

INTEGRATION OF WRITTEN AND VISUAL EVIDENCE FOR EXPERT TRIBUNALS

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INTRODUCTION

Lawyers arrive at this conference steeped in a tradition that prefers the written word as truth, and imposes rules to discourage resort to other options. In this tradition, visual evidence is generally a short chapter in lengthy evidence textbooks.

On the other hand, as professionals dealing with the “environment”, we also arrive here with deep interest in the physical and living worlds, the inter-connectedness of these worlds as ecosystems, and humanity’s cultural, social, and economic footprint on these worlds. Words are a pale imitation of the sensory richness of these worlds. We can easily accept the modernist philosophy that words are no “mirror of nature”.

These two perspectives are not easily reconciled. To date, environmental law appears to be in the thrall of words, not our collective experience of the world.

Why is this so? More particularly, why is this so for expert environmental tribunals?

Compared to the courts, expert tribunals are supposed to be different about the rules of evidence. They are supposed to be more open about what gets brought before them. Yet, as we will see in examples drawn from two tribunals dealing with federal environmental assessment, these tribunals are currently engaged in practices that put them in the same camp as civil courts dealing with jury trials.

My paper advocates for a different approach — an approach that prefers images to words. I have two points. My first point is that giving priority to images does not dispense with words. Words set up visual evidence. Words are needed to translate the legal scheme set out by our environmental laws into the foundation for all visual evidence: its scope, focus, and flow. However, I do advocate for far fewer words.

My second point is that expert tribunals are well-suited to implement a new priority to visual evidence. Our current legal frameworks give expert tribunals more latitude than other adjudicators to depart from our centuries of legal principles on evidence. For an expert tribunal, there are really only two questions on evidence: (1) is it relevant?, and (2) is it credible? Further, because of the “expertise” of the tribunal, courts are reluctant to supervise the judgments of these experts, particularly on questions of whether evidence is credible.

My focus for this advocacy is environmental assessment. If, as the saying goes, “A picture is worth a thousand words” environmental assessment is in desperate need of more visuals. At the same time as our political level keeps directing shorter, more efficient environmental assessment (EA) processes, the EAs before expert tribunals get longer and longer. Current EAs are not just thousands of pages; they are now tens of thousands of pages for some of the pipeline filings. In short, we now have longer EAs, yet less time to review them.

This makes EA ripe for a two-part reform: require increased use of visual evidence and shorten the EA documents. No more tens of thousands of pages of reports and a scattering of figures. On the requirement for shorter EA documents, we would not be treading new ground. It may be hard to believe but, since the early 1980s in the United States, by regulation, an environmental impact statement (EIS) is 150 pages normally, and up to 300 pages for an EIS involving “unusual scope or complexity”.¹

But there are more compelling arguments for visual evidence than simply reducing paper. Visual evidence facilitates understanding. Not only is a picture worth a thousand words, in EA, a good visual might be worth tens of thousands of words. Regardless of EA reviewer, visual evidence facilitates understanding. It facilitates understanding by expert reviewers as much as public or lay reviewers. Additionally, by facilitating understanding, visual evidence has the further virtue of expediting the review process. It is a lot easier to review an image or a series of images than hundreds, or thousands, of pages of reports.²

This paper proceeds in three parts. It begins with a brief review of court rules for visual evidence. Part 2 reviews where we are today on federal EA and visual evidence. Focusing on the terms of federal EA practice, this paper reviews two different models of expert tribunals now dealing with EA: the National Energy Board (NEB),³ and federal panel reviews constituted of independent experts under the terms of the *Canadian Environmental Assessment Act, 2012* (CEAA/12). In Part 3, the paper reviews four key concepts of federal EA and examines whether and how they may be presented visually.

PART 1 — BRIEF SUMMARY OF COURT RULES FOR VISUAL EVIDENCE

In court, the topic of demonstrative evidence covers a range of very different items.⁴ At one end, demonstrative evidence is about things, not documents: the “smoking gun” is hard

¹ See Council of Environmental Quality (CEQ), *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act*, 40 CFR Parts 1500-1508, s 1502.7 [CEQ Regulations].

² This advocacy for shorter EA reports and greater visuals is about reports, however, not data. It is not advocacy for less data or less disclosure of the data behind the EA and the visuals; however, it does seem likely that more focused reports and greater use of visuals might also limit the kind of data that gets gathered and filed.

³ For clarity, this review of NEB environmental assessment does not expressly distinguish between what the NEB requires under its governing statute, the *National Energy Board Act* (NEBA), and what is required under the *Canadian Environmental Assessment Act, 2012* (CEAA/12). This interaction is a complex topic beyond the scope of this paper.

⁴ An extremely detailed review of this topic is found in *Visual Evidence: A Practitioner's Manual* (Toronto: Carswell, 1991) vols 1-3, by Elliott Goldstein, who is a Deputy Judge of the Ontario Small Claims Court. Judge Goldstein's detailed analysis of key caselaw on expert evidence may be found in his “Issues in Focus” on “Assessment and Admissibility of Expert Evidence in Context of Novel Science” in vol 3 at IF-55 to IF-60.

to produce, but the bullet fired can be found and entered into court. At the other end, demonstrative evidence is about produced documents, including sophisticated videos.

In my experience, the live issues on visual evidence before expert tribunals are not so broad. I cannot recall any great anticipation or interest in producing a borehole sample, though it has happened and can certainly be relevant. What this paper addresses is visual evidence that is a product — a synthesis of data gathered to support or critique project applications that trigger environmental assessment. Put this way, visual evidence before expert tribunals is expert opinion evidence.

Thus, the fundamental test for allowing this evidence involves the four criteria set out in the 1994 case of *R. v. Mohan*, [1994] 2 S.C.R. 9 for admitting expert evidence. The evidence must be: (1) relevant, (2) of assistance to the trier of fact, (3) not subject to any exclusionary rule, and (4) provided by a properly qualified expert. Yet there are also other values in play, such as what can be fairly expected of a jury and whether and how a court should play “gatekeeper” to limit expert evidence. These other values are well articulated in the Ontario Court of Appeal decision of *R. v. Abbey*, 2009 O.N.C.A. 624. *Abbey* applies *Mohan* through a two-stage process for admitting expert evidence: in stage one, *Abbey* adds to *Mohan* additional guidance on what is “relevant”; in stage two, *Abbey* demands regard to the “necessity” of admitting the expert evidence: is the opinion providing information that is not otherwise before the Court.

