) the Secretariat of the International Plant Protection Convention, responsible for plant health.⁴² The USDA's U.S. Codex Office of the Food Safety and Inspection Service ("FSIS") coordinates U.S. relations with the Codex Alimentarius Commission.⁴³ The FSIS is the public health agency of the USDA,⁴⁴ and is responsible for ensuring that the United States' commercial supply of meat, poultry, and egg products is safe and correctly packaged and labeled.⁴⁵

¶14 The Animal and Plant Health Inspection Service ("APHIS") of the USDA is responsible for coordination with the Secretariat of the International Plant Protection Convention and the Office Internationale

³⁶ SWISS RE, NANOTECHNOLOGY - SMALL MATTER, MANY UNKNOWNNS (May 2004), <http://www.swissre.com/internet/pwswpspr.nsf/alldocbyidkeylu/ulur-5yaffs>.

³⁷ *Id.*

³⁸ THE ROYAL SOCIETY AND THE ROYAL ACADEMY OF ENGINEERING, NANOSCIENCE AND NANOTECHNOLOGIES: OPPORTUNITIES AND UNCERTAINTIES (July 29, 2004), at <http://www.nanotec.org.uk/finalReport.htm>.

³⁹ *Id.* at para. 8.1.3, <http://www.nanotec.org.uk/report/chapter8.pdf>.

⁴⁰ Codex Alimentarius Commission, at http://www.codexalimentarius.net/web/index_en.jsp (last visited April 6, 2005).

⁴¹ Office Internationale des Epizooties, What is OIE?, at http://www.oie.int/eng/OIE/en_oie.htm (last visited April 6, 2005).

⁴² See International Phytosanitary Portal, at <https://www.ippc.int/IPP/En/default.jsp> (last visited April 6, 2005).

⁴³ FOOD SAFETY AND INSPECTION SERVICE, Regulations and Policies, International Affairs, Codex Alimentarius, at http://www.fsis.usda.gov/Regulations_&Policies/Codex_Alimentarius/index.asp (last visited Mar. 19, 2005).

⁴⁴ FOOD SAFETY AND INSPECTION SERVICE, About FSIS, at http://www.fsis.usda.gov/About_FSIS/index.asp (last visited Mar. 19, 2005).

⁴⁵ *Id.*

des Epizooties.⁴⁶ The APHIS assesses and regulates the risks associated with agricultural imports.⁴⁷

II. APPLICABLE LAWS

¶15 In 1947, several countries enacted the General Agreement on Tariffs and Trade (“GATT”) to reduce tariffs and increase world trade.⁴⁸ On January 1, 1995, the World Trade Organization (“WTO”) replaced the GATT as the organization overseeing the “multilateral trading system.”⁴⁹ While the GATT has been very successful in reducing tariff barriers,⁵⁰ the practical effect of the GATT has been lessened because its Members have resorted to non-tariff trade barriers to skirt their obligations. For example, Article XX of the GATT allows for protective measures that protect human, animal, or plant health has been widely exploited.⁵¹ Ironically, these same Members created the SPS Agreement to reduce such non-tariff barriers to trade.⁵²

A. The SPS Agreement

¶16 The SPS Agreement has two main goals: (1) allowing Members to maintain the level of health protection they consider appropriate; and (2) ensuring that sanitary and phytosanitary (“SPS”) measures are not unnecessary, arbitrary, or scientifically unjustifiable.⁵³ To achieve these objectives the SPS Agreement only applies to SPS measures, and requires that SPS measures that are not following international standards conduct a risk assessment that is rationally related to scientific evidence.

⁴⁶ ANIMAL AND PLANT HEALTH INSPECTION SERVICE, Overview, International Services, at <http://www.aphis.usda.gov/is/pages/overview.htm> (last visited April 6, 2005).

⁴⁷ *See id.*

⁴⁸ *See* WTO, SPS Agreement Training Module: Introduction to the SPS Agreement, at

http://www.wto.org/english/tratop_e/sps_e/sps_agreement_cbt_e/cls1pl_e.htm [hereinafter SPS Introduction] (last visited April 6, 2005).

