

INTERTWINED UNCERTAINTIES: POLICY AND TECHNOLOGY ON THE JURIDICAL CONTINENTAL SHELF

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ABSTRACT

It would be a misconception to attempt to entirely separate technological uncertainties from legal/political uncertainties in the case of the juridical continental shelf. The truth is that technology is now playing a driving role in the development of continental shelf policy, and as a result is a force and a factor in our ability to justly apportion the juridical continental shelf. Indeed, the technological and legal uncertainties involved in an extended continental shelf claim are inexorably intertwined.

This paper will examine the ways in which technology is driving continental shelf policy and will make use of a specific example (Canada's Orphan Knoll) to demonstrate how legal and technological uncertainties intertwine to form a complex matrix of questions about the methods for preparing an extended continental shelf claim.

1. INTRODUCTION: THE CHANGING FACE OF TECHNOLOGICAL INFLUENCES ON POLICY

Traditionally, law and policy have been controlling factors in the use and development of technology. Patents and licenses, for example, have long regulated technological progress and applications.¹ This trend is slowly changing as high-speed technological growth is beginning to

¹ Patents amount to a "grant of right to exclude others from making, using or selling one's invention and includes [the] right to license others to make, use, or sell it." [Black, 1990, p. 1125 *citing* Valmont Industries, inc. v. Yuma Mfg. Co., D.C.Colo., 296 F. Supp. 1291, 1294.] Licenses are a "written authority granted by the owner of a patent to another person empowering the latter to make or use the patented article for a limited period or in a limited territory." [Black, 1990, p. 920]. As such, the laws surrounding patents and licenses control technological use, sale and manufacture, and distinguish between "true" (i.e. patentable) inventions, and those that are merely copying a previous invention. This is only one example of the ways in which law controls technology. We have only to look at the laws surrounding cloning and stem cell research to note that other laws may control, for example, the purpose to which technologies are applied.

set the pace for policy development.² This has resulted in cases where either the law and technology influence each other's evolution, or where technological standards are at the heart of policy development.

Both are the case in outer continental shelf concerns. Indeed, it is widely known that one of the catalysts for the inclusion of outer continental shelf issues in the UNCLOS negotiating forum was the existence of technologies capable of extracting non-renewable resources from both the continental margin and the deep seabed. Scientific and technological possibilities heavily influenced the wording of the final product of UNCLOS, the 1982 Law of the Sea Convention,³ on the definition of the continental shelf and the criteria for the determination of the outer limit of the legal continental shelf – Article 76. The wording of Article 76, a product of political compromise with some of the key issues left deliberately ambiguous, remains an area of inextricably intertwined political, legal and technological uncertainties.

All boundaries and most particularly national boundaries are political and are determined solely by the national government. Only in the rarest of situations does a State yield the decision-making respecting the location of a national boundary to an independent authority. Regarding maritime boundaries, for example, Canada has established unilaterally and without consultation with any other States the outer limit of its 200-n. mile zones even in situations where the claimed areas overlap with claims of other states (for example, in the Beaufort Sea where the Canadian claim overlaps with that of the United States). Canada has agreed on two occasions (in the Gulf

² The most obvious case is the regulation of information dissemination over the Internet. Web development has resulted in new jurisdictional problems [The Economist, 2001], a confused legal setting for the protection of some data (such as spatial data) [Pluijmers and Onsrud, 1997], and new copyright issues due to the new ways of duplicating and using authored works [Hardy, I.T., 1998]. In the case of extended continental shelf claims, the technological ability to map the deep ocean has been incorporated into the Scientific and Technical Guidelines of the Commission on the Limits of the Continental Shelf.

³ 1982 LOS Convention opened for signature 10 December 1982, UN Doc. A/Conf. 62/122 reprinted in United Nations, Official Text of the United Nations Convention on the Law of the Sea with Annexes and Index (New York: UN Sales No. E83.V.5, 1983).

of Maine vis-à-vis the United States and in the outer Gulf of St. Lawrence vis-à-vis France) to allow an independent judicial body to determine the location of the maritime boundary between the conflicting offshore claims of the States.

