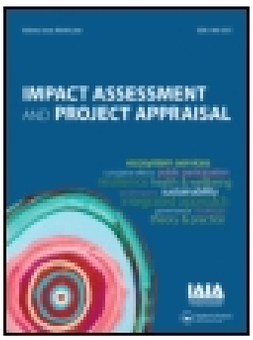

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Professional practice

Case study of an integrated assessment: Shell's North Field Test in Alberta, Canada

Marla Orenstein, Titus Fossgard-Moser, Trevor Hindmarch, Susan Dowse, Jordon Kuschminder, Pádraig McCloskey and Robert K. Mugo

There is growing recognition of the positive role that integrated assessments (IAs) can play in improving decision-making processes for public and private sector projects. Because IAs can help secure both the regulatory and the 'social' license to operate, an increasing number of companies, including Royal Dutch Shell, now require their undertaking for major projects. There are, however, limited published case studies to test IA theory and execution, and to provide practical lessons for others. The purpose of this paper is to summarize the undertaking of an IA for a heavy oil pilot project proposed by Shell in northern Alberta and to identify critical success factors. The paper explores key innovations in: (1) the organizational approach to the IA; (2) the scoping and impact evaluation processes; and (3) external communication of results and internal integration of the findings. The paper also provides lessons for industry, regulators, consultants and communities.

Keywords: integrated assessment, environmental, social and health impact assessment, Canada, community involvement, indigenous peoples

INTEGRATED ASSESSMENT (IA) is an emerging analytical tool in the world of impact assessments. Although IAs are similar in many aspects to other types of impact assessment (such as environmental impact assessments (EIAs), social impact assessments (SIAs), and health impact assessments (HIAs) that are typically carried out for development proposals, they have been advanced as having a number of unique advantages over these other discipline-specific assessments.

There is growing discussion in published literature that IA is more efficient, more relevant for decision-makers, and more closely aligned with stakeholder interests and principles of sustainability. In addition, IA can be an effective tool to build understanding, trust, and relationships between project proponents and affected stakeholders. However, to date there have been few published case studies of IAs that test IA theory and allow examination of IA execution (Kwiatkowski, 2003; Lynch, 2004; Bond *et al*, 2001).

Royal Dutch Shell (Shell) has an internal policy requiring that an IA (as opposed to other types of impact assessments) be conducted for all new major projects and for significant modifications to existing projects (Shell Health, Safety and Environment

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Committee, 2004).[1] The scope of individual IAs is meant to be 'fit for purpose', with the level of analysis and stakeholder engagement determined by the project size, potential for significant impacts, overall development plans for an area, and stakeholder concerns. This paper discusses a recent example of an IA undertaken by Shell for a heavy oil pilot project being considered in Alberta, Canada (the North Field Test project).

There were many reasons for undertaking an IA for the North Field Test (NFT) project, which was located in a remote area of northern Alberta largely inhabited by Aboriginal people. The project would be Shell's first significant and permanent activity in this area, and therefore Shell was keen to ensure that the project was designed, constructed and operated in a way that minimized adverse environmental, social, and health impacts and also maximized any potential benefits. Shell wanted to ensure broad community and regulator support and understanding of the project. The IA for this pilot project also presented an opportunity to build local community capacity and understanding around the IA process that would be required for any potential future commercial project in the lease area.

This paper provides a rare opportunity to examine an IA that was undertaken in a real-world context and in particular to explore those aspects of the IA that were undertaken in a more integrated manner and thus may be different from a more traditional discipline-specific impact assessment. It also presents the opportunity to discuss elements of the IA that were innovative and effective in meeting a key Shell goal of strengthening its relationships with local communities and gaining its social license to operate. In particular, this paper discusses (1) strategic and organizational approach to the IA; (2) scoping and evaluation of impacts; and (3) external communication and internal integration of results. The paper also presents a number of key lessons for industry, communities, and academics.

This paper provides a rare opportunity to examine an IA that was undertaken in a real-world context and in particular to explore those aspects of the IA that were undertaken in a more integrated manner and thus may be different from a more traditional discipline-specific impact assessment

Background on integrated assessment

There is a growing body of literature that discusses the emerging concept of the IA. However, despite this, there is no standard or accepted definition, and different authors highlight different elements of integration that are key to IAs. The elements of integration that are commonly discussed in existing literature on IAs are presented below. Many of these assessment elements are not unique to IAs, but are also found in more traditional assessment categories (such as EIAs).

