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APPLICATION OF THE PRECAUTIONARY PRINCIPLE TO THE MOON

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INTRODUCTON

A recent article in the American Journal of International Law (AJIL) on application of the Precautionary Principle to Antarctica 1/ engenders the idea that the Precautionary Principle could be applied usefully to activities on the Moon. The Precautionary Principle has been codified in several international agreements on protection of natural resources. As expressed in Principle 15 of the 1992 Rio de Janeiro Declaration 2/

> In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

According to the Precautionary Principle, 3/ States and their nationals doing activities relating to natural resources must use extra caution when the result or outcome of performing the activity is uncertain. The Principle is particularly relevant to fragile environments. 4/ The two authors of the AJIL article, Bastmeijer and Roura, express that the Principle deals more with managing uncertain risks than with the prevention of known risks. They conclude that the Precautionary Principle applies to Antarctica. 5/

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Antarctica is subject to the Antarctic Treaty of 1959, which has been universally accepted. 6/ The Antarctic Treaty demilitarized Antarctica and made it into *terra communis*. 7/

The objective of this paper is to examine whether the Precautionary Principle can also be applied to the Moon because the Antarctic Treaty 8/ is closely linked to and served as the model for the 1967 Outer Space Treaty (OST). 9/ The Antarctica analogy was most forcefully made by US President Eisenhower in his famous 1960 address to the UN General Assembly. He said:

> The nations of the world have recently united in declaring the continent of Antarctica "off limits" to military preparations. We could extend this principle to an even more important sphere. National vested interests have not yet developed in space or in celestial bodies. Barriers to agreement are now lower than they will ever be again.

President Eisenhower then proposed that, like Antarctica, outer space should not be subject to claim of sovereignty and that nations should not engage in warlike activities in outer space and on celestial bodies. 10/ Like the Antarctica treaty, the OST demilitarized the Moon and made the Moon *terra communis*. 11/ The Moon is "the province of all mankind" and "not subject to national appropriation by claim of sovereignty." 12/ *Ab initio*, it is notably the lack of right of national appropriation which

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weakens the absolute right of individual States to engage in lunar activities . In particular, lack of this right undermines the right to do anything in fragile areas because it may preclude other states from ever using those areas.

I. REASONS FOR INVOKING THE PRECAUTIONARY PRINCIPLE TO THE MOON.

The reasoning behind application of the Precautionary Principle to Antarctica is that Antarctica is a fragile environment. 13/ Possibly the Moon is more fragile than Antarctica. All astronauts agree that outer space, including the Moon, is a very dangerous and unforgiving place that does not permit any mistakes to be made. Its fragile environment makes the outcome of lunar activities uncertain. It is particularly important to focus on uncertainties in making decisions about the Moon's environment because erroneous decisions about the Moon cannot be reversed. The question of the Moon's fragility becomes urgent because several states have plans for exploration of the Moon, for example NASA's plans for moon exploration, which include the objective of permanent habitation; China's and possibly India's new interest in Moon exploration; the European Space Agency's (ESA) plans for lunar activities; private companies' plans for use of the Moon's minerals; as well as other private prospective planned uses such as manufacture and tourism on the Moon. 14/ The fact is that nothing grows on the Moon. It has no air. The Moon is unable to "heal" itself after impacts. Craters from long-ago asteroid strikes remain; the footprints of the visiting US astronauts will remain on the surface of the moon, unless disturbed by later lunar activity.

II. LEGAL BASIS FOR APPLYING PRECAUTIONARY PRINCIPLE TO OUTER SPACE

When and where did States agree on application of the precautionary principle to the environment of the Moon? Nowhere in the space law treaties is application of the Precautionary Principle to the Moon mentioned in so many words. However, neither does the Antarctica treaty system expressly adopt the Precautionary Principle. 15/ Legal authority for application of the Precautionary Principle to Antarctica is scholarly legal opinion that the Precautionary Principle can be read into the Antarctic treaty system because the treaty system implicitly describes and incorporates the Principle. The two authors of the AJIL article, Bastmeijer and Roura, first ascertain that the Antarctic treaty is accepted by all interested parties. 16/ The treaty parties meet regularly in the Antarctic Treaty Consultative Meetings to implement the Treaty system. Furthermore, "[a]pplication of the [precautionary] principle would be consistent with the proactive approach of the Antarctic Treaty System." 17/