⁴⁹ WTO, http://www.wto.org/english/thewto_e/gattmem_e.htm (last visited May 9, 2005). Most of the GATT’s substantive provisions were incorporated into the WTO.

⁵⁰ *See* World Trade Organization, The WTO in Brief, at http://www.wto.org/english/thewto_e/whatis_e/inbrief_e/inbr01_e.htm (last visited April 6, 2005).

⁵¹ General Agreement on Tariffs and Trade, Oct. 30, 1947 [hereinafter “GATT”], art. XX (1994).

⁵² *See* World Trade Organization, SPS Agreement Training Module: Background, at http://www.wto.org/english/tratop_e/sps_e/sps_agreement_cbt_e/intro1_e.htm (last visited April 6, 2005).

⁵³ SPS Introduction, *supra* note 48.

Lastly, the Agreement allows for countries to take temporary precautionary measures in the face of uncertain risk.

1. Scope

¶17 The SPS Agreement applies only to WTO Members. Moreover, it states in its first article that the agreement applies to “all sanitary and phytosanitary measures which may, directly or indirectly, affect international trade.”⁵⁴ Considering the global economy, the requirement that these measures affect international trade is in practice not difficult to satisfy. This analysis assumes that this requirement is met. The more difficult question is what constitutes a sanitary or phytosanitary measure. According to Annex A1 of the SPS Agreement, whether a measure prohibiting trade is a sanitary or phytosanitary measure depends on its purpose.⁵⁵ Annex A1 specifically mentions four purposes that satisfy this requirement:

- (a) to protect animal or plant life or health . . . from risks arising from . . . pests, diseases, disease-carrying organisms or disease-causing organisms;
- (b) to protect human or animal life or health . . . from risks arising from additives, contaminants, toxins or disease-causing organisms in foods, beverages or feedstuffs;
- (c) to protect human life or health . . . from risks arising from diseases carried by animals, plants or products thereof, or from the entry, establishment or spread of pests; or
- (d) to prevent or limit other damage . . . from the entry, establishment or spread of pests.⁵⁶

The form of the measure is not important in determining whether it is a SPS measure.⁵⁷ For example, SPS measures include even technical measures, such as labeling requirements, if they are created to protect human life from the risks arising from toxins.⁵⁸

¶18 Few Appellate Body decisions and panel reports discuss the scope of the SPS Agreement. In *Australia – Measures Affecting Importation of Salmon* (“*Australia – Salmon*”), however, a WTO panel examined whether an Australian prohibition on imports of dead

⁵⁴ SPS Agreement, *supra* note 9, art. 1.1.

⁵⁵ *Id.* Annex A1.

⁵⁶ *Id.*

⁵⁷ WTO, SPS Agreement Training Module: Introduction to the SPS Agreement, 1.4 SPS and TBT measures, *at* http://www.wto.org/english/tratop_e/sps_e/sps_agreement_cbt_e/c1s4p1_e.htm (last visited April 6, 2005).

⁵⁸ *Id.*

salmon was a “sanitary measure” within the meaning of paragraph 1(a) and (b) of Annex A1 of the SPS Agreement.⁵⁹ The panel found that Australia’s prohibition was within the scope of the SPS Agreement under paragraph 1(a) because the purpose of the measure was to protect Australia’s fish from exotic disease.⁶⁰ Once it is found that the SPS Agreement applies to a specific measure, whether the measure is based on scientific evidence or an international standard must be determined.