Article 76 of the Law of the Sea Convention allows States to extend their exclusive national jurisdiction over areas of the continental margin beyond 200 M. Article 76 provides a complex series of criteria (not just distance as in the case of the 200 M. zone) that States are to take into account when establishing the outer limit (i.e. boundary) of their continental shelf. A critical feature of Article 76 is that there is a limit on a State's continental shelf claim. This is one of the essential differences between Article 76 and its predecessor Article 1 of the 1958 Geneva Convention on the Continental Shelf. One might be inclined to reflect that it is not overly critical where the Article 76 outer limit is located (assuming the outer limit is not based on an exaggerated claim) provided that it is finalized. Put another way, technical virtuosity respecting the location of the outer limit of the continental shelf may be less important than the political feature of the outer limit being "final and binding".

Part of the political compromise respecting Article 76 is the establishment of the Commission on the Limits of the Continental Shelf which has as its mandate the perusal of State claims made to continental margin areas beyond 200 M. In the context of ocean boundary-making, the Commission is a unique body. According to the government of the United States:

The Commission is designed to provide a mechanism to prevent or reduce the potential for dispute and uncertainty over the precise limits of the continental shelf where the continental margin extends beyond 200 miles. ... *Ultimate responsibility for delimitation lies with the coastal State itself*, subject to safeguards against exaggerated claims. (*Emphasis added*)⁴

⁴ Treaty Doc. 103-39, 103rd Congress, 2d Session, Senate, Message From the President of the United States, U.S. Government Printing Office, Washington, 1994.

The Commission, deliberately composed solely of technical experts to enhance the apolitical function it has been assigned, is to receive information on outer continental shelf claims and make recommendations to the submitting State concerning that information and the Article 76 criteria. It is, therefore, the Commission and the submitting State that will be faced with the intertwined uncertainties of legal wording, politics and technology of Article 76. The nature of that uncertainty can be illustrated using the following questions:

- 1) Is there a burden of proof a claiming State must fulfill in order to pass the Commission on the Limits of the Continental Shelf's (CLCS) inspection of that State's Article 76 claim?
- 2) In what ways were the hierarchies of evidence in the Technical Guidelines influenced by current technological ability, and how do they influence technology in turn?
- 3) How do the decisions of the Commission (a technical body) influence the final legal outer continental shelf boundaries?

2. BURDEN OF PROOF

A) Is there a burden of proof that a coastal State has to meet in order to pass the Commission's scrutiny?

In 1999, the Commission on the Limits of the Continental Shelf issued scientific and technical guidelines to assist coastal States wishing to make a claim over the extended continental shelf.⁵ The aim of the guidelines was to clarify the "scope and depth of admissible scientific and technical evidence to be examined by the Commission during its consideration of each

⁵ These guidelines were not simply intended to aid submitting coastal States, however: "The Guidelines, which the Commission adopted by consensus, serve multiple purposes: they are primarily intended to assist coastal States in preparing their submissions. They are also designed to provide an important scientific and technical reference for the consideration of these submissions and the preparation of the Commission's own recommendations. And last but not least, they form the basis on which the Commission shall provide advice, if requested by coastal States during the preparation of their necessary data." Commission on the Limits of the Continental Shelf, *Scientific and Technical Guidelines of the Commission on the Limits of the Continental Shelf*, CLCS 11, Adopted 13 May 1999. Preface.

submission for the purpose of making recommendations...”⁶ The guidelines, the Commission states, were necessary because of the strange mesh of technology and law in the outer continental shelf context. In short, the LOS Convention, specifically Article 76, made “use of scientific terms in a legal context which at times [departed] significantly from accepted scientific definitions and terminology.”⁷ While the Guidelines establish various hierarchies of evidence,⁸ and suggest useful technologies to claimant States, they incorporate no clear, precise burden of proof a coastal State’s claim must meet in order to pass the scrutiny of the Commission.

The lack of a burden of proof is consistent with the role assigned to the Commission under Article 76. This role becomes clearer by examining the detailed wording of Article 76 (8) where it provides that the Commission “is to make recommendations” to the submitting State “on matters related to the establishment of the outer limits of the continental shelf.” The making of recommendations is not the passing of judgment on the validity of an outer limit line. The Commission is not imbued with the authority of a court of law to decide upon the bona fides of an outer limit claim.