- *Multi-disciplinary analysis.* The assessment should involve the experience, knowledge, and analysis of numerous disciplines, bringing together environmental, social, economic, and health analyses in a single study, and synthesizing information into insights that cannot be derived from a single disciplinary analysis (Baines *et al*, 2006; Lee, 2006; Bond *et al*, 2001; Hisschemoller *et al*, 2001; Rotmans and Asselt, 1996).
- *Complementary or linked appraisal methods.* Given the participation of different disciplines, a variety of appraisal methods may be utilized. The assessment should ensure that the methods and evaluation criteria are reconciled between the disciplines (Baines *et al*, 2006) and that consistent assumptions and data are used (Bond *et al*, 2001).
- *Providing useful information to decision-makers.* The outcomes of the study should be fully integrated into the decision-making process of project design, with the goal of optimizing the project (Baines and Morgan, 2006; Lee, 2006; Bond *et al*, 2001; Scrase and Sheate, 2002; Hisschemoller *et al*, 2001; Rotmans and Asselt, 1996; Tol and Vellinga, 1998).
- *Assessing all stages of a project.* The study should integrate the assessment of different stages of a project, such as construction, operations, and decommissioning phases, integrating the possible impacts stemming from the full cycle of a project (Lee, 2006).
- *Considers wider context of project*. It should consider the proposal in the context of other projects concurrently taking place or proposed in its study area.
- *Input from stakeholders.* It should integrate input from local stakeholders in a meaningful and participatory manner (Scrase and Sheate, 2002; Bond *et al*, 2001; Rotmans and Asselt, 1996). Also, when conducted in areas with Aboriginal populations, it should ensure traditional knowledge is integrated with Western or scientific knowledge.

Within Shell, an IA is defined as an assessment that:

- Looks at environmental, social (including economic), and health impacts in an integrated manner;

- Integrates the impact assessment process with the business development and project development process;
- Integrates the impact assessment as a cross-functional activity within several internal departments (e.g. health, safety and environment, reputation/issues management, social performance); and
- Looks at issues raised by projects that are also important beyond the project scope, with regard to both the host society and international interest.

Shell's definition of an IA incorporates certain key elements that are discussed in literature (e.g. multi-disciplinary analysis, providing useful information to decision-makers, considering wider context of the project). However, from Shell's perspective, two of these elements are considered most critical. The first critical element is the multi-disciplinary analysis. This does not equate with environmental, social, and health disciplines conducting assessments in parallel and under one report cover. Rather, each identified issue or possible impact area must be assessed with the insight and input of the three discipline areas (environment, social, and health) together so that linkages between issues are understood and effectively described. This allows the analytical outcome of the study to present issues in a manner that mirrors the way stakeholders experience them. It also requires an equal balance in the final assessment between environmental, social, and health focused issues. The second critical element is integrating the results of the assessment into the project decision-making process, so that the project can be optimized from a local stakeholder perspective.

The experience gained in undertaking the IA described in this paper indicates that an IA may be similar in many respects to a thoroughly and effectively conducted impact assessment with a different name. The differences between an IA and other types of assessments are nuanced and not easily isolated. There may be a suite of integrative elements that should be addressed and maximized in any assessment that is considered 'integrated' in nature.

Case study

This section provides a description of the IA undertaken for Shell's NFT. Because it is assumed that the reader is generally familiar with the impact assessment process, the discussion does not attempt to capture all of the activities undertaken during an IA (e.g. baseline studies, development of mitigation), but rather focuses on selected aspects of the IA that Shell considered unique and innovative.

The paper first provides background information on the context of the NFT project and the specific objectives of the IA. It then provides a discussion of the unique features of the IA including innovations in the:

- Strategic and organizational approach to the IA;
- Process by which the IA was undertaken; and
- Communication of IA findings externally and internal integration.

Finally, the discussion focuses on how the IA performed relative to objectives and also in comparison with traditional assessments.

Background on the NFT project

In February 2006, Shell acquired hydrocarbon leases in north-central Alberta in an area that was predicted to contain potential hydrocarbon reserves.

The lease area and associated Shell project, known as the Grosmont Venture, is located in the Municipal District of Opportunity (MDO), and falls completely within the traditional territory of the Bigstone Cree First Nation. The lease area is located approximately 80 km by road from the MDO's largest community of Wabasca (population approximately 4,000) and approximately 20 km by road from the small traditional community (population approximately 90) of Chipewyan Lake (Figure 1).

The MDO remains a relatively isolated and sparsely populated region (approximately 5,000 people in total). The population is predominantly comprised of First Nation and Métis (individuals of mixed Aboriginal and non-Aboriginal descent) residents, the majority of whom continue to combine traditional ways of life (e.g. hunting, trapping, fishing) with participation in wage-based economic activities (such as seasonal employment in oil and gas and forestry jobs). Overall literacy in the MDO population is relatively low, with about 30% of the adult population having graduated from high school.

Shell's lease area is located in the boreal forest eco-region. Overall, environmental health is good; soils, vegetation, wildlife, and water are typical of other undeveloped parts of the boreal forest in northeastern Alberta. The forest has a wide range of species that support traditional lifestyles of hunting, fishing, and gathering. Common traditional use species include moose, wolf, lynx, small fur-bearers, walleye, northern pike, and berries. These species are used as a source of food, and their hides provide clothing and are a source of income.