The four criteria in *Mohan* would appear relevant to expert tribunals dealing with expert evidence. It may also be relevant to an expert tribunal to exercise the gatekeeper function articulated in *Abbey*.⁵

Yet some judicial principles applicable to visual evidence may not be appropriate in the expert tribunal setting. One example is caselaw from criminal courts that has excluded visual evidence on the basis that it is “cumulative”: “it does not add any new information or introduce any new facts to the case, but merely duplicates evidence that is already before the court.”⁶ Importantly, courts do not appear to have applied this principle rigorously in non-jury trials.⁷ This paper argues that the “cumulative” function of visual evidence on EA is what makes it valuable to admit in an expert tribunal hearing, not what should exclude it. For EA, in particular, the requirement to consider “cumulative” impacts makes it important to consider how to take distinct information on distinct projects and impacts and formulate some way to put that information together and understand cumulative impacts.

⁵ A recent example of an expert tribunal dealing with these issues may be found in the 2011 Ontario Environmental Tribunal Decision in *Erickson v Director, Ministry of the Environment* (ERT 10-121, 10-122, 18 July 2011) at 152-177.

⁶ Goldstein, *supra* note 4 at 8-24.

⁷ *Ibid* at 8-27.

Overall, judicial principles on expert evidence provide valuable guidance for expert tribunals dealing with expert evidence. However, these principles may be best seen as a starting point for considering what is most appropriate; they may not provide the best end point.

PART 2 — CURRENT PRACTICES AND PRINCIPLES OF FEDERAL EA TRIBUNALS DEALING WITH VISUAL EVIDENCE

National Energy Board

The key statute for the National Energy Board is the *National Energy Board Act* (NEBA). Section 3 establishes the Board and sets its membership. Section 11 of NEBA advises that the Board is a court of record with the powers of a superior court to deal with all aspects of evidence, including witnesses, documents, and inspection of property. On the other hand, the same section advises that all applications and proceedings before the Board are to deal with “as expeditiously as the circumstances and considerations of fairness permit.” The Board is also subject to statutory time limits.

Section 8 of the NEBA advises that the Board has authority to make rules respecting, among other things, the procedures for making applications and the conduct of hearings.

The current NEB Rules⁸ address, among other things, the contents of applications, advising that every application shall contain a “concise statement of the relevant facts” and “any other information that explains or supports the application”. The Rules also require that the Board issue a hearing order for each hearing “containing the procedural details applicable to the hearing”. Thirdly, the Rules address the evidence for such hearings as follows:

36.(1) A party who intends to present evidence at an oral hearing shall, within such time limit as the Board may fix, file with the Board and serve on all other parties written evidence containing

- (a) the position of the party on the issues in the hearing; and
- (b) particulars regarding the name, title, position and other credentials of each witness who will address evidence on behalf of the party and the issues that the witness will address at the hearing.

(2) Each witness referred to in paragraph (1)(b) shall confirm orally at the hearing or, with leave of the Board, by affidavit, that the written evidence or part thereof that the witness will address at the hearing was prepared by the witness or under the direction and control of the witness and is accurate to the best of the knowledge and belief of the witness.

⁸ See *National Energy Board Rules of Practice and Procedure*, 1995 (SOR/95-208) current to 4 February 2015.

(3) For greater certainty, all written evidence referred to in subsection (1) must be confirmed pursuant to subsection (2).

(4) Written evidence shall be

(a) in question and answer form, each line of which shall be consecutively numbered; or

(b) in narrative form, each paragraph of which shall be consecutively numbered.

Commentary

The NEBA framework emphasizes the judicial tradition and approach to evidence. Although it does not rule out other evidence, virtually all aspects of its guidance focuses on written evidence. This is evident in the detailed checklists on environmental matters. It is 11 pages long and addresses over one hundred topics; however, there is no requirement for a “map”, “figure”, “visual”, or “illustration” of any topic.

Current NEB Practice

The NEB approach to environmental assessment is set out in its detailed filing manual for all applications. Since the filing manual covers all key topics of an environmental assessment under CEAA/12, this paper will focus on this manual only.⁹ The current manual, issued December 2014, advises on its overall purpose:

When seeking approval, applicants must submit applications or information filings (collectively referred to as filings) to the Board that are complete and that enable the Board to:

- evaluate the overall public good that the request can create as well as its potential negative aspects;
- weigh the various impacts; and
- make an informed decision that balances, among other things, the economic, environmental and social interests at that point in time.

While it is ultimately the responsibility of the applicant to make its case before the Board, this manual has been developed to provide direction regarding the information the Board would typically expect to see addressed in a filing. The goal is to provide applicants with a clear definition of the Board’s expectations for complete filings. Complete filings should allow the Board to carry out more consistent assessments with fewer information requests and therefore, shorten timelines required to make a decision.

The current filing manual sets out detailed requirements for each type of application before the NEB. Chapter 4 of this guide deals with physical projects, such as those which trigger

⁹ There appear to be some important legal differences between the process expected by the manual and the process demanded by CEAA/12, but these differences are beyond the scope of this paper.

environmental assessment under CEAA/12. Its filing requirements are set out in sections 4.1 and 4.2, and Guide A. The requirements analogous to environmental assessment are found in Parts A.1 and A.2 of Guide A. Together, these parts of the filing manual provide over 60 pages of guidance.

The NEB requirements for visual evidence may be summarized in the following table.

Reference	Filing Requirement
4A-10	Map showing valve locations
4A-11	If compressor or pump facilities: <ul style="list-style-type: none"> • Station schematic showing buildings and all major piping and valves • Plot plan of the facility including the location of roads and fences
4A-11	If pressure regulating or metering facilities: <ul style="list-style-type: none"> • Station schematic showing buildings and all major piping and valves • Plot plan of the facility including the location of roads and fences
4A-12	If liquid tanks or other commodity storage facilities: <ul style="list-style-type: none"> • Station schematic showing tanks, buildings and all major piping and valves • Plot plan of the facility including the location of roads and fences
4A-21	
4A-22	The ESA must include both quantitative and qualitative information. Applicants must consider the extent to which detailed maps, survey and trend data, or diagrams or figures relating to specific areas of biophysical or socio-economic elements of interest or concern may enhance the assessment. The number and nature of biophysical and socio-economic elements considered within an ESA, and the supporting level of detail necessary, will vary depending on the setting and issues raised about the project.
4A-25	Identify and describe the current biophysical and socio-economic setting of each element (i.e. baseline information) in the area where the project is to be carried out. Include a map at an appropriate scale ...
4A-36	A final comprehensive EP Plan must: ... include the GPS locations for environmentally-sensitive areas identified in the surveys; ...

On the other hand, the following table (Table 2.2.1.B) provides examples of NEB filing requirements that do not require the filing of visual evidence.