Article 76 does not indicate what the responsibilities are of a submitting State after receiving “recommendations” of the Commission, although Annex II, Article 8 requires a coastal State which disagrees with the “recommendations” to make a revised submission to the Commission. There is the potential of a ping-pong result between the Commission and the submitting State the end of which is not established in the LOS Convention.⁹ Article 76 (8)

Retrieved from the World Wide Web August 22, 2001
http://www.un.org/Depts/los/clcs_new/documents/CLCS_11.htm

⁶ Ibid., p.4

⁷ Commission on the Limits of the Continental Shelf, *Scientific and Technical Guidelines of the Commission on the Limits of the Continental Shelf*, § 1.3. CLCS 11, Adopted 13 May 1999. Retrieved from the World Wide Web August 22, 2001 http://www.un.org/Depts/los/clcs_new/documents/CLCS_11.htm

⁸ See Section III, below.

⁹ Experts disagree on just how long this submission-recommendation-resubmission process would continue. The Commission cannot “impose a boundary line...” [Gardiner, 1987, p. 69], and some would argue that there are

further provides that: “The limits of the shelf established by a coastal State on the basis of these recommendations shall be final and binding.” A 1980 government of Canada statement sheds some light on this sentence of Article 76 (8) and perhaps more generally on the “ping-pong” effect:

The...Commission is primarily an instrument which will provide the international community with reassurances that coastal States will establish their continental shelf limits in strict accordance with the provisions of article 76. It has never been intended, nor should it be intended, as a means to impose on coastal States limits that differ from those already recognized in article 76. Thus to suggest that the coastal States limits shall be established “on the basis” of the commission’s recommendations rather than on the basis of article 76, could be interpreted as giving the commission the function and power to determine the outer limits of the continental shelf of a coastal State. We are assured on all sides that this is not the intention¹⁰

Without clear wording in Article 76, the only reasonable conclusion given the political nature of ocean boundaries is that it is the submitting State that has the final say on its outer limit determination. The Commission may relate to the international community that the outer limit boundary is at odds with the Commission’s understanding of Article 76. It is up to the international community (or more properly individual States within the community) to decide on their own whether to accept or not the outer limit boundary proclaimed by a State. In an alternative scenario, if the Commission and a submitting State concur respecting the location of the outer limit, this does not have the result that the international community or individual States must of necessity accept and/or respect that outer limit.

It is evident that the role of the Commission is to assist the claiming State, where such assistance is necessary, in making its Article 76 claim and to assist the international community

various possible outcomes should the coastal State refuse to accept the recommendations of the Commission. [Gardiner, 1987, p. 69]. Others mention that “[t]heoretically, this [ping-pong] process could go indefinitely.” [Smith and Taft, 2000, p. 20].

(the non-claiming States) by providing to the international community an objective analysis of whether the submitted claim of an outer limit meets the criteria set out in Article 76. One can describe this role of the Commission as that of a legitimator. Where a coastal State and the Commission are generally in accord with the location of an outer limit this will provide great legitimacy to that boundary and make challenges of the boundary more difficult. A coastal State outer limit not in accord with Commission recommendations will be less legitimate and more open to challenge by other States or perhaps even in the International Seabed Authority.

In short, a submitting State does not face a proof burden when submitting information to the Commission, but rather it faces a situation of the Commission conferring on the submitting state's claim a greater or lesser degree of legitimation. Given the uncertainties that exist both in the five different delineation methods outlined in UNCLOS¹¹ and in the technologies used to evidence these methodologies, States need to be aware of how to meet these uncertainties in order to increase the legitimation of their claims in the eyes of the Commission.

There are some grave uncertainties inherent in the application of current technology to the Article 76 delimitation framework. These can be described by the following table:

¹⁰ Written Statement by the Delegation of Canada Dated 2 April 1980, UN Doc. A/Conf. 62/WS/4 United Nations, Third Conference on the Law of the Sea, Ninth Session, New York.

¹¹ UNCLOS Article 76(4-7). These are outlined in Table 2.1, below, and include the allowance for evidence to the contrary found in UNCLOS Article 76(4)(b).