2. *Scientific evidence and the risk assessment*

¶19 If an SPS measure is not based on an international standard, the Member must show it is based on a risk assessment.⁶¹ A risk assessment requires that Members “ensure that their sanitary or phytosanitary measures are based on an assessment, as appropriate to the circumstances, of the risks to human, animal or plant life or health, taking into account risk assessment techniques developed by the relevant international organizations.”⁶² It further requires that Members take available scientific evidence into account.⁶³ In *Hormone Beef*, the WTO Appellate Body determined that Article 2.2 of the SPS Agreement informs Article 5.1.⁶⁴ Article 2.2 requires that SPS measures be based on scientific principles and maintained with sufficient scientific evidence, while Article 5.1 requires that Members ensure their SPS measures are based on a risk assessment.⁶⁵ The Appellate Body found further that Article 2.3 informs Article 5.5. Article 2.3 requires that SPS measures do not unjustifiably discriminate between Members and that they are not applied in a way that would constitute a disguised restriction on trade, and Article 5.5 requires that Members avoid arbitrary and unjustifiable distinctions in SPS protection levels for different situations.⁶⁶ These findings solidify the importance of scientific evidence as a requirement of the SPS Agreement when measures are not based on international standards.

3. *Harmonization with international standards*

¶20 With few exceptions, the SPS Agreement requires Members to base SPS measures on existing international standards. The SPS Agreement explicitly recognizes the standards set by the three

⁵⁹ Australia – Measures Affecting Importation of Salmon, Recourse to Article 21.5 by Canada, WT/DS18/RW [hereinafter *Australia – Salmon*] (Feb. 18, 2000), available at [http://www.worldtradelaw.net/reports/wtopanels/australia-salmon\(panel\)\(21.5\).pdf](http://www.worldtradelaw.net/reports/wtopanels/australia-salmon(panel)(21.5).pdf).

⁶⁰ See *id.* para. 2.3.

⁶¹ SPS Agreement, *supra* note 9, art. 5.1.

⁶² *Id.*

⁶³ *Id.* art. 5.2.

⁶⁴ *Hormone Beef*, *supra* note 10, paras. 180-81.

⁶⁵ *Id.*

⁶⁶ *Id.* para. 250.

international standard setting bodies mentioned above: (1) the Codex Alimentarius Commission, for food safety; (2) the Office Internationale des Epizooties, for animal health; and (3) the Secretariat of the International Plant Protection Convention, for plant health.⁶⁷ The WTO's SPS Committee oversees harmonization of domestic measures with international standards by working directly with these three bodies.⁶⁸

4. *Precaution and the precautionary principle*

¶21 Article 5.7 of the SPS Agreement allows Members to use some precaution when enacting SPS measures.⁶⁹ Specifically, it permits countries to adopt provisional SPS measures in cases where relevant scientific evidence is not sufficient to establish the safety or threat of a good.⁷⁰ These provisional measures must be based on available pertinent information.⁷¹ This information includes that from relevant international organizations and from SPS measures applied by other Members.⁷² In such circumstances, Members must seek to obtain the additional information necessary for a more objective assessment of risk and review the SPS measure accordingly within a reasonable time.⁷³ Provisional measures are permitted only until sufficient evidence is available to either justify or condemn the measures.

B. *Other WTO Disputes*

¶22 Members have only brought a few disputes before the WTO regarding the SPS Agreement. The most important dispute, *Hormone Beef*, was brought by the United States and Canada against the European Communities challenging the E.C.'s ban on the importation of hormone treated beef. The WTO Appellate Body found that the E.C.'s measures prohibiting the importation of hormone treated beef were in violation of Article 5.1 of the SPS Agreement because they were not rationally related to a risk assessment.⁷⁴ Although the original panel was requested to hear the dispute in 1996 and the Appellate Body's report was adopted in 1998, the European Communities still has not complied with the

⁶⁷ SPS Agreement, *supra* note 9, art. 3.

⁶⁸ *See id.* art. 3.5.

⁶⁹ *See id.* art. 5.7.

⁷⁰ *See id.*

⁷¹ *Id.*

⁷² *Id.*

⁷³ *Id.*

⁷⁴ *Hormone Beef*, *supra* note 10, paras. 208-209.