Reference	Filing Requirement
4.2	Economic Feasibility, Alternatives and Justification
4.2.2	Alternatives ... Describe and justify the selection of the proposed route and site including a comparison of the options evaluated using appropriate selection criteria.
A.2.5	Description of the Environmental and Socio-Economic Setting
A.2.6	Effects Assessment ¹¹

¹⁰ This list of examples may be compared against the checklists provided in the filing manual to assist applicants with identifying the topics requiring information, the filing manual also includes checklists. It sets these out in Appendix I and encourages applicants to submit completed checklists with each application. Reviewing the described checklist for physical projects (ie Chapter 4, ss 4.1-4.2) and Guide A, the NEB provides 11 pages of detailed filing requirements relevant to environmental assessment and protection matters.

¹¹ It may be noted that the filing manual does advise in Section A.2.3 “Level of Detail” that, “The information provided by an applicant in its ESA must be of sufficient detail to allow the NEB to ... identify the spatial and temporal extent of interactions between the project and the biophysical and human environments.”

Table 2.2.1.B: Examples of NEB Filing Requirements that do NOT require Visual Evidence¹⁰	
Reference	Filing Requirement
A.2.6.1	Identification and Analysis of Effects
A.2.6.2	Mitigation Measures
A.2.6.3	Evaluation of Significance
A.2.7	Cumulative Effects Assessment
A.2.7.1	Cumulative Effects — Scoping and Analysis
A.2.7.2	Cumulative Effects — Mitigation
A.2.7.3	Cumulative Effects — Evaluation of Significance
	Inspection, Monitoring, and Follow-up
Table A-2: Filing Requirements for Biophysical Elements	
	Physical and Meteorological Environment
	Soil and Soil Productivity
	Vegetation
	Water Quality and Quantity
	Fish and Fish Habitat
	Wetlands
	Wildlife and Wildlife Habitat
	Species at Risk or Species of Special Concern
	Air Emissions
	GHG Emissions
	Acoustic Environment
Table A-3: Filing Requirements for Socio-Economic Elements	
	Human Occupancy and Resource Use
	Heritage Resources
	Traditional Land and Resource Use
	Social and Cultural Well-Being
	Human Health
	Infrastructure and Services
	Navigation and Navigation Safety
	Employment and Economy

Beyond the NEB Filing Manual, there are other illustrations of the NEB approach to visual evidence found in various procedural rulings in the Northern Gateway hearing. Starting with the Hearing Order, the NEB introduces guidance to potential participants by identifying four types of participation: letter of comment, oral statement, intervenor, and government participant. In no instance of participation does the Hearing Order encourage use of visual evidence. Moreover, for all but the oral statement option, the emphasis is upon written participation.

This emphasis on written evidence continued through various procedural directions issued by the joint review panel. Three such directions show a deliberate path away from visual evidence. Beginning with Procedural Direction #3 on “Community Hearings”, the panel advised:

To ensure transparency and fairness in the joint review process, all information presented to the Panel and considered in their decision making must be available on the public record for all to see

Although this requirement suggests that the ESA should contain some visual evidence on this topic, it is possible to address this requirement without any visual evidence.

and consider. Therefore, any visual aids used at the community hearings for oral statements or oral evidence must also be submitted in a format that can be filed on the public registry.

For instance, if your visual aid is a physical object, you could take a photograph of the object and describe why it is important in your written evidence (for Intervenors) or in your letter of comment (for those making an oral statement).

If your visual aid requires any sort of equipment, such as a laptop computer or projector, you must write to the Panel to seek permission in advance. This will help the Panel ensure that the visual aid is in a format that can be placed on the public record and ensure the appropriate technology and facilities are available.

For Intervenors and Government Participants, any visual aids that you plan to use as part of your oral evidence must be filed as evidence by 22 December 2011.

For those making an oral statement, any visual aids used or other documents you plan to refer to should be filed in a letter of comment, at least two weeks before you make your oral statement.

In Procedural Direction #4 on “Oral Evidence by Intervenors”, the Panel expressly advised that the following information should not be included in any presentation at community hearings: “technical and scientific information. This may only be provided as written evidence” Moreover, the panel advised that:

You can use visual aids during your oral evidence presentation. Visual aids may include things such as photographs, maps, PowerPoint presentations or other media that supplements your oral evidence. If you intend on using a PowerPoint presentation or video, it should not be the main focus of your oral evidence. Rather, it should only be used as a tool for illustrating your oral evidence.

Any visual aids that you intend to use during your oral evidence presentation must be submitted in advance as written evidence. All visual aids would constitute “written evidence” and must be filed on the public registry.

As the deadline to file written evidence has passed, you must file a motion requesting permission to:

- use the visual aid during your oral evidence presentation; and
- have the visual aid submitted as late written evidence.

Information on how to file a motion is available in section 10 of the Hearing Order.

You must submit your motion as soon as possible to give the Panel time to consider your request, view your visual aid and make a decision. The Panel may decide to:

- accept your visual aid as late written evidence to be placed on the public record and allow it to be shown at the community hearing;
- accept your visual aid as late written evidence to be placed on the public record but not allow it to be shown at the community hearing; or

- deny your request if the evidence is not relevant to the decisions which the Panel must make on the Project.

Subsequently, the Panel issued Procedural Direction #6. This replaced the earlier guidance with the following:

The use of visual aids is not encouraged. The focus of your 10 minute statement should be on sharing your personal knowledge, views and concerns about the Project and your thoughts on the decisions that the Panel must make. ...

If necessary, to communicate your message to the Panel, you may use visual aids that can be produced on paper such as photographs, charts, maps, or other documents during your presentation. A map showing the proposed pipeline, facilities and marine shipping routes will be displayed for you to refer to during your presentation.

Electronic forms of visual aids such as PowerPoint presentations, videos, digital photos, sound recordings or maps, or other media will not be permitted.

Commentary

On the basis of the current NEB filing requirements, it appears clear that the NEB does not require or encourage the use of visual evidence for the majority of EA considerations. What is not clear is why this is so. Tracing the evolution of procedural directions in the Northern Gateway hearing, it is possible to see this evolution as grounded in judicial principles of evidence described above in Part 1 of this paper. Within a judicial framework, this kind of visual evidence is a form of opinion evidence, and opinion evidence is an exceptional form of evidence reserved for experts. Nevertheless, two comments seem appropriate: first, since the evidence is coming to the panel and the panel is an expert tribunal, it is not obvious what risk there is to the panel of relaxing rules that apply to court proceedings and jury trials in particular. Second, if restricting visuals to experts is the rationale for the panel's approach, why not explain the problem and advise participants how to bring forth this kind of evidence? Overall, it does not appear that this is the real issue with visual evidence at the NEB. Instead, based on review of panel directions and the NEB filing manual, no one (including experts) is encouraged to file visual evidence. This appears to me to be a very unfortunate practice and missed opportunity to reduce paper, expedite review, and improve public understanding.