Table 2.1 after Monahan and Wells, 2001. Showing the range of uncertainty in the location of the various components of Article 76.

| ELEMENT | COMPONENTS | DISCIPLINE | UNCERTAINTY |
|--------------------------------------|---------------------------------|---------------------------|----------------|
| 350 M | baselines distance | hydrography geodesy | Kms and metres |
| 2500 m contour plus 100 M | depth contouring distance | hydrography geodesy | 100s of metres |
| Foot of the Slope plus 60 M | bottom morphology distance | hydrography geodesy | kms |
| Foot of the Slope sediment thickness | bottom morphology sediments | hydrography geophysics | kms |
| Evidence to the Contrary | bottom morphology structure | geology geophysics | tens of km |

As Table 2.1 shows, the positional uncertainties inherent in the various elements that can contribute to the outer limit range from metres to tens of kilometres. There are different reasons for this. The outer constraint of 350 M can have large uncertainties based on the strategic, non-technical decision to include or not include straight baselines, and much smaller uncertainties based primarily on the technological limitation of how well the tide can be measured.¹² Uncertainty in the 2500 m contour plus 100 nautical miles of 100s of metres is derived from the use of International Hydrographic Organisation's current standard (IHO, 1998), which Monahan and Wells¹³ argue has not kept pace with technology and can be rewritten to reduce this uncertainty considerably. The uncertainty associated with these two components of the Outer Constraint pales in comparison with the uncertainty associated with finding and locating the Foot of the Slope. UNCLOS Article 76 considers the Foot of the Slope as a geomorphic feature;¹⁴ on the real earth, it is a feature that might not exist, and where it does exist, it can possess a very variable nature. Article 76 deals with the possibility of non-existence through the "evidence to

¹² Monahan et al, this volume.

¹³ Monahan and Wells 2001a, 2001b, this volume.

the contrary” clause.¹⁵ The CLCS insists that Coastal States first search for a Foot of the Slope and must document their failure to find one before attempting to use evidence to the contrary.¹⁶

The Commission will need to apply some type of objective standard in evaluating the information provided by a submitting State. That standard, yet unarticulated by the Commission, has been set out in the 1993 U.N. Division for Ocean Affairs and the Law of the Sea publication *The Law of the Sea Definition of the Continental Shelf*¹⁷ (hereinafter the “Definition”). This document proposes the following: “the Commission must be satisfied that the data submitted truly reflect the geological/geomorphological conditions claimed.”¹⁸

A literal application of a “truly reflect” standard, while meeting a scientific desire for certainty, would require informational sophistication beyond the reach of all but the wealthiest States. A literal application of “truly reflect” is also inconsistent with the general thrust of Article 76, which is that of outer limit finality provided the claim is not exaggerated. Yet, what the Commission is to examine is the relationship of the information submitted with the criteria of Article 76 – does the information, within reason, “truly reflect the ... geomorphological conditions claimed”

Currently, the Commission seems to have adopted a flexible approach. The Guidelines indicate that as long as coastal States makes use of the Commission guidelines to collect data about their claim, the Commission should be reasonably satisfied.¹⁹ The Guidelines allow

¹⁴ UNCLOS Article 76(4)(a).

¹⁵ UNCLOS Article 76(4)(b).

¹⁶ One possible sequence of events, then, is that a Coastal State could attempt to delineate its Foot of the Slope using Single Beam Echo Sounding (SBES), fail to find it, resurvey the Continental Slope using Multi Beam Echo Sounding (MBES), again fail to find a Foot of the Slope, and then be forced to increase the intensity and scope of its technology to include the full range of geological and geophysical data collection methodology.

¹⁷ United Nations, Division for Ocean Affairs and the Law of the Sea, *The Law of the Sea: Definition of the Continental Shelf*, (New York, UN Sales No. E.93.V.16, 1993).

¹⁸ *Ibid.*, §V(83).

¹⁹ See Note 5, above.

submitting States the use of different methodologies in most instances,²⁰ specifying only what technologies and methodologies are preferred.²¹ This flexible approach is not only a valid approach, given the diversity of economics, available technology and size of claim among the coastal States, but is also consistent with the history and context of the role of the Commission and Article 76 more generally. However, the flexibility of the Guidelines may leave some claimants (or at least their scientists) questioning what information they will have to provide to the Commission in order to satisfy the Commission's scrutiny.

3. HIERARCHIES OF EVIDENCE IN THE GUIDELINES OF THE COMMISSION ON THE LIMITS OF THE CONTINENTAL SHELF

A) In what ways did the accuracy and precision of various technologies influence these hierarchies?