Appellate Body report.⁷⁵ After almost 10 years, the dispute is still disrupting trade.⁷⁶

¶23 Another WTO dispute dealing with the SPS Agreement is Japan – Measures Affecting Agricultural Products (“*Japan – Agricultural Products*”).⁷⁷ There, the Appellate Body identified four requirements Members must meet to comply with Article 5.7.⁷⁸ Members may provisionally adopt an SPS measure if the measure is (1) imposed in response to insufficient scientific information; and (2) adopted “on the basis of available pertinent information.” After imposing provisional measures, Members must also (3) seek additional information necessary for a more objective risk assessment; and (4) review the measure within a reasonable period of time.⁷⁹ The Appellate Body stated further that “Article 5.7 operates as a *qualified* exemption from the obligation under Article 2.2 not to maintain SPS measures without sufficient scientific evidence. An overly broad and flexible interpretation of that obligation would render Article 5.7 meaningless.”⁸⁰

¶24 The most recent WTO dispute alleging violations of the SPS Agreement is European Communities – Measures Affecting the Approval and Marketing of Biotech Products (“*EC – Biotech Products*”).⁸¹ The WTO has not yet released a panel report regarding this dispute. Here, the United States alleges the E.C. moratorium on the approval of products of agricultural biotechnology (“biotech products”) violates, among other agreements, the SPS Agreement. Specifically, the U.S. alleges that the E.C. moratorium imposes an undue delay to its biotech procedures. Furthermore, many of the products “caught up in the E.C. moratorium have been positively assessed by the E.C.’s own scientific committees.”⁸² Since the WTO has not yet issued a report on

⁷⁵ See Bridges: Weekly Trade New Digest, EC beef hormone dispute drags on (Nov. 13, 2003), at <http://www.ictsd.org/weekly/03-11-13/story3.htm>.

⁷⁶ *Id.*

⁷⁷ Japan – Measures Affecting Agricultural Products WT/DS76/AB/R (Feb. 22, 1999) [hereinafter Japan – Agricultural], available at [http://www.worldtradelaw.net/reports/wtoab/japan-agproducts\(ab\).pdf](http://www.worldtradelaw.net/reports/wtoab/japan-agproducts(ab).pdf).

⁷⁸ WTO, Analytical Index, SPS Agreement, art. 5.7, para. 115, available at http://www.wto.org/english/res_e/booksp_e/analytic_index_e/sps_02_e.htm#article5B6 (last visited Mar. 19, 2005).

⁷⁹ Japan – Agricultural, *supra* note 77, para. 89.

⁸⁰ *Id.* para. 80.

⁸¹ European Communities – Measures Affecting the Approval and Marketing of Biotech Products WT/DS291/23, Request for the Establishment of a Panel by the United States (Aug. 8, 2003), available at [http://www.worldtradelaw.net/pr/ds291-23\(pr\).pdf](http://www.worldtradelaw.net/pr/ds291-23(pr).pdf).

⁸² European Communities – Measures Affecting the Approval and Marketing of Biotech Products WT/DS291, 292, and 293, Executive Summary of the First Submission of the United States, para. 4 (April 30, 2004), available at http://www.ustr.gov/assets/Trade_Agreements/Monitoring_Enforcement/Disput

this issue, it is less relevant to the discussion of nanotechnology and the SPS Agreement than other WTO disputes.

III. THE SPS AGREEMENT AND NANOTECHNOLOGY

A. Would the SPS Agreement apply to measures regulating trade in nanotechnology?

¶25 Whether the SPS Agreement applies to measures regulating trade in nanotechnology ultimately depends on the purpose of the specific measures. The SPS Agreement applies to all “sanitary and phytosanitary measures which may, directly or indirectly, affect international trade.”⁸³ Assuming measures regulating trade in nanotechnology affect international trade, they are subject to the SPS Agreement if they are SPS measures. They are SPS measures if they have any of the four purposes identified in Annex A1 of the SPS Agreement, discussed in section IIA above. The first three provisions generally have two requirements: to protect different kinds of life from various health risks. The fourth category seeks to prevent damage by pests.