Despite the potential presence of heavy oil reserves, the area has not experienced significant oil and gas development on the same scale as the well-known mega projects in the nearby Fort McMurray area in the northeastern corner of Alberta, where the bulk of oil sands activity lies, including several large surface mines, i*n situ* projects (e.g. steam assisted gravity drainage), and associated infrastructure (e.g. processing facilities, power plants). The lack of large-scale development in the NFT area has been due to limited success or non-applicability of more traditional heavy oil extraction techniques such as mining and steam injection in this area.

Figure 1. Map of the NFT project area

With the acquisition of the leases, Shell identified three development phases. The first stage involved the undertaking of seismic and drilling appraisal activities to better understand the geology of the lease area. The second phase comprised the undertaking of the pilot project, and the third stage was a potential full-scale commercial project.

The pilot project, known as the North Field Test (NFT) project, had two primary objectives. The *technical* objective was to assess the feasibility of a new heavy oil extraction technique utilizing electrical heaters to convert heavy oil into lighter hydrocarbon products that can be brought to surface. The *economic* objective was for the NFT to provide further information regarding the potential to undertake a full-scale commercial project.

The NFT project consisted of four key components:

- In-field facilities and equipment for the test (power plant, accommodation, drilling site etc);
- A pipeline to supply fuel gas for use in the power plant;
- An airport upgrade (in the nearest town of Wabasca); and
- A road upgrade (from Wabasca to the field site along a private dirt/gravel forestry road) to facilitate the transfer of materials and personnel.

In total, the NFT was expected to produce no more than the equivalent of 30 barrels of oil a day that would be subjected to further laboratory testing at an off-site facility to support development of future plans.

Under the provincial (Alberta) regulatory process, and given the size and specific research objectives of the project, the NFT was not subject to a full EIA review. However, an assessment of the key potential biophysical impacts of the project such as impacts on air, noise, surface water, and groundwater was required. Additionally, the permitting process for the NFT did not require specific studies related to social or health issues, but did include a public consultation component with the potential for a public hearing to address any outstanding concerns.

Specific objectives for the NFT IA

Specific objectives for undertaking the NFT IA included:

- To understand in an integrated manner potential environmental, social, economic, and health impacts associated with the NFT;
- To make design, construction, and operation changes to the NFT to avoid and/or minimize any adverse impacts and to optimize possible benefits;
- To build stakeholder understanding of the NFT, its potential impacts, and mitigation measures; and
- To build external stakeholder, internal Shell, and consultant knowledge, understanding and experience in undertaking an IA in anticipation of a much more complex and detailed IA for a potential full-scale commercial project.

Shell initiated consultation meetings and open houses in the MDO in the fall of 2006 when the NFT

and its location were still in early planning. The NFT IA was initiated in the winter of 2007/2008 once a preferred location had been identified and the engineering design teams had an initial design for the project. The IA took 10 months to complete (through September 2008).

Innovation in strategic approach and organizational structure

An important aspect of any IA is the overall strategic approach as well as the organizational structure that is adopted (Lee, 2006). *Strategic approach* relates to such aspects as how rigid or flexible the IA process is and the relative emphasis given to technical data collection versus external consultation. *Organizational structure* concerns the composition of the consultant team responsible for the IA, the interface mechanisms with the project proponent, and how the project proponent is internally organized to maximize effective integration and implementation of the IA findings.

Discussed below are several aspects of Shell's approach to the NFT IA that were novel and that enabled Shell to use the IA process to achieve its desired objectives.

Strategic approach Shell's perspective was that the process of undertaking the IA was as important, if not more important, than its purely 'technical' outcomes (such as the collection of data and production of technical reports). This perspective is different from more regulatory driven impact assessments, where the emphasis is frequently on data collection and reporting.

This perspective arose for several reasons. First, Shell placed high importance on the objective of capacity-building around the IA process. Because the IA concept is new and the project area had not experienced significant previous development, capacity needed to be built in the local communities, among the IA consultants, and within the Shell team as groundwork for a potential future IA of a larger commercial project. Second, Shell recognized that in order to maximize the chances of gaining its social license to operate, the IA needed to be responsive to concerns that emerged during stakeholder consultations. As a result, the Shell and IA teams made changes to the IA form and focus as the study progressed. Specifically, they adapted the nature of issues scoping, the assessment methodology, the approach to data gathering, and the format of deliverables as external expectations and the key issues became clearer.[2]

Shell's organizational structure The second novel aspect of the strategic approach was the organizational structure within Shell's Grosmont Venture. Prior to starting the IA, a 'Business Integration' (BI) team was created, responsible for all non-technical aspects of the project and coordinated by a single focal point, the BI Manager. The team brought together a cross-functional group within Shell, including personnel with expertise in environment, social performance, regulatory affairs, and communications. The BI team created a set of 'non-technical' values and beliefs that guided the development and implementation of specific strategies as well as the overall operating philosophy of the project.