Federal Environmental Assessment Panel Reviews

Legal Principles

Federal EA panel reviews are established under CEAA/12. These panels have the powers of a court of record to enforce the attendance of witnesses and the production of documents; otherwise, however, they do not follow a judicial model of hearings. There is a long

practice of providing two kinds of hearings: community and general hearings.¹² Neither type of hearing is quasi-judicial.¹³

CEAA/12 also contains a number of provisions relevant to the evidence received by panels. These provisions include a broad definition of “record” to include all variety of visual materials.¹⁴ CEAA/12 also provides the federal Minister of the Environment with broad powers to set out general regulations on panel procedures and to set terms of reference for each panel review. Similarly, CEAA/12 provides panels with broad authority to conduct the environmental assessment, including authority to set requirements for additional information from proponents and others.¹⁵ Under these powers, panels have set out “public hearing procedures”, often through a two-stage process that includes consultation on a draft. Recent guidance allows participants to include all “relevant references and data” and expressly makes provision for a “presentation” using “audio-visual equipment”.¹⁶

Commentary

The CEAA/12 framework establishes panels as having some judicial powers, but generally supports a non-judicial approach to panels. Panels guide the entire process including the format and approach of public hearings and questions of witnesses. Within the panel procedures, there is express recognition of visual presentations by all participants. However, no guidance promotes the use of visual evidence by participants other than guidance to the proponent set out below.

Current Panel Review Practice

The practice for panel review is to issue detailed guidance to proponents on a project-specific basis through Environmental Impact Statement (EIS) guidelines. The following

¹² This distinction arose from recommendations of a 1980 panel review into a proposed Eldorado uranium refinery which identified the need for different hearing processes to deal with technical witnesses: see Appendix II. For a similar recommendation, see also the 1990 Alberta-Pacific Pulp Mill panel review at 80. Following the 1980 recommendation, many panel reviews held both community and general sessions and had the technical evidence presented at the general sessions. More recently, panel reviews have conducted three types of hearing session: general sessions, community sessions, and topic-specific sessions. This model is evident in the “Public Hearing Procedures” for the Site C Clean Energy Project (November 2013) at 4, s 5.3.

¹³ This can be altered where the hearing is a “joint” hearing involving another authority or jurisdiction and (1) the other authority or jurisdiction has the power to make the hearing quasi-judicial, and (2) the federal Minister of the Environment agrees to do so.

¹⁴ Section 2(1) provides: “record” includes any correspondence, memorandum, book, plan, map, drawing, diagram, pictorial or graphic work, photograph, film, microform, sound recording, videotape and machine readable record, and any other documentary material, regardless of physical form or characteristics, and any copy of it.

¹⁵ See ss 42-45.

¹⁶ See “Public Hearing Procedures” for the Site C Clean Energy Project at 5, 7, 10-11 & 13.

tables highlight the visual evidence required by the panel for the recent Jackpine panel review that concluded in 2013.

Reference	Filing Requirement
2.2	Project Area and Study Area ... c) a map that identifies the location of all existing and proposed development activities d) a map showing the area proposed to be disturbed in relation to existing topographic features, township grids, wetlands, watercourses and waterbodies ... f) maps of appropriate scale which illustrate boundaries and identify the LSAs and RSAs chosen to assess impacts
2.3	Provide an outline and/or drawings of the project activities and components
3.1.c	Include suitable maps, charts and other illustrations to identify the components of the Project, the existing conditions, and the environmental and the socio-economic implications of the development.
4.2	Project Components and Site Selection f) the location of components on a site development plan and the proposed phasing and sequencing of components and development phases. Provide maps showing: r) the location of existing and proposed Project facilities and infrastructure; s) all existing surface leases and clearings and illustrate how these areas will be used for Project development; t) all existing seismic lines and other linear corridors (e.g. pipeline, utility corridors and trap lines); and u) the locations of development components of the Project relative to all terrestrial and aquatic components including, but not limited to, soils, topography, waterbodies, vegetation, wildlife habitat, watersheds and wetlands and traditional land use areas of Aboriginal peoples.
4.5	Utilities and Transportation ... b) include a map showing transportation access to the Project from provincial highways;
5.2	Provide resource maps of suitable scale that include legal land descriptions, topographical and other natural features of the Project Area and other study areas.
5.4.1	Air Quality ... f) the modelling in accordance with Alberta Environment's <i>Air Quality Model Guide</i> (March 2003); g) for acid deposition modelling, provide deposition data from maximum levels to areas within the 0.25 keq/ha/yr and 0.17/keq/ha/yr Potential Acid Input (PAI) isopleth; include analysis of PAI deposition levels consistent with the CEMA acid deposition management framework; ¹⁷
5.5	Land, Access to Public Lands and Aggregate Resource Conservation ... g) whether and to what extent, the development is consistent with the intent of the applicable land use and resource management and planning directives. Identify: i) the relevant boundaries for the application of guidelines and objectives, including management areas, sub-areas and relevant ecosystem classifications with functional linkages mapping; ... iii) the proposed setbacks from waterbodies and watercourses with regard for applicable guidelines and management objectives. Discuss the rationale for the location of proposed facilities in the context of the proposed setbacks; h) the existing recreational use and implications of the Project on those activities; i) all sources of aggregate impacted and/or required by the Project, the quantity and quality, as well as proposed mitigation and management of the resource. Provide exploration maps including resource type and depth; ...

¹⁷ Although neither of these two requirements expressly requires visual evidence, they are included in this table because it seems doubtful that these requirements can be addressed without visual evidence.