A second way in which law and policy are influencing one another in the continental shelf regime is apparent in the hierarchies of acceptable evidence in the Commission Guidelines.²² For example, in section 4.2 of the Guidelines, the Commission makes an exhaustive²³ list of the of the data types it will accept in the delineation of the 2,500 m isobath. The Commission also states that only single- and multi-beam echo sounding measurements will be considered as primary

²⁰ This is borne out by § 1.4 of the Guidelines, in which the Commission states: "These Guidelines are not intended to exhaust the full range of possible methodologies contemplated by States.... the Commission has endeavoured to emphasize those which might minimize costs and result in the optimization of existing information and resources." One exception to this generality lies in § 4.2.1 of the Guidelines, which states the "complete bathymetric database used in the delineation of the 2,500 m isobath may *only* include a combination of the following..." (*emphasis added*) and goes on to list six methodologies acceptable to the Commission.

²¹ For example, § 4.2.2 of the Guidelines specifies which methods will be considered primary sources of information, and which ones as merely complementary for the delineation of the 2,500 m isobath; § 4.2.3 lists some exceptions to these rules.

²² By way of example, hierarchies are evident in sections 4.2, 5.2, and 8.2 of the guidelines. CLCS, *Scientific and Technical Guidelines of the Commission on the Limits of the Continental Shelf*, CLCS 11, Adopted 13 May 1999. Retrieved from the World Wide Web August 22, 2001

http://www.un.org/Depts/los/clcs_new/documents/CLCS_11.htm

²³ The Commission states, in § 4.2.1 of the guidelines, that only a combination of single-beam echo sounding measurements, multi-beam echo sounding measurements, bathymetric side-scan sonar measurements, interferometric

sources of evidence in this delineation,²⁴ with some exceptions in special circumstances.²⁵ The Guidelines also create a further layer to the hierarchy by declaring other technologies to be unacceptable, (thus the three hierarchical layers are: (1) primary, (2) complementary, and (3) unacceptable). These hierarchies are based on the confidence that the authors of the Guidelines collectively place in the accuracy and reliability of data gleaned from these various technologies.²⁶

B) *How much of a role does data density play in these hierarchies of evidence?*

Interestingly, the hierarchies in the Commission Guidelines only mention data density in connection with seismic evidence.²⁷ For example, the hierarchy specified in § 4.2 of the Guidelines suggests that echo sounding measurements are superior to bathymetric and interferometric side-scan sonar measurements, but says nothing about how much of each data type the Commission considers necessary to evaluate a claim. It is therefore conceivable that the Commission only requires a very few measurements from its preferred technology, and that the rest of the claim could be made based on the “complementary information” highlighted in each hierarchy. Furthermore, it is possible that denser measurements using a less accurate technology would present a more complete picture of a claim than a few primary source measurements, and

side-scan sonar measurements, and seismic reflection-derived bathymetric measurements may be included in the database used to delineate the 2,500 m isobath.

²⁴ CLCS Guidelines § 4.2.2.

²⁵ CLCS Guidelines § 4.2.3. One special circumstance noted by the Commission in this section is the case of ice-covered areas, in which case the Commission will accept “bathymetric information derived from seismic reflection and interferometric side-scan sonar...” as the primary source of evidence.

²⁶ This leads back to the question of what information is required to receive Commission legitimation. Although the Commission obviously finds some sources of data more reliable than others, it does not always require that comprehensive data from the primary sources of evidence be available. In § 8.2.1 of the guidelines, the Commission points out that “complementary forms of evidence are particularly relevant in instances where only a non-comprehensive seismic database may be available.” This suggests that although some more expensive and more reliable data sources may be available, a large portion of a claim could be based on the less reliable, and therefore sometimes less expensive, techniques.

²⁷ There is a minimum data coverage suggested for seismic lines under § 8.2.21 of the Guidelines

could result in considerable cost savings. Perhaps this should be taken into account when considering the evidence presented in a claim.

C) In what ways do the hierarchies of evidence preferred by the Commission influence the technology used to make a claim?

Overall, in fact, the Commission does seem amenable to portions of a claim being based solely on complementary data.²⁸ When coupled with the data density considerations outlined above, this suggests that complementary technologies could be used exclusively for large portions of the claim, potentially at a lesser cost. However, the Commission has clearly stated its preference for the primary sources of evidence.²⁹ Particularly in the case of the first few claims, when the ultimate significance of data sources is less clear, the language in the Guideline hierarchies will inevitably lead to some cost-benefit analysis by the claiming coastal States. A coastal State must ask itself whether it will be less expensive to use the “best” technology (i.e., the Commission’s “primary source of evidence”) in the first place, rather than using a complementary technology and being asked to re-submit as a result.³⁰

This will, no doubt, have some influence over the technologies used to make a claim. In fact, it may even result in changing the focus of technological development, so that as more nations start to make claims to the outer continental shelf, the technologies preferred by the Commission develop more rapidly in response. This could not only stunt the progress of the less preferred technologies, but also discourage the development of new tools, particularly where the

²⁸ See note 26, above.