The pre-existence of this team facilitated three key aspects of the IA. First, the philosophy of working on 'non-technical issues' in an integrated and cross-disciplinary fashion was already embedded in the project's culture prior to commencing the IA. Second, in the two years leading up to the IA, the Calgary, Alberta, and Wabasca-based team members established strong relationships with the local communities. Over this period, they worked together on activities ranging from consultation for appraisal programs to co-sponsoring local training initiatives. The presence of pre-existing relationships with stakeholders facilitated a quick focus on issues scoping and impact evaluation once the IA got under way. Less time was required to establish contact and build trust with stakeholders as part of the process.

Although the Shell BI team was based in Calgary, it also included personnel based in Houston, Texas (where the project design engineers were located), and Wabasca (where field activities were based). The presence of these dedicated resources, familiar with the IA process and embedded in the project design team, facilitated a constant two-way flow of information, both formally and informally, between local stakeholders, the IA team, and the project design team. This, in turn, facilitated the iterative and continuous integration of the IA findings to the project decision-making process.

Integrated assessment team Given Shell's desire for an IA study that placed equal emphasis on environmental, social, and health issues, the selection of the right consultants was key. To eliminate the perception of bias, Shell sought an external party to conduct the IA. Shell contracted three different consulting companies — each with a specific area of expertise — with the expectation that they would work together in an integrated fashion to deliver the IA, with an equal emphasis given to environmental, social, and health issues. As discussed below, the consultant team was able to forge novel methods, tools, and deliverables that met the expectations of both Shell and the local community. In addition, two community-based coordinators were hired from Chipewyan Lake to work as part of the IA consultant team. As discussed below, the hiring of these individuals greatly facilitated communication with the local community and resulted in a more thorough understanding of local issues.

Innovation in undertaking the IA

Building on the strategic and organizational approach described in the previous section, this section

A key element of the NFT IA was the cross-disciplinary examination of potential project effects

discusses a number of critical success factors that relate to how the NFT IA was undertaken.

Integration of environmental, social, and health disciplines A key element of the NFT IA was the cross-disciplinary examination of potential project effects. Potential impact areas were examined jointly by all disciplines to ensure that the full range of effects was considered, and the linkages between effect areas were explored. This integration was particularly relevant given that the communities within the project study area are majority Aboriginal, and the biophysical environment plays a central role in social and cultural systems, livelihoods, and overall well-being.

This process began with exploratory discussions among a three-person team (consisting of the environment, social, and health discipline leads) to delineate and explore potential effect pathways from the perspectives of each of the discipline areas and to determine areas of overlap. This was followed by joint technical working sessions in which a broader team of environmental, social, and health experts exchanged information and developed joint analyses of effects, rankings of significance, and mitigation strategies.

An example of the importance of these cross-disciplinary technical meetings can be seen in relation to the issue of water quantity and quality. Water is of central importance to local communities near the NFT project; residents rely heavily on rivers and lakes for drinking water and for fishing. Thus, any impact on the water resources themselves was likely to have health and/or socio-economic implications in addition to effects on the local environment. Figure 2 shows a simplified version of the cross-disciplinary understanding that was developed during the exploratory discussions of how the NFT might affect water resources, and the possible environmental, social, and health changes that could result.

This multi-disciplinary and balanced approach was carried over to documentation and communication of the IA results, which was undertaken from a local community perspective by grouping the impact analysis into three themes: ‘Our Land’, ‘Our Communities’, and ‘Our Lifestyles’. This made the outcomes more meaningful to local communities, because it was in a framework that more closely reflected their world-view versus the hierarchical nature of a typical EIA report. While the same information may be presented in both formats (IA vs. traditional EIA), information in a traditional EIA is typically organized under separate headings for each environmental and socio-economic component: atmospheric (air, noise), terrestrial (soils, vegetation, wildlife), water (surface water, groundwater, fish and fish habitat), and socio-cultural (historic resources, visual aesthetics), making the information less accessible and less informative for lay readers.

Another critical component of the integration process was a ‘flat’ structure within the consultant team that gave equal weighting to environmental, social, and health issues, and allowed open discussion and a balanced analysis.

A dual scoping process The NFT IA used a two-phase scoping process that yielded some interesting