Reference	Filing Requirement
5.6.2	<p>Geology, Soils, Terrain</p> <p>... b) the distribution of soil types in the Study Area using appropriate soil survey procedures as outlined in the <i>Soil Survey Handbook</i>, vol. 1 (Agriculture Canada, 1987). The soil survey maps should show approximate soil inspection and sampling locations corresponding to appropriate survey intensities in the footprint areas. ...</p> <p>f) the effects of surface disturbance on geological features and soils, including:</p> <ul style="list-style-type: none"> i) the type and extent of changes to the pre-disturbance topography; ... iii) an assessment and maps of the pre- and post-disturbance land capability of the Project Area and a description of the changes to land capability classes resulting from the Project.
5.6.3	<p>Vegetation</p> <p>Describe and map vegetation communities in the EIA study areas. Map the Project development footprint at a scale of 1:20,000.</p>
5.6.4	<p>Wildlife</p> <p>... h) maps of the changes in habitat fragmentation, and the potential for habitat patch isolation, anticipated from the Project and other planned activities on a local and regional level;</p>
5.6.5	<p>Groundwater</p> <p>Describe baseline groundwater conditions and map the groundwater regime in the Study Area. Discuss:</p> <p>... f) the potential for changes in the groundwater regime and the effects of these changes, including:</p> <ul style="list-style-type: none"> ... vi) a numerical model to obtain a long-term prediction of the effects due to groundwater withdrawal/dewatering; discuss model validation. Provide details (e.g. location, completion) on any observation well network used to calibrate the model; ... l) maps and cross-sections that include groundwater table and piezometric surfaces based on identifiable groundwater systems and data sources, such as drill holes;

On the other hand, the panel did not require visual evidence for the majority of EIS topics. A summary of the topics not requiring any visual evidence is set out in the Table below.

Reference	Filing Requirement
3.1	<p>EIA Summary</p> <p>... b) Identify the environmental, cultural, and socio-economic impacts of the Project including the regional, temporal, and cumulative effects. As appropriate, impact significance should be explained in terms of direction, magnitude, frequency, duration, seasonal timing, reversibility, geographic extent and uncertainty. Where possible, predictions are to be quantified.</p>
4.0	<p>Project Description and Management Plans</p> <p>Describe the project components, infrastructure and activities.</p>
4.1	<p>Alternatives, including major components included and excluded</p>
4.6	<p>Water Supply, Water Management and Wastewater Management</p>
4.7	<p>Air Emissions Management</p>
4.8	<p>Hydrocarbon, Chemical and Waste Management</p>
4.10	<p>Reclamation and Closure</p>
5.0	<p>Environmental Assessment</p> <p>Define assessment scenarios including:</p> <ul style="list-style-type: none"> a) a Base Case, which includes existing environmental conditions, existing and approved Projects or activities; b) an Application Case, which includes the Base Case plus the Project; and c) a Planned Development Case (PDC), which includes past studies, existing and anticipated future environmental conditions, existing and approved projects or activities, plus planned projects or activities.

Table 2.2.2.B — Topics where 2013 Panel EIS Guidelines did NOT require Visual Evidence	
Reference	Filing Requirement
5.1	Information Requirements for the Environmental Assessment ... f) the demonstrated use of appropriate predictive tools and methods, consistent with CEMA, RIWG, WBEA and RAMP and any other relevant initiatives including integrated land management, to enable quantitative estimates of future conditions with the highest possible degree of certainty; g) a description of the system employed to classify and evaluate the effects associated with the Project. The classification system will include qualitative and quantitative descriptions of the effects, and as appropriate, will have regard for direction, magnitude, frequency, duration, seasonal timing, reversibility, geographic extent and uncertainty (CEAA Responsible Authority’s Guide). The evaluation system will rank the consequences of the residual effects measured quantitatively against management objectives or baseline conditions, and described qualitatively with respect to the views of the proponent and stakeholders;
5.3	Cumulative Environmental Effects Assessment
5.4.2	Noise
5.6.1	Biodiversity
5.6.6	Surface Water
5.6.7	Aquatic Resources
7.0	Public Health and Safety
8.0	Traditional Ecological Knowledge and Land Use
9.0	Historic Resources and Land Use Assessment
10.0	Socio-Economic Factors

Commentary

This review of a 2013 panel direction on preparing EIS guidelines shows that panels can be alert to the merits of visual evidence to address key topics. However, even in this example, the numerous requirements for visual evidence do not come close to representing the majority of the required topics set out in the same EIS guidelines. Compared to these 1.5 pages of visual requirements, the EIS guidelines total 27 pages of details for the EIS.

It is not clear why federal EA panels do not seek much greater emphasis on visual evidence. As with the NEB, panels are subject to increasingly lengthy documents, tight time pressures, and wide public interest in their proceedings. Visual evidence offers an opportunity to improve the path of EA on all three points.

PART 3 — KEY CONCEPTS OF FEDERAL ENVIRONMENTAL ASSESSMENT

To examine how visual evidence may assist environmental assessment, this paper examines four concepts central to environmental assessment. They are (1) the “ecosystem”, (2) “significant adverse environmental effects”, (3) “cumulative environmental effects”, and (4) “alternative means”¹⁸ of carrying out a project. All four concepts are part of

¹⁸ As in “alternative means of carrying out the designated project” found in s 19(1) of CEAA/12. This concept is also often generalized as “alternative methods”: see Ontario *Environmental Assessment Act*, s 6(2).

CEAA/12. They were also present in the predecessor legislation: CEAA/92. Importantly, they have also been present in the practice of federal EAs since the late 1970s.¹⁹

This Part of the paper begins by reviewing the basic idea behind each concept, particularly under CEAA/12. It then examines whether and how visual evidence may assist our understanding of how these concepts apply to specific projects.

Review of Key EA Concepts

Ecosystem

This concept is not expressly stated in CEAA/12; however, it is implicit in the definition of the “environment” (s. 2):

“environment” means the components of the Earth, and includes

- (a) land, water and air, including all layers of the atmosphere;
- (b) all organic and inorganic matter and living organisms; and
- (c) the interacting natural systems that include components referred to in paragraphs (a) and (b).

The same definition was part of CEAA/92. Today, however, the ecosystem merits much more attention in CEAA/12 through the approach to environmental effects set out in section 5. The table below summarizes this provision.

No.	Sub-section	Paragraph	Type of Effect
(1)	5(1)	(a)	(i) a change that may be caused to fish and fish habitat
(2)		(a)	(ii) a change that may be caused to aquatic species at risk
(3)		(a)	(iii) a change that may be caused to migratory birds
(4)		(b)	(i) a change that may be caused to the environment on federal lands
(5)		(b)	(ii) a change that may be caused to the environment across a provincial boundary
(6)		(b)	(iii) a change that may be caused to the environment across an international boundary
(7)		(c)	(i) An effect of an environmental change on aboriginal health or socio-economic conditions
(8)		(c)	(ii) An effect of an environmental change on aboriginal physical or cultural heritage
(9)		(c)	(iii) An effect of an environmental change on an aboriginal current use of lands for traditional purposes
(10)		(c)	(iv) An effect of an environmental change on an aboriginal structure, site or thing of cultural significance

¹⁹ See, for example, the 1978 panel report on the Shawkwak Highway Project and its references to (1) alternative routes at 16, (2) cumulative environmental effects at 12, and (3) significant adverse environmental impacts at 9. For reference to the “ecosystem”, see the 1978 panel report on the Port Granby Project at 60.