²⁹ CLCS Guidelines § 4.2.2.

³⁰ Under UNCLOS Annex II, Article 8, claiming States must re-submit if disagree w/ Commission recommendations.

Commission has made its lists of acceptable evidence exhaustive, as in § 4.2.1 of the Guidelines.³¹

D) *Are the hierarchies of evidence outlined in the Commission Guidelines effective, or does it depend on the goal of the claiming State?*

The Commission Guidelines are based on the presumption that every claiming State will find it worthwhile to use the best available technology in order to maximize their claim.³² This raises the following question: What if a State did not find it valuable to spend the extra money in order to obtain data from the Commission's primary sources? In these circumstances, the Guideline hierarchies become less effective as a tool on which to base a technological choice. If such a State arrived before the Commission with only complementary sources of data, how would the Commission respond? Should it recommend that the claimant State acquire data from the primary sources? If the claimant State were to argue that the data already at its disposal was sufficient for its non-maximization purposes, and refused to obtain primary source data, it is somewhat unclear how the situation would be resolved.³³

4. CANADA'S ORPHAN KNOLL: A SPECIFIC EXAMPLE

A) *What data currently exists on Canada's Orphan Knoll? (A preliminary look.)*

If Canada wanted to make a claim now, without spending additional funds, could it do so and fulfill the Commission's legitimation criteria and evidence hierarchy requirements? The evaluation of available data over a small portion of the continental shelf is useful to help analyze

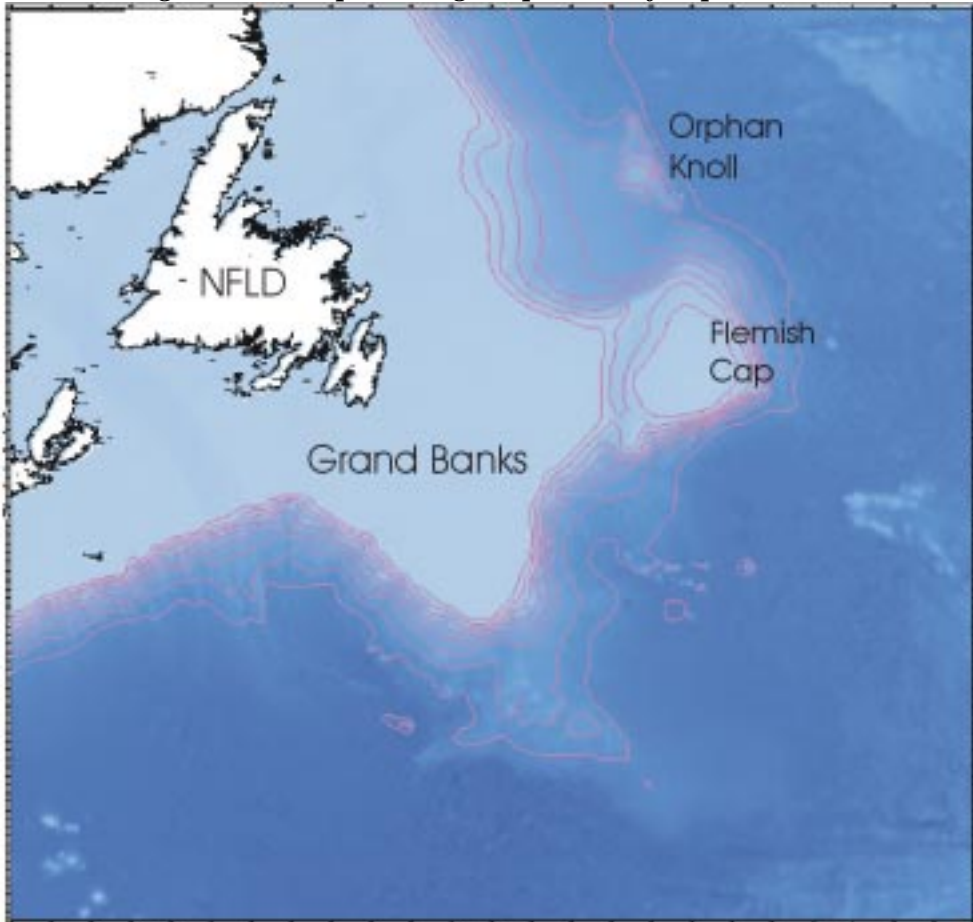
³¹ This influence will, of course, depend on the number States that actually make a claim, the size of the claims, and how strictly the Commission adheres to its hierarchies of evidence in the first few cases.