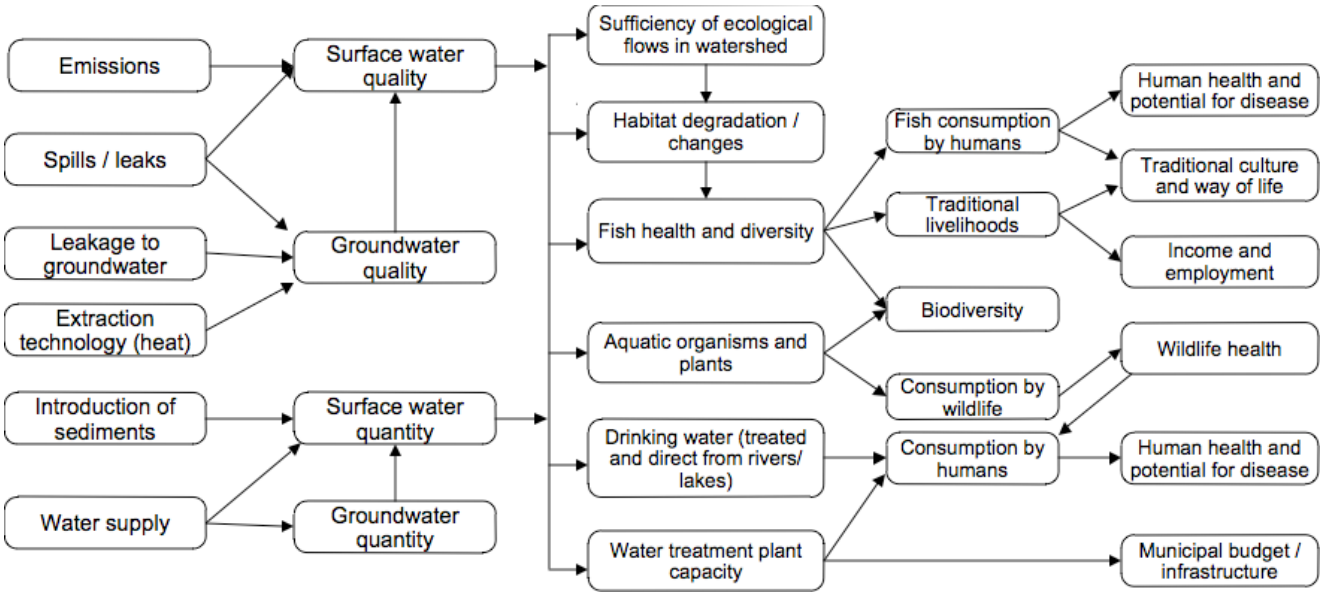

Figure 2. Simplified example of integrated environmental, socio-economic, and health concerns around water (note: arrows represent potential linkages between diagram elements to be examined in the assessment)

insights into ways of framing issues that balanced community input with professional and technical opinion.

The first phase of scoping for the NFT IA involved a technical scoping exercise conducted among the consultants, based on existing documentation of stakeholder concerns, discussions with Shell, and professional judgment. This technical scoping exercise resulted in the list of issues in the left column of Table 1. After the completion of technical scoping, a series of workshops with key local stakeholder groups were organized to scope issues from the community perspective, and thus refine the key issues to be focused upon in the IA. These issues are listed in the right column of Table 1.

What is perhaps most interesting is not so much the difference in the issues themselves, but in their groupings. In the first column, generated from the technical scoping sessions, the issues are grouped in a traditional EIA discipline-based format. The grouping of issues in the second column reflects the way that many community members expressed their concerns, which fell into three broad topic areas: issues related to the land, issues related to community identity, and issues related to lifestyles and livelihoods (as utilized in the final Community Report — see below). Although virtually all the topics in the left column fell under one or more categories in the right column, the community-driven approach reinforced the need to integrate the technical disciplines to address local concern about potential impacts.

Table 1. Comparison of results from technical and community issues scoping exercises

Scoped issues based on technical scoping sessions	Scoped issued based on community scoping sessions
A. Environment	**Our land**
Air/noise	Water
Vegetation and habitat	Air
Water	Animals
Fish and wildlife	Plants
Reclamation	Fish
B. Jobs and economy	**Our Communities**
Employment and income	Noise
Economic effects	Traffic
C. Health and wellness	Road upgrade
Disease	Isolation and quiet of the hamlet
Safety	Problems from more money
Diet	**Our lifestyles**
Alcohol and substance abuse	Jobs and training
Privacy and security	Hunting, trapping, fishing
Social structures	Traditional foods
Health care and social service	
D. Infrastructure and capacity	
Local government capacity	
Police and emergency services	
Physical infrastructure	
E. Traditional culture	
Lifestyle and economy	
Cultural/historical resources	

Consultation and the role of local assistants During an early issues scoping workshop, leaders of the Chipewyan Lake Community Association suggested that the IA would be significantly more meaningful to the local community if the opportunity for more direct community participation in the IA process existed. In particular, they recommended hiring local residents to act as coordinators for the IA. In response to this suggestion, two local Community Coordinators were hired from Chipewyan Lake: one to assist with environmental/biophysical issues and one to assist with social/health issues. The Community Coordinators were mature adults who were well-known and respected in their community, and were therefore well-positioned to assist with community access (both to and from the IA consultants) and gathering and sharing information.