A. Protection of Fragile Lunar Resources

If application of the Precautionary Principle to the Moon is linked to fragility of the lunar environment, then we search for OST treaty provisions requiring caution in use of the Moon's resources. General acceptance of the need to use caution is expressed in OST, Art. V, which requires States to inform the United Nations of "any phenomena they discover in outer space, including the Moon and celestial bodies, which could constitute a danger to the life or health of astronauts." General acceptance of the need to use caution is also expressed in the Outer Space Treaty, Art. IX, in which contracting States agree to "avoid harmful contamination" of the Moon. 18/ Prospective harmful activities give States Parties the right to appropriate

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international consultations before such activities begin:

> A Party to the Treaty which has reason to believe that an activity or experiment planned by another Party in outer space, including the Moon and other celestial bodies, would cause potentially harmful interference with activities in the peaceful exploration and use of outer space, including the Moon and other celestial bodies, may request consultation concerning the activity or experiment." 19/

Strict control by the States Parties to the OST of national activities on the Moon in OST Art. VI is another indication that the Outer Space Treaty recognizes the fragility of the Moon. States "bear international responsibility for national activities in outer space, including the Moon and other celestial bodies." Other indications are OST, Art. VII on liability for damages, OST, Art IX on state jurisdiction and control over their spacecraft, as well as the Liability Convention 20/ , and the Registration Convention. 21/ The Aid to Astronauts Convention 22/ is also relevant to this discussion. It was negotiated a year before the U.S. landed on the Moon in 1969. The United States and the then-USSR were in a race to be the first to land on the Moon. Both were concerned about the uncertain dangers facing the astronauts and cosmonauts on the Moon. In this treaty they agreed on a procedure for assistance in case, through some unfortunate event, astronauts and cosmonauts got stranded on the Moon. Thus the Aid to Astronauts Convention acknowledges the uncertainty of lunar activities as early as 1968. 23/

While no human beings had been to the Moon when the OST was drafted, the drafting of the 1979 Moon Treaty 24/ does have the benefit of the knowledge and experience of astronauts having faced the uncertainties of existence on and return from the Moon. The 1979 Moon Treaty specifically provides in Art 7(1):

> In exploring and using the Moon, States Parties shall take measures to prevent the disruption of the existing balance of its environment, whether by introducing adverse changes in that environment, by its harmful contamination through the introduction of extra-environmental matter or otherwise.

The 1979 Moon Treaty is particularly clear about the fragility of the lunar environment. The treaty was negotiated in the UN Committee for Peaceful Uses of Outer Space (COPUOS) just prior to 1979 at a time when COPUOS delegates had greater knowledge and greater understanding of the impact of actual human activities on the Moon since the Apollo visits after 1969 and the several lunar probes. However, the 1979 Moon treaty is weaker international law than the OST because the 1979 Moon treaty, while in force, is not universally accepted. 25/ Therefore its greater significance is as evidence of the COPUOS delegates' (and thus the World's) awareness of the fragility of the Moon. They found it necessary to establish a neutral information bank in the United Nations. 26/ They decided to require states to limit their lunar activities as much as possible 27/ and to keep the UN Secretary General informed. 28/ They agreed on the need to revisit the issue of an international regime to govern use of the natural resources of the Moon. Finally, the delegates felt the need to strengthen the obligation to demilitarize the Moon. 29/

The general admonition not to disrupt the existing environmental balance of the Moon is underscored by the 1979 Moon Treaty's Art. 7(3) provision that permits designating areas of scientific interest worthy of special

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protective arrangements. Also on point is 1979 Moon Treaty, Art. 8(1) stating that: "States Parties may pursue their activities in the exploration and use of the Moon anywhere on or below the surface, subject to the provisions of this Agreement." The treaty requires the States Parties to be cautious of disturbing the balance of the environment. It is possible to construe the application of the Precautionary Principle to the Moon based on the combination of the four space law treaties. Such construction is more difficult if we remove the 1979 Moon treaty from consideration. However, it is not a huge leap from OST Art. IX's obligation to avoid harmful contamination of the Moon to the 1979 Moon treaty's more specific obligation to prevent disruption of the existing balance of the Moon's environment.