¶26 Given Dr. Oberdörfer’s studies showing the toxicity of some nanoparticles to fish, it is easy to imagine measures regulating nanotechnology with the purpose of protecting animal or human life from toxins in foods, beverages or feedstuffs. Such measures would satisfy the requirements of category (b) above and, therefore, be subject to the SPS Agreement. Moreover, the first question of whether such measures would have the requisite purpose of protecting animal or human life is an abstract question because we do not have specific measures to analyze. However, as shown by *Hormone Beef and Australia - Salmon*, the purpose of protective measures is generally not disputed. That is, if a Member says the purpose of a measure is to protect or fish from diseases, this assertion is generally not challenged. The second question, whether nanotechnology is a toxin, is also not difficult to answer. Considering Dr. Oberdörfer’s studies, it is hard to imagine that measures prohibiting the trade of fullerenes would not satisfy this category. Oberdörfer has shown that fullerenes are toxic to large mouth bass.⁸⁴

¶27 Other provisions of Annex 1A present more difficult questions. For example, category (a) includes any measure with the purpose of

[e Settlement/WTO/Dispute Settlement Listings/asset_upload_file737_5542.pdf](#).

⁸³ SPS Agreement, *supra* note 9, art. 1.1.

⁸⁴ However, a similar measure regulating the trade of all nanotechnology might not be so easily justifiable. Are all nanotechnologies toxic to human or animal life? Such factual questions, although important, are beyond the scope of this iBrief.

protecting animal or plant life or health from risks from pests or diseases, including disease -carrying or-causing organisms. Are nanoparticles pests? Are they diseases? Or, do they cause disease and, thus, also satisfy the requirement? What about measures that regulate the trade in a different type of nanotechnology? For example, Drexler's example of the gray goo problem sounds a lot like a pest: "'Plants' with 'leaves' no more efficient than today's solar cells could out-compete real plants, crowding the biosphere with an inedible foliage."⁸⁵ Category (d) also raises the question of whether nanotechnology is a pest.

¶28 In addition, category (c) encompasses any measure whose purpose it is to protect humans from the risks of diseases carried by animals, plants or products thereof, or from pests. This again raises some of the same questions mentioned above: are nanoparticles diseases, or do they cause disease? What about nanotechnology as a whole? If nanoparticles are not themselves considered toxins but cause diseases, measures regulating their trade would be subject to the SPS Agreement. To answer these questions one must examine the nature of the specific nanotechnology in question. Moreover, in the case of nanoparticles, specifically fullerenes, these questions may be avoided by looking at the ostensibly more straightforward questions presented by category (b) of Annex A1.

¶29 WTO jurisprudence provides little help in determining whether nanotechnology or nanoparticles are pests, diseases, disease-carrying organisms or disease-causing organisms. The only WTO ruling that expounds Annex A1 is *Australia - Salmon*. There, Australia banned the importation of fresh, chilled or frozen salmon that had not been heat treated to protect against 24 known disease agents.⁸⁶ The panel implicitly acknowledged without discussion that the measure was subject to the SPS Agreement. The only discussion was directed towards determining which provision of Annex A1 covered the measure. The panel found that because of "the objectives for which the measure is being applied," it was a "sanitary measure" under the definition of paragraph 1(a) of Annex A1.⁸⁷ The panel ruling reinforces the language of Annex A1 stating that any measure whose objective is to protect humans, animals, or plants from the risks specified in the SPS Agreement is considered an SPS measure and subject to the SPS Agreement.

¶30 *Hormone Beef* also sheds some light on the question. There, the European Communities banned the importation of meat and meat

⁸⁵ Engines of Creation, *supra* note 17, at 215.

⁸⁶ Australia - Measures Affecting Importation of Salmon, WT/DS18/R, paras. 1.1 & 2.11 (June 12, 1998), available at [http://www.worldtradelaw.net/reports/wtopanels/australia-salmon\(panel\).pdf](http://www.worldtradelaw.net/reports/wtopanels/australia-salmon(panel).pdf).