The tasks undertaken by the Community Coordinators included arranging and facilitating local meetings, conducting interviews with key informants (e.g. Elders) collecting local and traditional knowledge, and acting as a local Cree-speaking resource to help the community understand relevant aspects of the NFT project and the NFT IA. In essence, the Community Coordinators acted as a bridge between local residents and the rest of the IA team. They helped ensure that the voices of a large number of residents were heard; they also became well-educated about the NFT project and the IA process. Furthermore, the Community Coordinators helped present the results of IA in the local Cree language to the community at the end of the study.

While introducing this idea midway through the IA changed the pace and process of the study, the model of working with local Community Coordinators was highly successful. The coordinators were able to obtain certain information efficiently and in likely more openness than the consultants would have encountered. Because of their daily presence in the community, issues were continually discussed and refined at the community level. Finally, their involvement helped develop the capacity of the community to understand and participate in future impact assessments for other oil and gas related activity. Having the two positions filled by experienced adults greatly aided in the success of this approach.

Innovation in communicating and implementing results

External communication Upon completion of the NFT IA, the main challenge faced in communicating

…the model of working with local Community Coordinators was highly successful

information about the results was the diversity of stakeholder audiences. These included local community residents (many with Cree as a first language), the Shell engineering design team, local government bodies (municipal and Aboriginal), and — potentially — provincial government and non-governmental organizations (NGOs). The information needs of these audiences were diverse, as was the way in which they were used to receiving information. For example, the communities wanted to understand what the key issues and impacts were, while the project engineers wanted to know what commitments were made and how these commitments would impact the design, construction, and operation of the project.

It was recognized that traditional EIA reporting methods would not satisfactorily meet the needs of all stakeholders (as evidenced by the grouping of issues in Table 1). Traditional impact assessment reporting is often highly technical and detailed — as well as voluminous — in order to satisfy regulatory approval processes. Unfortunately, this often means that people who have participated in the IA process do not recognize their input and contribution to the study and the layperson cannot readily understand study results. Different tools and methods were therefore chosen to communicate relevant results to different stakeholder groups.

For community residents and for members of the local government bodies, a Community Report was created. A non-technical summary is a common approach to summarizing the highlights from an impact assessment. However, most summaries are written from the perspective of a project developer or with the regulator in mind. In contrast, the Community Report for the NFT IA was written with the community residents firmly as the target audience. The language used in this report was community-friendly, with deliberate attempts made to use non-technical and non-business wording. It also included an executive summary in Cree. The report used a question and answer format (Figure 3) to reflect the way in which issues were raised during the scoping phase and to make it easier for community members to identify their input to the IA. Furthermore, the formatting of the report — including the layout, extensive use of pictures to illustrate certain issues, inclusion of direct quotes from community members, and even font size — was designed with the community in mind. The Community Report was presented in person to members of each individual community, and the draft results discussed openly. Whenever possible, the Community Coordinators presented information in the local Cree language.

For those requiring additional technical information, the consultant team prepared a very detailed technical appendix, which was organized more like a traditional impact assessment required for a regulatory application. The appendix provided detailed baseline data, as well as impact assessment methodology and results. It was, however, still written to reflect the integrated understanding and analysis of issues, and discussed all environmental, social, and health implications associated with each primary topic area.

Integration of IA results within Shell's Grosmont Venture In order for the NFT IA to achieve its stated objectives, it was critical that the mitigation and management actions identified through the IA be successfully integrated into the project planning process within Shell. Following through on commitments made in the IA process was particularly important in building trust with local communities. However, evidence from other projects suggests that the uptake and institutionalization of mitigation and management strategies can be difficult to achieve. There are several reasons for this: recommendations proposed by consultants may not always be accepted by the project team; different personnel may be involved in design, construction, and operation of projects; and the proposed mitigation and management

Question: The fish are healthy and plentiful in the lakes and streams. How do we know this will not change?

Answer: Fish are an important source of food for communities in the area of the Project and an important part of their culture. The types of fish used by the community include whitefish, jackfish, tulibee, suckers, Mariah, and perch.

Shell is aware that fish health can be affected by increases in sediment concentrations in streams and lakes, by accidental spills, and by other chemical inputs from surface runoff and wastewater. The same practices used to protect the drinking water quality will also protect fish health.

The number of fish in local lakes and streams can be affected by changes in their habitat. For example, changes in lake level could change the places available to fish for shelter and food. Additional sediment on stream bottoms could reduce available food and reduce the number of good areas for spawning. Shell is aware of these things and is taking steps to make sure this does not happen as a result of its water use and its river crossings for the gas pipeline. All upgrades to the bridges on the Al-Pac road will be done in a way that will ensure the rivers and streams are not disturbed. Water levels and sediment load will be monitored to make sure these practices are effective.

The number of fish can also be affected by the number of people who fish in the local lakes and rivers. As an indirect result of the Project, more people may be able to come to the area to fish. This is particularly true for Chipewyan Lake. Shell will restrict access to the community of Chipewyan Lake for its non-local staff and the staff of its contractors. Responsibility for managing fish harvesting from the lake is the responsibility of the government of Alberta (through Alberta Sustainable Resource Development or ASRD). This is something that Shell does not have control over. However, we recommend that Shell offer to work with the Chipewyan Lake Community Association and the Bigstone Cree Nation if they ask for help and decide to have discussions with ASRD.