³² In fact, Australia seems to be doing just that. Symonds, Philip A. et al, 1998. "The Outer Limits of Australia's Resource Jurisdiction off Western Australia," In Purcell, PG and RR (Eds.), *The Sedimentary Basins of Western Australia*. 2. Proc Petroleum Exploration Soc. Of Australia Symp., Perth.

³³ See note 9, above.

the answer to this question. Examining simply the data types available, without looking at the specific accuracies and uncertainties associated with them, we turn to Canada's Orphan Knoll. Orphan Knoll is an elevated area in the Atlantic Ocean east of the island of Newfoundland (figure 4.1, below).

Figure 4.1 – Map showing the position of Orphan Knoll



Currently, Canada has access to the following data on Orphan Knoll:

Table 4.1 – Current Orphan Knoll Data Pertinent to a Continental Shelf Claim

| DATA TYPE | DATA SOURCE |
|-------------------------------|---|
| International Bathymetry maps | GEBCO, ETOPOV |
| Canadian bathymetry maps | In the Natural Resource Series |
| Bathymetry data | Single beam echosounder tracks, mostly randomly distributed in space and collected over a number of years |
| Seismic data | A few seismic tracks collected in the 1970s to support DSDP drilling |
| Drill cores | From a DSDP Hole |
| Magnetic data | Collected in conjunction with the SBES tracks |
| Gravimetric data | Collected in conjunction with the SBES tracks |

B) *Could the current data fulfill the hierarchies of evidence articulated by the Commission?*

As stated in Section 3 of this paper, while the Guidelines establish various hierarchies of evidence, and suggest useful technologies to claimant States, they create no clear, precise burden of proof a coastal State’s claim must meet in order to pass the scrutiny of the Commission. A submitting State merely faces a situation of the Commission conferring on the submitting state’s claim a greater or lesser degree of legitimation. Because the Guidelines allow the use of many different technologies with various (sometimes very large) uncertainties associated with them, the claiming State acting pursuant to the Guidelines only seems to be asked to show (in order to gain Commission legitimation) that its claim is not outrageous, taking into account today’s technologies and their associated costs.

Given the Commission’s flexibility, due to its Article 76 role, the best we can do is to see how closely our data fulfills the Commission’s Guideline requirements. This test also handily answers the question of how closely current Orphan Knoll data fits within the hierarchies of

evidence articulated in the Guidelines. For these purposes, we will examine the data with respect to three hierarchies: § 4.2, § 5.2, and § 8.2.

Table 4.2 – Data Types Allowed in § 4.2 v. Current Orphan Knoll Data

| DATA TYPES ALLOWED IN § 4.2: DELINEATION OF THE 2,500 M ISOBATH | DO WE HAVE THIS TYPE OF DATA FOR ORPHAN KNOLL? |
|--|---|
| Single beam echo sounding measurements (primary) | Yes |
| Multi beam echo sounding measurements (primary) | No |
| Bathymetric side scan sonar measurements (complementary) | |
| Inferometric side scan sonar measurements (complementary) | |
| Seismic reflection-derived bathymetric measurements (complementary) | A couple of seismic data tracks |

Table 4.3 – Data Types Allowed in § 5.2 v. Current Orphan Knoll Data

| DATA TYPES ALLOWED IN § 5.2: IDENTIFYING THE BASE OF THE CONTINENTAL SLOPE (MAY BE ONE OR A COMBINATION, BUT ONLY BATHYMETRIC DATA USED TO DETERMINE THE MAXIMUM CHANGE IN GRADIENT AT THE FOS) | DO WE HAVE THIS TYPE OF DATA FOR ORPHAN KNOLL? |
|---|---|
| Single beam echo sounding measurements | Yes |
| Multi beam echo sounding measurements | No |
| Hybrid side scan sonar measurements | |
| Inferometric side scan sonar measurements | |
| Seismic reflection-derived bathymetric measurements | A couple of seismic data tracks |