No.	Sub-section	Paragraph	Type of Effect
(11)	5(2)	(a)	Other environmental change (OEC) directly linked or necessarily incidental to a federal statutory power that must be exercised for the designated project to proceed
(12)		(b)	(i) An effect of OEC on health and socio-economic conditions
(13)			(ii) An effect of OEC on physical and cultural heritage
(14)			(iii) An effect of OEC on a structure, site or thing of cultural significance

Significant Adverse Environmental Effects (SAEEs)

This concept arises in CEAA/12 in several key places, including its preamble, purposes (s. 4), factors of assessment (s. 19), decision-making criteria (s. 52), and criteria for determinations (ss. 67-9).

A 1994 Reference Guide prepared by the then Federal Environmental Assessment Review Office (FEARO) provides the leading government guidance on this topic.²⁰ It advised that several “criteria” should be taken into account to decide whether an adverse environmental effect is “significant.” They were: magnitude, geographic extent, duration, frequency, reversibility, and ecological context. On the other hand, the Guide also advised that the most common way to determine whether an adverse environmental effect was significant was to use “environmental standards, guidelines, or objectives”: if the effect exceeds the standard, it *may* be significant.

Many federal EA panels have considered this reference guide on significance. One of the most detailed efforts to use this guidance was the 2013 Jackpine panel report. Its detailed approach to this topic may be seen in the following excerpt:

[652] Based on the criteria provided in the Agency’s guide, *Determining Whether a Project is Likely to Cause Significant Environmental Effects* (November 1994), the Panel used the following approach to determine the significance of project effects on wetland habitat in the LSA:

- The likelihood of the loss of wetlands in the LSA is *likely* — the Project footprint will be cleared and post-reclamation landscape will not be the same as base case.
- The magnitude will be *high* — given a 10 000 ha loss of wetlands, 85 per cent of which are peatlands that cannot be reclaimed.
- The geographic extent is *regional* — given that the lenticular fen in the LSA is the only one in the RSA. Furthermore, the effects of drawdown as a result of the Project will extend beyond the LSA, as will the potential effects on the greater ecosystem of the oil sands region, such as increased forest fire risk and loss of wildlife habitat for species that range broadly throughout the RSA.

²⁰ See *Reference Guide: Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects* (Ottawa: FEARO, 1994).

- The duration is *long-term*—given that the time frame for wetlands to return to their former biodiversity and function is more than 80 years and peatland restoration has not been demonstrated for oil sands projects.
- The effects are largely *irreversible*—given that there is no evidence that peatlands can be successfully reclaimed.
- The ecological context of the oil sands region where the Project is taking place has already been adversely affected by human activities, and some wetlands are particularly fragile given their inability to be reclaimed (e.g. lenticular fen). The Project footprint is immediately adjacent to other existing and approved oil sands mines (e.g. Shell Muskeg River, Syncrude Aurora North, and Imperial Kearn Lake).

[653] Given the aforementioned analysis, the loss of more than 20 per cent of the wetland resource, the inability to reclaim peatlands, and the effects on species at risk and migratory birds (as discussed in the Effects on Wildlife and Their Habitat section), the Panel finds a significant adverse project effect on wetlands (namely peatlands) in the LSA.²¹

Cumulative Environmental Effects

This topic arises in two key places in CEAA/12: its purposes (s. 4), and factors of assessment (s. 19). Section 19(1) advises that an environmental assessment must take into account:

[A]ny cumulative environmental effects that are likely to result from the designated project in combination with other physical activities that have been or will be carried out;

The 2013 Jackpine panel report also addressed this topic in multiple ways. Staying with the topic of wetlands introduced above, the panel approach to assessing the significance of cumulative effects may be seen in the following excerpt:

[682] Based on the criteria provided in the Agency’s guide, *Determining Whether a Project is Likely to Cause Significant Environmental Effects* (November 1994), the Panel used the following approach to determine the significance of cumulative effects on wetlands based on the application case and the PDC:

- The loss of wetlands in the RSA is *likely*—the Project footprint (along with numerous other projects) will be cleared resulting in a permanent loss of peatlands given that current evidence suggests that these cannot be reclaimed.
- The magnitude will be *high*—given a loss of peatlands of 126 531 ha and 185 872 ha (1265 km² and 1859 km²) in the application case and PDC, respectively.
- The geographic extent is *regional*—affecting the RSA.

²¹ See *Review of the Joint Review Panel Shell Canada Energy Jackpine Mine Expansion Project* (9 July 2013).

- The duration is *long-term*—given that the timeframe to restore wetlands is more than 80 years and peatland restoration is still not demonstrated for oil sands projects.
- The effects are *largely irreversible*—given that there is no evidence at this time to suggest that peatlands can be reclaimed.
- The ecological context of the oil sands region where the Project is taking place has already been adversely affected by human activities, and is characterized by a wetland-dominant landscape with unique vegetation communities that are particularly sensitive to development (i.e. cannot be reclaimed).

[683] Given the aforementioned points, the overly large size of the RSA, the uncertainty around Shell’s predictions, the lack of proposed mitigation measures shown to be effective for the loss of peatlands, the resultant changes to the ecosystem, resulting in a landscape dominated by upland ecosystems, and the cumulative effects on species at risk and migratory birds as discussed in the Effects on Wildlife and Their Habitat section, the Panel finds significant adverse cumulative effects on wetlands (namely peatlands) in the RSA. The Panel notes that although the cumulative losses of 12 and 18 per cent for the application case and PDC, respectively, are below the 20 per cent threshold used by the Panel to determine significance, the Panel emphasizes that had Shell chosen a smaller RSA been chosen or had Shell included the amount of uncertainty around Shell’s predictions as discussed in the Methods Used to Assess Effects on Terrestrial Resources section, the amount of wetlands lost would have surpassed 20 per cent in the RSA.

Alternative Means (of Carrying out the Project)

This concept arises in section 19 of CEAA/12. CEAA/12 requires that an environmental assessment take into account:

- (g) alternative means of carrying out the designated project that are technically and economically feasible and the environmental effects of any such alternative means;

This concept is not unique to environmental assessment,²² but environmental assessment is likely where this concept has attracted greatest attention. Examples of alternative means of carrying out a project include alternative routes, alternative sites, and alternative project designs. The general principle behind this concept is where a project has potential to cause adverse effects on the environment, it is appropriate to ensure that the location or design of the project avoids or minimizes those effects by avoiding sensitive features or minimizing the impacts upon such features.