Figure 3. Example of question and answer from the Community Report

strategies may be incompatible with existing project tools or processes.

The NFT IA employed two techniques for effectively integrating results of the IA into Shell project planning processes. First, a continuous process of feedback between the IA consultants and the Shell project team was established. Rather than waiting for a final report, emerging recommendations proposed by the IA consultant team were fed back to the project team on a continuous basis. This meant that the project team was able to identify if recommendations were feasible, if they were already covered by existing plans, and also who would be accountable within the project organization for the deliverable. Thus, by the time the final report was written, the recommendations were already familiar to, vetted by, and accepted by the engineering team. At a high level, the process of iterative information flow between stakeholders, the IA team, and the design team was as follows:

- An issue was raised by the community;
- The IA team would analyze the issue and find potential linkages;
- The IA team would suggest potential mitigation based on their understanding of the issue and the project;
- The mitigation action would then be brought to the project design team to see if this was feasible, practical, or if another solution existed; and
- This solution would then be tested with the IA team to see if it met the community's needs.

Over time the understanding by the IA team of technical project details and constraints increased, as did their understanding of the key issues facing the community, to the point where the iterative process described above became integral both to the project design process and the impact management aspect of the IA.

The second technique that was employed was the development of an Environmental, Social and Health Impacts Management Plan (ESHIMP) — a tool that could easily be incorporated into Shell's existing project action-tracking mechanisms. The ESHIMP was built as an active Excel spreadsheet in which mitigation measures could be filtered either by issues (community perspective) or project phase (project perspective), and where specific personnel responsible for each action were identified. This allowed the ESHIMP to be embedded within the project action-tracking tool that was already in use, and that had a pre-existing tracking system for ensuring delivery of commitments.

Discussion

Success of the IA process

As described earlier, the NFT IA had four high-level objectives. This section discusses whether and how the NFT IA process was able to better meet the objectives or provide additional value compared with a more traditional EIA.

The first two objectives involved developing an understanding of potential impacts in an integrated, cross-disciplinary manner, and implementing changes to the NFT project to minimize adverse effects and optimize possible benefits. In this regard, the IA process was deemed successful. Figure 2 provided an example of how a locally important issue such as water could be better understood in a holistic context that acknowledges environmental, social, and health implications. Table 2 provides an example of proposed mitigations and enhancements that were developed in relation to three specific community concerns: water availability, fish health, and community isolation and quiet. As shown in the table, the specific impacts predicted in these three areas span environmental, social, and health concerns and the proposed mitigation measures that were developed are similarly broad in order to adequately address the full range of potential impacts of the NFT project. As such, the IA process provided value by enabling Shell to understand the full range of impacts, to create appropriate mitigation strategies, to improve efficiency by avoiding duplication of efforts by different consultant teams, and to build stakeholder trust by fully addressing local concerns.

With regard to the third objective of building stakeholder understanding of the NFT project, the IA approach again proved successful. The key element that facilitated this success was the model of working with local Community Coordinators, the advantages of which were described earlier, as well as the development and sharing of the Community Report. The increased level of understanding about the project and its potential impacts resulted in advanced trust being built between Shell and community members. Not only did community members express satisfaction about their increased understanding, but they also expressed appreciation for Shell's willingness to be open and transparent about its plans and to seek external feedback on how these plans could be enhanced from the community's perspective.

Finally, the objective of building capacity in anticipation of a larger IA for a potential commercial project was achieved. For Shell itself, the NFT IA made a process often seen by engineering teams as quite abstract into something real that added value beyond its regulatory role. For the consultants, strategies, tools, and templates were developed that would enable them to work together as a team, to assess potential impacts and develop mitigations from a multi-disciplinary or holistic perspective, and to present results in a way that was meaningful to all stakeholders. It also allowed the consultants to develop an understanding of how a larger IA would differ from standard regulatory driven EIAs. Finally, capacity for undertaking a future IA was built within the local community and in particular

Table 2. Example of proposed mitigations and enhancements for three scoped issues

Community concern/issue	Potential impact	Proposed mitigation/enhancement
'Will the Project take water from our lakes and rivers?'	- Reduced availability of water for community use/changes in water flows and levels	- No water will be taken directly from any of the lakes or rivers in the area - Drinking water for project workers will be brought in by truck, from a municipal water treatment facility - Water for drilling and domestic washing purposes will come from two groundwater wells - Strong community involvement in ongoing groundwater and surface water monitoring programs