B. Protection for Scientific Investigation on the Moon.

Preservation and facilitation of scientific investigation is an element of the Precautionary Principle and scientific investigation is a major purpose of the Antarctic Treaty. That is clearly indicated in the Antarctic Treaty's Articles II and III. 30/ This leads Bastmeijer and Roura to conclude that application of the Precautionary Principle to Antarctica would harmonize with Antarctica's dedication to scientific investigation. 31/ A similar conclusion may be made about application of the Principle to the Moon. It would harmonize with the Moon's dedication to scientific investigation. The 1967 OST. Art. I specifies that "There shall be freedom of scientific investigation in outer space, including the Moon and other celestial bodies, and States shall facilitate and encourage international cooperation in such investigation." In fact, scientific investigation of outer space is one of the main purposes underlying all the treaty and UNGA declarations on use of the Moon. 32/

C. Due Regard for Interests of Other States.

States Parties agreed in the OST Art. I, that the Moon and other celestial bodies "shall be the province of all mankind." This principle emphasizes that use of the Moon by one individual state or by a group of states must take into consideration the interests of other States Parties. This principle is amplified by the1979 Moon Treaty, Art. 11 principle stating: "The Moon and its natural resources are the common heritage of mankind." 1979 Moon Treaty, Art. 11 (5), continues that the States Parties shall in the future "establish an international regime, including appropriate procedures" governing use of the Moon's resources. This means that the Moon continues to be common property, as stated in the 1967 treaty, but that a detailed regime will be created in the future.

In lunar exploration and use States Parties "shall conduct all their activities in outer space, including the Moon and other celestial bodies, with due regard to the corresponding interests of all other States Parties to the Treaty." 33/ The obligation to pay due regard permeates both the OST and the 1979 Moon Treaty. 34/ The due regard requirement is in harmony with application of the Precautionary Principle to the Moon, because the effect of this principle is for individual States to think twice before using the Moon's resources. 35/

The conclusion is that States' use of lunar resources must take into consideration the interests of other States.

III EFFECT OF APPLYING PRECAUTIONARY PRNCIPLE

What would be the practical effect of applying the precautionary principle to the Moon? First of all it must be emphasized that the Precautionary Principle differs fundamentally from an Environmental Impact Assessment. 36/ The

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Precautionary Principle is an acceptance of the uncertainty facing lunar activities and the need to take this uncertainty into consideration in decision-making. The Precautionary Principle is not absolutist and does not prohibit activities on the Moon, however it may consider certain risks to be unacceptable. Application of the Principle may lead to more thorough planning that includes the short and long-term effects of lunar activities. In the words of Bastmeijer and Roura: 37/

> Generally speaking, a reasonable chance that serious adverse impacts will take place combined with questionable socioeconomic importance or available alternatives will push the "pointer" to requirements for additional precautionary measures or even to a "no go" or "not yet" decision."

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In Antarctica the Precautionary Principle leads to improved evaluation of impact prior to the event rather than after the event, or to prohibitions on activities where characteristics of the area are unknown, or to establishment of limits on certain kinds of activities. On the Moon the Precautionary Principle could lead to similar consequences. It is clear that in Antarctica the Precautionary Principle may be used to regulate tourism in sensitive areas. On the Moon the Principle could be used for careful planning of manufacturing activities as well as tourism. 38/ Entrepreneurs Sir Richard Branson and Burt Rutan are now soliciting reservations and plan to be in business in 2008. Branson plans to build hotels on the Moon. 39/ The Principle may also lead to minimum levels of decontamination and other precautions before sending missions to the Moon. 40/

IIII ENFORCEMENT OF THE PRECAUTIONARY PRINCIPLE

How would application of the Precautionary Principle to the Moon be enforced? Enforcement of the States Parties' concerns with the fragility of the Moon's environment through application of the Precautionary Principle would be mainly accomplished unilaterally by the States who are responsible for national activities on the Moon. They are responsible for assuring that national activities are carried out in conformity with international law 41/. States Parties retain jurisdiction and control over their spacecraft, including persons onboard, while on a celestial body 42/ and States Parties are internationally liable for damages caused by their space craft on the Moon. 43/

Enforcement may also involve the Liability Convention, Art. III, 44/ and the Registration Convention 45/ the purposes of which are to identify and locate spacecraft that may cause damage in outer space.