The process of identifying and evaluating alternative means is often a “narrowing down” process that includes a number of steps, moving from general to particular. For example,

²² Review of alternatives is part of Canadian expropriation law: see, for example, s 14(1) of the BC *Expropriation Act*; and *Re Karn*, 1977 CanLII 1035, interpreting s 7 of the *Ontario Expropriations Act* and the phrase, “fair, sound and reasonably necessary”. It is also part of the federal *Species at Risk Act* (SARA), through, for example, s 73 regarding the authorization of activities affecting a listed species, its residence, or its critical habitat.

considering the establishment of a new corridor such as a new highway (or transmission line), the process may start in Step 1 with applying all applicable screening criteria to identify all areas that the proposed highway must avoid; Step 2 involves identifying from the remaining areas those areas sufficiently connected to identify alternative highway corridors; Step 3 involves applying comparative criteria to the various corridors to identify the corridor of least overall impact. There may also be a Step 4 and 5 to go into greater detail and identify the alternative routes within the corridor and select the specific route of least impact.

Review of Key EA Concepts for Possible Visual Presentation

Visual Presentation of the Ecosystem

In the late 1970s, EA administrators and regulators faced concern over too much paper and the study of irrelevant topics. In response to this concern, the U.S. Council of Environmental Quality issued 1978 regulations to focus EAs required by the *National Environmental Policy Act* of 1969 (NEPA). These CEQ regulations formally incorporated the term “scoping” into EA legislation.²³ Similarly, in Canada, federal EA administrators sought to focus on the most relevant effects. Beginning in the early 1980s under EARP, FEARO commissioned a detailed study that resulted in the 1983 publication of “An Ecological Framework for Environmental Impact Assessment in Canada” by G.E. Beanlands and P.W. Duinker. This framework introduced the term “valued ecosystem components” (VEC) into federal EA.

Ecological scoping begins by considering what is important in the environment. Important environmental features become the VECs. The next step is to conceptualize how the project might affect a VEC. This step involves using the relevant ecosystem components to formulate, first, a table of project-environment interactions, and, second, a conceptual model of the overall ecosystem structure and possible pathways of change from a project to the VECs within the ecosystem. This pathways model then guides subsequent steps in the EA, notably the relevant EA studies.

A panel review from the 1990s saw the need for a pathways analysis to chart the flow of radiological contaminants, as follows:

A third approach, which stimulated considerable discussion at the hearings, was that of pathways analysis. This approach uses field studies and computer models to examine the movement of contaminants through the food chain. Pathways analyses were used by both the proponent and the AECB to demonstrate that the radiological impact of the additional development at Rabbit Lake would be acceptable. The panel was provided with information on field studies of lead and polonium pathways in lichens, caribou and wolves that shows the practicality and value of this approach.

²³ See CEQ Regulations, *supra* note 1, s 1501.7 “Scoping”, and s 1508.25 “Scope”. See also “Memorandum: Scoping Guidance” (CEQ, 30 April 1981).

Environment Canada recommended that the proponent conduct radionuclide pathway analyses for local aquatic and terrestrial food chains in addition to the analyses for regional food chains already performed. The results of the pathway analyses could be used to identify areas where environmental monitoring is required. The panel concludes that there is a need for pathways analysis based on field data to provide a greater understanding of the fate of heavy metals and contaminants discharged to the environment.²⁴

CEAA/12 demands new attention to pathways analysis. By narrowing the biophysical world to specific components of the “environment”, CEAA/12 has set out the specific end-points for pathways analysis. Working backwards from these endpoints, CEAA/12 has also narrowed the environmental changes from the project to these end-points that merit attention.

Table 3.2.1: Framework for Visual Presentation of s. 5(1) of CEAA/12

Project	Environmental Change	Listed Feature
Col. 1	Col. 2	Col. 3
Physical activities	<ul style="list-style-type: none"> • air (air quality, noise) • water (quality/quantity) • land (soils, stability) • natural systems (wetlands, forests, grasslands) 	(a.i) fish and fish habitat (a.ii) aquatic species at risk (a.iii) migratory birds (b.i) federal lands (b.ii) in another province (b.iii) in another country (c) Aboriginal (c.i) health, (c.i) socio-economic conditions (c.ii) physical and cultural heritage (c.iii) current of lands for traditional purposes (c.iv) structure, site or thing of cultural significance

This visual presentation of section 5(1)²⁵ is preliminary only. It raises but does not answer important legal questions. For example, for each listed feature in column 3, absent scoping, must an EA take into account all possible column 2 changes that may affect that feature? On the other hand, the table may miss an important legal detail since it does not address all of the specific language found in section 5(1), namely the reference to a “change” to the listed features (a.i) to (b.iii) in contrast to the reference to an “effect of an environmental change” to the listed features (c.i) to (c.iv). Over time, it seems likely that there will be answers to these questions and thus more definitive visualizations of the section 5 approach to environmental effects.

Visual Presentation of Significance

To date, panel report discussions on significant adverse environmental effects tend to use few words and lack traceability. The 2013 Jackpine decision excerpted above is a major

²⁴ See the Canada, Federal Environmental Assessment Review Office (FEARO), *Rabbit Lake Uranium Mining: A-Zone, D-Zone, Eagle Point* (Ottawa: FEARO, 1993) at 19.

²⁵ There are additional challenges with addressing the requirements of s 5(2) visually.

departure from current practice in its effort to address each of the recommended criteria for significance.

The key question for this Part of the paper is whether the various criteria of significance can be represented visually. The answer is yes, as follows:

- (1) Geographic extent: this may be represented visually as an “impact zone” extending out from a project;
- (2) Ecological context: this may be represented visually by demarcating the outer extent of an ecological feature near a project;
- (3) Magnitude: this may be represented visually by providing grades of impact within an impact zone;
- (4) Duration: this may be represented visually by visually emphasizing long-term impacts over short-term impacts;
- (5) Frequency: this may be represented visually by visually emphasizing continuous impacts over discontinuous and infrequent impacts;
- (6) Reversibility: this may be represented visually by visually emphasizing irreversible impacts over reversible impacts.

Table 3.2.2: Indicators of Significance and Capacity to Present such Indicators Visually

Indicators of significance	FEARO Reference Guide (1994)	Found in NEB filing manual at 4A-38	Found in Jackpine EIS guidelines	Amenable to visual presentation (Y/N)
Geographic extent	Y	Y	Y	Y
Ecological context	Y	Y	Y	Y
Magnitude	Y	Y	Y	Y
Duration	Y	Y	Y	Y
Frequency	Y	Y	Y	Y
Reversibility	Y	Y	Y	Y

Visual Presentation of Cumulative Environmental Effects

Under CEAA/92 and CEAA/12, the conceptual foundation for assessing cumulative effects is the same as the foundation for significant adverse environmental effects. One simply applies the process used to assess a single project or activity to all projects found within a study area. Therefore, it is possible to address cumulative environmental effects, or more accurately, “cumulative significant adverse environmental effects,” visually using the same tools as apply to addressing SAEs individually.