'The fish are healthy and plentiful in the lakes and rivers. How do we know this will not change?'	- Changes in fish habitat
	  - Changes in water levels
	  - Increased sediment concentrations in streams
	  - Accidental spills and other chemical inputs from surface runoff and wastewater
	- Changes to fish population sizes
	  - More people may be able to access the area to fish
		- Incorporate Best Management Practices (BMP) for working in and or adjacent to water to ensure no contamination by sediment or chemical emissions
		- Employees and contractors not allowed to fish or to access local lakes and rivers for recreation
		- Community involvement in ongoing surface water monitoring program
		- Work with the community and Alberta Sustainable Resource Development to limit fishing licenses and fish harvesting by non-community members

'Our community values its isolation and quiet. People are also not used to traffic coming through the community. How will this be affected?'	- Noise from the project will cause animals to leave area - Noise from the project will increase noise levels in the community (currently isolated and quiet) - Increase in potential for traffic collisions with project-related traffic - Increased number of non-community members visiting the hamlet	- Noise controls on equipment used for the project - Scheduling of activities so as to minimize noise emissions (e.g. day-time operations and during winter) - Monitoring of noise levels within the community - Restriction on project-related traffic into the community - Mandatory collision-avoidance training for Shell drivers - To decrease the number of additional vehicles in the area, workers will be driven to camps by shuttle, rather than private vehicles - Shell employees and contractors prohibited from visiting the community of Chipewyan Lake - Toll-free phone number established for complaints and questions

the Community Coordinators. In addition to understanding the IA process, the Community Coordinators highlighted that their participation in the process resulted in them learning things about their community about which they were previously unaware, and helped them build their own self-confidence and skills (e.g. in giving presentations).

Key lessons

This case study has presented a number of lessons relevant to those who may participate in future integrated assessments, including project proponents, consultants, regulators, local communities, and other stakeholders.

Overall, an IA can be done so that it provides benefits to industry and its stakeholders. The key is defining early what constitutes success for each group, being comfortable that the desired outcomes may be dissimilar, tailoring the methods and process accordingly to meet individual outcomes, and continually adjusting along the way. The NFT IA team was able to achieve this by establishing an integrated team and nurturing a 'culture of adaptability'. This allowed for new ways of scoping and analyzing issues to evolve throughout the study, and most importantly, for a suite of implementation tools to be developed that were meaningful to their intended audiences.

'Integration' can refer to several elements of an assessment's design, organization, and methodology. When key elements of integration are achieved it can lead to an end product that is more meaningful to affected stakeholders, has the appropriate level of emphasis on stakeholder issues, and is effective at influencing project design and execution. A key element of integration is the integration of environmental, social, and health disciplines in the analysis of issues and recommendations — and ideally with an equal and balanced emphasis on each. Another key element of integration is the inclusion of local communities and the valuation of local knowledge on par with Western science and other technical data (Ravetz, 2004). A further key element is the full integration between the IA team with and the project proponent in order to maximize the likelihood that

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the results of the IA will influence both project design and corporate culture. An end goal of an IA is to have a series of documents that are used by stakeholders and proponents on an ongoing basis, as opposed to being seldom referenced following the regulatory review process (which is commonly the case with traditional EIAs).

The communication of results is critical to the acceptance of the IA as a valid process and to the adoption of mitigation and management strategies that are developed. Two important elements of effective communication are: (1) translating findings into communication mechanisms that are relevant to different audiences; and (2) ensuring that the perspectives of these audiences are reflected in the way that information is delivered.

It is significant to note that the consultation process during the NFT IA did not necessarily identify many new issues or impacts, or indeed lead to fundamental changes in the design. However, it prioritized and articulated anticipated impacts in ways that are understood and experienced by local communities, rather than fragmenting issues and their interconnections along disciplinary lines. It also provided local stakeholders with a greater sense of ownership of the predicted impacts, the proposed mitigation measures, and the project itself.

Finally, the NFT IA has demonstrated how IAs can be used to build external stakeholder understanding of the IA process and the relevant project or activity associated impacts. In this case, the stakeholder was a local community, but one could envisage that in contexts with different levels of regulatory maturity the IA process could also be used with regulators, NGOs, and other key stakeholders.

Postscript

The NFT IA was completed in September 2008, around the same time as the world economic crisis adversely impacted the price of oil and forced several companies to delay projects. As an aftermath to these conditions, Shell decided to postpone the development of the NFT and any potential commercial development. As a result of this postponement, it is not possible to evaluate the full value of the NFT IA, such as the outcome of mitigation and monitoring measures that had local significance. The process of undertaking the NFT did, however, provide insight into the IA process and how it can be used to design projects and build relationships between industry, communities, and consultants.

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Notes

1. In 2009, Shell updated this policy with the requirement for IAs now more directly linked to the project scope and anticipated impacts. Depending on these criteria, different levels of IAs are required.
2. This flexible approach was facilitated by the fact that much of the baseline data that was required for the IA had already been obtained by the consultant team prior to the start of the IA. Environmental data had largely been collected during the NFT permit application process. Social and health baseline data had been collected in the context of a pre-existing data collection process that would meet the needs of a larger commercial project.

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