⁸⁷ *Id.* para. 8.34.

products from cattle treated with any of six specific hormones for growth purposes. The explicit purpose of these measures was to protect human health. Both parties agreed that the measures were subject to the SPS Agreement according to Paragraph 1(b) of Annex A: “any measure applied to protect human . . . health . . . from risks arising from additives, contaminants, toxins or disease-causing organisms in food, beverages or feedstuffs.”⁸⁸ The panel agreed with the parties. It said the E.C. measures were applied to protect human life or health from risks arising from contaminants, “namely residues of six specific hormones, in foods.”⁸⁹ The panel noted that footnote 4 to Annex A specified that “contaminants” includes “pesticide and veterinary drug residues and extraneous matter.” The panel concluded that “[s]ince the six hormones in dispute are veterinary drugs, the parties agree that the alleged risks at issue arise from contaminants.”⁹⁰

¶31 Considering recent scientific evidence, measures that regulated the trade in nanotechnology with the purpose of protecting human or animal life from toxins would be subject to the SPS Agreement.

*B. Would the SPS Agreement provide an objective balance between the risks and benefits of trading in nanotechnologies?*⁹¹

¶32 Because the SPS Agreement requires Members to base their SPS measures on scientific evidence, the Agreement would provide an objective balance between the risks and benefits of trading in nanotechnology.⁹² According to Article 2.2, Members must ensure that their SPS measures are “based on scientific principles and [are] not maintained without sufficient scientific evidence.”⁹³ In addition, Members must ensure their SPS measures “do not arbitrarily or unjustifiably discriminate between Members,” and that their SPS

⁸⁸ EC Measures Concerning Meat and Meat Products (Hormones) Complaint by the United States Report of the Panel WT/DS26/R/USA, para. 8.21 (Aug. 18, 1997) [hereinafter *Hormone Beef Complaint*], available at [http://www.worldtradelaw.net/reports/wtopanels/ec-hormones\(panel\)\(us\).pdf](http://www.worldtradelaw.net/reports/wtopanels/ec-hormones(panel)(us).pdf).

⁸⁹ *Id.* para. 8.22.

⁹⁰ *Id.* para. 8.21.

⁹¹ In practice, the answer to this question depends on how individual Members interpret the obligations created by the SPS Agreement. For example, in *Hormone Beef*, the European Communities dismissed the SPS Agreement’s requirement to base SPS measures on scientific evidence. They disagreed with the United States and the WTO Appellate Body on how precaution should play a role in the risk assessment. For the SPS Agreement to objectively regulated trade in nanotechnologies, the European Communities and the United States need to reconcile their differences regarding the role of precaution under the SPS Agreement.

⁹² SPS Agreement, *supra* note 9, art. 2.2.

⁹³ *Id.*

measures are not applied in a manner that would constitute a disguised restriction on trade.⁹⁴ Although this article has not been adjudicated at the WTO, the Appellate Body in *Hormone Beef* held that Article 2.3 is part of the risk assessment of Article 5.5.⁹⁵ Article 2.3 play an important role in future WTO disputes.

¶33 In the case of nanoparticles, especially fullerenes, it seems that preliminary measures under Article 5.7 could be based on scientific evidence, specifically the Oberdörster study. In light of how long it took the international community to effectively regulate asbestos it would seem that protective measures regulating the trade in potentially harmful nanoparticles would be welcome.

CONCLUSION

¶34 Nanotechnology is becoming more important each day. This includes both the development of and trade in goods containing nanoparticles and the progress made towards the specific goal of molecular manufacturing. Although such developments bring immediate benefits to consumers and investors in the form of, for example, longer lasting tennis balls and loftier golf balls, they also bring significant risks. In light of these risks, nations will inevitably establish measures that regulate the trade in nanotechnology. Considering recent scientific evidence, measures that regulated the trade in nanotechnology with the purpose of protecting human or animal life from toxins would be subject to the SPS Agreement. If this is the case, the agreement's reliance on scientific evidence would provide for an objective balance between the risks and benefits in trading in nanotechnology.

⁹⁴ *Id.* art. 2.3.

⁹⁵ *Hormone Beef*, *supra* note 10, paras. 180-81.