Equally, the visual representation of cumulative effects should not require additional data collection compared to existing practices of data collection. Certainly the best data will be

quantitative, but this requirement exists in current EIS guidelines (e.g. Jackpine); it is not a new requirement. Thus, if one has the data on other projects that is required to assess the significance of their effects, one should also have the data to represent these effects visually.

What is required to assess cumulative effects is simply the data for a variety of projects and activities, not just the proposed project.

Visual Presentation of Alternative Means

The visual presentation of alternative means of carrying out a project is one of the earliest practices of environmental assessment. A classic book on this topic is Ian McHarg's *Design with Nature* (1969). A visual presentation of this planning and legal process is often termed a "site selection" or "route selection" process. The basic idea of these processes is that, through the application of various mapping criteria to a study area, one can gradually narrow down the range of possible alternatives for a new site or route to identify a preferred option. The two types of criteria are: (1) screening criteria; and (2) comparative criteria.

Screening criteria are applied to screen out or eliminate lands from consideration. Thus, for example, a common screening criterion for a new route such as a highway is "Screen out built-up areas". This has the effect of screening out and eliminating from further consideration all lands within a built-up area. The rationale for a screening criterion is that the impact is "unacceptable". It thus amounts to a 'No go' zone.

Comparative criteria are applied to compare options and identify better and worse options. Thus, they deal with a different kind of impact. They deal with impacts that are adverse, but not unacceptable. Thus, for example, a common comparative criterion is "Compare extent (hectares) of sensitive ecological habitat on or within 120m of the site or route". The idea behind a comparative criterion is to minimize the extent of the adverse effect. While a comparative criterion will prefer an option that has no impact (e.g. no sensitive ecological habitat), it will also prefer an option that has lower comparative impact. Thus, with comparative criteria, the best alternative is one that has no impact; however, there will also be other alternatives that each have some impact. A comparative criterion gives preference to the alternative with the least impact.

Based on this overview of criteria used in site and route selection, it is evident that criteria are identified based on the kinds of impacts important to a study. It is also evident that one needs good mapping data to accurately apply any of these criteria.

CEAA/92 fundamentally changed the legal foundation of site or route selection under federal EAs. The first important change was to eliminate reference to an "unacceptable" effect. In one sense, CEAA/92 replaced this term with a similar concept: a "significant, but not justified adverse environmental impact." However, this change was not just a name change; it was also a major process change. Whereas, under previous regimes, an

assessment was able to identify and determine an unacceptable effect, CEAA/92 provided that only the federal cabinet could determine whether a significant effect was or was not justified. Further, CEAA/92 made only limited provision to engage cabinet: this engagement was at the end of an environmental assessment process only. The result of these changes is that a site or route selection process could not draw a firm contrast between an “unacceptable” effect and a “significant” effect. Instead, if one wanted to avoid the uncertainty of a cabinet appeal at the end of the environmental assessment, one needed to treat a “significant” effect as a screening criterion and thus screen out lands that might cause a significant adverse environmental effect (SAEE).

The second change was to focus all CEAA decision making around the avoidance of significant adverse environmental effects, not the minimization of adverse environmental effects. The result of this change was set out in a Federal Court of Appeal decision which addressed the question whether an assessment was required to prefer the alternative method with the least adverse environmental impact. It answered as follows:

¶49 The broadest of the appellant's arguments is an implicit attack upon the use of any significance threshold for radiation effects. The appellant raises the so-called ALARA (“As Low As Reasonably Achievable”) principle, arguing that the only appropriate design for the project was the one which caused the least environmental effect at a reasonable cost. For the purposes of the argument before us, it says that the reference design was the appropriate choice since its effects would be less than the final design and they could be achieved at a reasonable cost.

¶50 The appellant claims that the spirit of the ALARA principle is incorporated into subs. 16(2)(b) of the Act, which requires that a comprehensive study include a consideration of alternative means of carrying out a project that are technically and economically feasible and of their environmental effects ... [T]here is equally no question in my mind that it does not go as far as to mandate that the alternative with the least environmental impact be selected. To do so would be to contrary to the scheme of the legislation. The approach of the *Act* is to require a finding that the alternative chosen not be likely to cause significant adverse environmental effects in order for it to proceed.²⁶

Nor did the Court believe that CEAA/92 required that all alternative methods be subject to the same level of study as the preferred alternative:

¶58 It is true that the alternatives which were adopted in the final system design were not subjected to the same detailed radiological calculations that the reference design was

¶60 Even if I were to accept the factual assertions made by the appellant, it is clear that the predicted effective doses caused by the final design would still be well below both the significance threshold set out in the report and the current regulatory limit of 1,000 microsieverts per year. Under these circumstances, I do not believe that the Minister or any of the Agencies advising her was required to conduct any further analysis. The comparisons conducted by the comprehensive study report did

²⁶ See *Inverhuron & District Ratepayers' Assn v Canada (Minister of the Environment)*, 2001 FCA 203 (FCA).

provide her with a rational basis for concluding that no significant adverse radiological effects were likely to be caused by the project. (References omitted)²⁷

The language of CEAA/12 virtually replicates the language of CEAA/92 on this point. Therefore, these conclusions about the analysis of alternatives likely apply today.

The effect of these two changes is dramatic for site or route selection processes under federal EA and thus CEAA/12. On the one hand, to avoid the uncertainty of a cabinet appeal, it appears prudent to try to screen out lands that may trigger a significant adverse environmental effect. If that is possible, it would leave a site or route selection process dealing exclusively with the comparison of options that have no potential to cause an SAEE. On the other hand, CEAA/12 makes no demand to take into account any effect that is not likely to be a significant adverse environmental effect. There is thus no legal reason to spend time developing and comparing less than significant effects. The one scenario where a site or route selection process may be necessary under CEAA/12 is where every alternative is likely to cause an SAEE. In this scenario, it would appear to be relevant to select the alternative with the fewest SAEEs or the least overall adverse environmental effect.

CONCLUSIONS

There is so much more to be done to improve the environmental evidence put before expert tribunals. This paper makes this case using the example of federal environmental assessment. Federal EA now arises before several expert tribunals, particularly through the terms of the CEAA/12.

While there may be some forums where visual evidence could misrepresent the evidence or be misunderstood, this seems a non-existent risk before expert tribunals dealing with environmental assessment.

Visual evidence offers the opportunity to dramatically reduce paper, expedite review, and improve public understanding of environmental assessments.

²⁷ *Ibid.*