States receive information about the lunar activities of other states through the information bank in the United Nations maintained by the Office of Outer Space Affairs (OOSA). States may raise issues of lunar activities during discussions in COPUOS. They may request bilateral consultations under OST Art. IX. Under the 1979 Moon Treaty, Art. 15, Parties may "seek the Assistance of the Secretary General, without seeking the consent of an other State Party, in order to resolve the controversy." Also, States may ask the International Court of Justice for enforcement of treaty obligations. 46/

V. CONCLUSION

We know very little about the Moon in today's early stage of exploration and use.

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States Parties have agreed to proceed cautiously and jointly, stating that, "[t]he exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind." 47/

Human activities in Antarctica raise more than environmental issues. They also raise such issues as search and rescue, economy of the tourist industry, and the politics of differing or irreconcilable claims of sovereignty. The Moon's future is also multifaceted, involving many kinds of human activities on the Moon ranging from tourism to colonization, mining and appropriation of land by means of use or occupation.. The space law treaties clearly did not envision the volume of human activities planned for the Moon. These increased lunar activities are reason to consider application of the Precautionary Principle to the Moon prior to environmental degradation. If the Precautionary Principle can be applied to Antarctica, then the Precautionary Principle can also apply to the Moon. 48/

ENDNOTES

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1. Bastmeijer and Roura, *Regulating: Antarctic Tourism and the Precautionary Principle,* 98 Amer. J. Int. Law 763 (2004)
2. The United Nations Conference on Environment and Development, Rio de Janeiro, June 3 -14, 1992, 1992. Convention on the Conservation of Antarctic Seals, 29 UST 441 (1972). Convention on the Regulation of Antarctic Mineral Resource activities, 27 ILM 859. (This Convention is not in force). See also The European Community Treaty, Art. 174(2) www.europa.eu.int./eur-lex (preparatory acts/com documents:2000 n.1.):

> Community policy on the environment shall aim at a high level of protection taking into account the diversity of situations in the various regions of the Community. It shall be based on *the precautionary principle*, and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay (emphasis added).
>
> The Commission of the European Communities, Communication from the Commission on the Precautionary Principle, Com (2000) 1 final, Brussels, Feb 2, 2000, explains:
>
> [M]easures based on the precautionary principle should be *inter alia:*
>
> - proportional to the chosen level of protection.
> - non-discriminatory in their application.
> - consistent with similar measures already taken.

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- based on an examination of the potential benefits and costs of action or lack of action (including, where appropriate and feasible, an economic cost/benefit analysis).
- subject to review, in the light of new scientific data, and
- capable of assigning responsibility for producing the scientific evidence necessary for a more comprehensive risk assessment.

3. Professor Robert V. Percival, Director of Environmental Programs, University of Maryland has researched the Precautionary Principle from a U. S. point of view, see Percival *Who is Afraid of the Precautionary Principle,* 23 Pace Env. L. Rev. 801. Professor Percival finds four main elements of the Precautionary Principle: A serious threat of irreversible damage; uncertainty about the impact of planned activities on the environment; the scope of the authority of the regulator; the regulator's use of that authority. Wybe Th. Douma, *The Precautionary Principle in the European Union*, 9 Rev. of Eur. Comm. & Env. L., at 132, states that the Precautionary Principle applies "when it is unclear whether damage will occur at all or what causes existing damage." It applies when "risks are not quantifiable and can be referred to as potential risks."

4, Bastmeijer and Roura, *supra* n. 1, at 772.

5. *Id.*

6. Antarctic Treaty, 402 UNTS 71 (1979). 47 States are parties to the Treaty. The Antarctic Treaty system includes the Protocol on Environmental Protection to the Antarctic Treaty which entered into force in 1998.

7. Common territory to which sovereignty cannot be acquired, see Jessup and Taubenfeld, *Controls for Outer Space and the Antarctic Analogy*, at 181 (Columbia Univ. Press, 1959).

8. *Supra* n. 6.

9. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, 610 UNTS 205 (1967), (hereinafter referred to as the Outer Space Treaty, or the OST)..

10. See Legal Problems of Space Exploration, U.S. Senate Committee on Aeronautical and Space Sciences, 87th Cong. Sen. Doc. No. 26, March 22, 1961, at 1009.

11. OST, Art. IV, *supra* n. 9.

12. Id. Arts. I and II.

13. Bastmeijer and Roura, *supra* n. 1, at 772.

14. Larsen, *Current Legal Issues Pertaining to Space Solar Power Systems*, 16 Space Policy 139-144 (2000).

15. *Supra* n. 6. Lluis Paradell-Trius, *Principles of International Environmental Law: an Overview,* 9 Rev. of Eur. Comm. & Env. L. at 94, states that principles of international environmental law, such as the precautionary principle, are often drawn from many sources, in particular from soft law.