Table 4.4 – Data Types Allowed in § 8.2 v. Current Orphan Knoll Data

| DATA TYPES ALLOWED IN § 8.2: DETERMINING SEDIMENT THICKNESS | DO WE HAVE THIS TYPE OF DATA FOR ORPHAN KNOLL? |
|---|---|
| Seismic reflection survey data (primary) | A couple of seismic data tracks |
| Seismic refraction survey data (primary) | A couple of seismic data tracks |
| Bathymetric side scan sonar measurements (complementary) | No |
| Gravimetric data (complementary) | Yes |
| Magnetic data (complementary) | Yes |
| Complementary data (complementary) | Drill cores |

Using the above tables it does seem that Canada’s current data on Orphan Knoll would sufficiently fulfill the hierarchy of evidence requirements for the Commission for these sections of the Guidelines. Given that this data could arguably fulfill even the data density requirements articulated in § 8.2.21 of the Guidelines for seismic lines,³⁴ it is conceivable that Canada could enter a claim to Orphan Knoll without collecting any further data.

5. TECHNICAL EXPERTISE IN A LEGAL FRAMEWORK

A) How do the Commission’s actions (those of a technical body) intertwine with the law?

The most obvious way in which the technical decisions of the Commission (a technical body) affect and are affected by the law rests in the Guidelines themselves. The Guidelines contain the Commission’s interpretation of legal terms.³⁵ The technical expertise of the Commission members has been brought to bear in order to arrive at the hierarchies of evidence in the Guidelines.

³⁴ The “Full bathymetric models” required under § 4.3.5 of the Guidelines could be produced using current bathymetric data sets.

³⁵ Commission Guidelines, § 1.3.

However, a few questions about the Commission's power under the law remain. A draft of a preliminary report by the ILA Committee on Legal Issues of the Outer Continental Shelf³⁶ poses the following question: "What is the meaning of the words 'on the basis of' the recommendations of the CLCS contained in article 76(8) of the LOS Convention?"³⁷ Indeed, should a dispute arise about whether a claim has been made "on the basis of" the Commission's recommendations, who would determine whether the test of "on the basis of" had been met?³⁸ Would the technical body (the Commission) be able to answer that question, or would a legal entity have to be invoked to settle the dispute?

Furthermore, as the ILA Committee points out, does the fact that claims established on the basis of the Commission's recommendations are final and binding³⁹ mean that all other outer limit lines invalid *per se*?⁴⁰ As we can see from the legal complexity of these questions, while the Commission, a technical body, is interpreting and evaluating extended continental shelf claims based on the law, the law may continue to influence its decisions in unforeseen ways.

6) CONCLUSION

As this paper has shown, technical and legal uncertainties affect one another in many ways on the extended continental shelf. The Commission's role as legitimator of claims, hierarchies of evidence, and the overall structure of extended continental shelf claim evaluation are examples of the ways in which policy and technology display intertwined uncertainties in this

³⁶ ILA Committee on Legal Issues of the Outer Continental Shelf, Preliminary Report on the Limits of the Outer Continental Shelf (Draft), Prepared by Dr. Alex G. Oude Elferink, Utrecht University, Utrecht, the Netherlands, 4 September 2001. This is only a draft document.

³⁷ Ibid, p.9

³⁸ Ibid, p.9

³⁹ UNCLOS Article 76(8).

⁴⁰ ILA Committee on Legal Issues of the Outer Continental Shelf, Preliminary Report on the Limits of the Outer Continental Shelf (Draft), Prepared by Dr. Alex G. Oude Elferink, Utrecht University, Utrecht, the Netherlands, 4 September 2001. P. 9. This is only a draft document.

regime. Based on even these links alone, it would be a misconstruction to attempt to entirely separate technological uncertainties from legal/political uncertainties in the case of the juridical continental shelf.

Legal uncertainties in this case do not rest exclusively in the language of the law. The truth is that technology and its accompanying uncertainty is now playing a role not only in the development of continental shelf policy, but also, because science is written into the law, in the execution of a claiming State's legal obligations. The technological and legal uncertainties involved in an extended continental shelf claim are inexorably intertwined, and must be evaluated together in order to fully understand the outer continental shelf regime.

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