16. *Supra* n. 3.

17. *Id.*

18. Hintz, *Environmental Aspects of the Moon and Mars – Planetary Protection*, 34 Proc. IISL 59, questions the scope of harmful contamination: Does any change in the Moon's environment constitute harmful contamination or must it offend other states? He assumes that the Treaty permits contamination below the level of harming the interests of other States.

19. OST, Art. IX, *supra* n. 9 .

20. Convention on International Liability for Damage Caused by Space Objects, 961 UNTS 197 (1972). Damage to a space object on Moon is subject to proof of fault.

21. Convention on Registration of Objects Launched Into Outer Space, 1023 UNTS 15

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(1976). Space objects sent to the Moon must be registered.
22. Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space, 672 UNTS 119 (1968).
23. Dembling and Arons, *The Treaty on Rescue and Return of Astronauts and Space Objects,* 9 William and Mary L. Rev. 630 (1967-68).
24. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, International Instruments of the United Nations 299 (hereinafter the 1979 Moon Treaty). Neither the United States nor Russia have ratified this treaty.
25. Id.
26. *Id.* Arts. 5 and 7. The information office is operated by the U.N. Secretary General, that is, the Office of Outer Space Affairs. See www.oosa.unvienna.org
27. *Id.* Art 9.
28. *Id.* Arts. 5 and 7.
29. *Id.* Art 3.
30. *Supra* n. 6.
31. Bastmeijer and Roura, *supra* n. 1, at 772.
32. See President Eisenhower's 1961 speech to the UN General Assembly, *supra* n.10. Note that the Commission of the European Communities Communication, *supra* n. 2, at 16, states: "The implementation of an approach based on the precautionary principle should start with a scientific evaluation, as complete as possible, and where possible, identifying at each stage the degree of scientific uncertainty."
33. See Hintz *supra* n. 18 at 61.
34. OST, Art. IX, *supra* n. 9 and 1979 Moon Treaty, Arts. 1 and 2, *supra* n. 24.
35. See *U.K. v. Iceland,* 1974 I.C.J. 3 (Icelandic Fisheries case) in which the International Court of Justice held that on the high seas States have "the obligation to pay due regard to the interests of other States in the conservation and equitable exploitation of these resources." This principle was adopted in UNCLOS, Arts. 56 – 59
36. National Environmental Policy Act (NEPA), 42 U.S.C. 4321 et seq.. For discussion of whether NEPA applies to Antarctica see *Environmental Defense Fund v. Massey*, 986 F. 2d, 528 (D.C. Cir. 1993). See Purvis, The Long Arm of the Law? Extraterritorial Application of U.S. Environmental Legislation to Human Activity in Outer Space, 6 Geo. Int. Env. L. Rev. 455 for an excellent discussion of extraterritorial application of U.S. environmental laws. .
37. Bastmeijer and Roura, *supra* n. 1, at 773.
38. Fiorini, *The Sky's Is no Limit*, Aviation Week and Space Technology, August 1, 2005, at 34, states Bert Rutan predicting that 100,000 people will visit outer space during the first 12 years of operation of his spacecraft and that tourism will be the "foundation for human colonization of space.".
39. *Id.*
40. Hintz, *supra* n. 18, at 61,
41. OST, *supra* n. 9, Arts. III and VI.
42. *Id.*, Art VIII.
43. *Id.* Art. VII.
44. *Supra* n. 20.
45. *Supra.* n. 21
46. Statute of the International Court of Justice (ECJ), Art 36. International Instruments of the United Nations, at 419 (1997). Note that the European Court of Justice enforced the European Community Treaty, Art. 174(21) (the Precautionary Principle), supra n 2, in May 5, 1998, Case C-157/96, *R. v. Ministry of Agriculture, Fisheries and Food and Others,* [1998] ECR I-2265. The Commission had banned export of beef from the U.K. to prevent the risk of BSE. The ECJ sustained holding that "Where there is uncertainty as to the existence or extent of risks to human health, the institutions may take protective measures without having to wait until the

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reality and seriousness of those risks become fully apparent"

47. OST, Art. 1, *supra* n.9.

48. This discussion of Application of the Precautionary Principle to the Moon omits the consideration of domestic laws.