

Integrated assessment

Health impact assessment, integration and critical appraisal

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There is little existing debate about what constitutes either a good quality health impact assessment (HIA) or a good quality integration of health with environmental and social assessment (EIA, SIA). A critical appraisal process is required to assure the quality of each. The appraisal considers procedural and methodological components. It includes a comparison of the completed report with the terms of reference on which it is based. It examines the competence and experience of the assessment team, the role of the steering committee and local community, the determinants of health, and the way in which integration is achieved. There are both parallel and sequential components to integration because the outputs of EIA and SIA are often inputs to HIA. A case study from Sakhalin Energy Investment Company concludes that integration added value and that there were additional opportunities for community involvement and integrated mitigation.

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THE HEALTH IMPACT ASSESSMENT (HIA) concept is ever more widely accepted as a planning instrument. Policy drivers can be found in national and regional government policy in the UK (for example Secretary of State for Health, 1999), the European Commission (1999), and the Organisation for African Unity (1997). They can also be found in multilateral lending guidelines, such as the World Bank (Birley *et al.*, 1997), Asian Development Bank (Birley and Peralta, 1992) and African Development Bank (2001), and in transnational corporations such as the Shell group of companies (Shell International, 2001).

The policy drivers have generated action at policy and project level in both developing and developed economies. These actions have many similarities. There is, for example, the growing trend towards an integrated impact assessment that combines environmental, social and health considerations, which is described below. This trend is occurring before many of the issues surrounding health impact assessment have been properly worked out. Some of these issues have profited from widespread debate (see, for example, the papers associated with the World Health Organization European Centre for Health Policy, 2003). Others have not, such as the critical appraisal or review of completed assessment reports.

Some possible components of an HIA review or critical appraisal have been proposed (Bos *et al.*, 2003), but they were identified by a relatively small number of individuals. They have not yet been debated by a wider audience, tested against a range of case studies, or compared systematically against the approaches adopted in other kinds of impact assessment (Vanclay and Bronstein, 1995; Wood,

1995). In addition, the trend towards integration has created a need for an additional kind of critical appraisal that examines the success, or otherwise, of the integration itself.

This paper examines some of the trends in integrated impact assessment and suggests what may be required to undertake critical appraisal of both an HIA alone and an integrated assessment. It applies the theory to a case study of an oil and gas project. Sakhalin Energy Investment Company (SEIC) was formed to exploit the huge oil and gas reserves of Sakhalin Island on the Pacific coast of Siberia. It is a joint venture that includes the Shell Group. Health, social and environmental impact assessments were undertaken.

In keeping with best practice, there was a critical appraisal of the assessments using a separate funding mechanism to commission specialists who were independent of the companies involved. The author was initially a member of that independent procedure and had an opportunity to appraise and challenge the draft HIA, but without having sight of the environmental and social assessments. This role was terminated as soon as a conflict of interest became possible as a result of an offer of employment by Shell.

The revised impact assessments and the executive summary were published on the web in about March 2003 (Balint *et al*, 2003; Sakhalin Energy Investment Company, 2003). This provided an opportunity to examine how health was integrated in practice within the three assessments. The examination was based entirely on published information plus one cited personal communication.

Integrated impact assessment

Impact assessment is a general concept that first gained prominence in the environmental field. Environmental impact assessment (EIA) is a mainstream and statutory function in many nations and multinational institutions. There is considerable diversity and complexity surrounding the many other issues that also require prospective assessment. Some of

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these were explored in Vanclay and Bronstein (1995). There have been a number of proposals to integrate health into EIA (for example Birley and Peralta, 1992; Birley *et al*, 1997; Birley *et al*, 1998).

More recently a broader approach to integration has emerged. This seems to be partly a response to the need to rationalise and to avoid a large number of single issue, piecemeal assessments that have a wide degree of overlap. It is also a response to sustainability criteria and is apparent at both policy and project level. Possible advantages of integration include synergy. Possible disadvantages include impractical complexity. However, the purpose of this paper is not to advocate integration but to consider its characteristics.

Bond *et al* (2001) have distinguished weak and strong integration. Weak integration involves separate assessments that may be co-ordinated in time. The decision-making authority integrates the results. Strong integration involves a single assessment that presents a unified result to the decision-maker. They concluded that further procedural and methodological development and capacity building was required to progress from weaker to stronger integration.

There are examples of both kinds of integrated impact assessment projects in the United Kingdom policy, multinational development banks, European Commission, transnational corporations, and the World Health Organisation (2001). What do these different initiatives have in common?

Integrated assessment in United Kingdom policy

The UK integrated policy appraisal tool provides an example of the kind of approach that can be adopted to make a rapid decision when faced with a flood of government policy proposals (DTLR, 2002). It has 42 questions covering economic, social and environmental categories. The kinds of questions included provide an insight into the links between health and the other categories of impact. The social category, for example, includes four questions on public health and safety, five on crime and six on social capital, community and education. The public health and safety questions focus on standard biomedical issues of occupational safety, health related behaviour and access to medical services.

The questions in the other categories and sub-categories can be identified as largely concerned with the broader determinants of health. For example, they ask whether the policy or project involved will impose administrative or other burdens on public service providers, affect people's fears about being a victim of crime, affect the availability of affordable homes of suitable quality, lead to change in the emissions of air pollutants, lead to an increase or decrease in water pollution, impact on a location in such a way as to change its sense of place or identity, or involve visually intrusive construction works. All of these activities have an impact on health.

A similar tool is being developed to support the UK Northwest region sustainability plan (UK Northwest, 2000; National Centre for Business and Sustainability, 2002). A recent survey of UK integrated assessment projects concluded that there was considerable receptivity but less activity (Bailey *et al.*, 2003).

Integrated assessment in multinational banks

The multilateral development banks lend money to regional governments to enable them to implement national policies. They are accountable to boards of directors drawn from lending nations, who are themselves accountable to national governments and their electorates. These banks are increasingly concerned with the diverse range of impacts associated with their lending policies. They respond by creating safeguard policies and procedures based on impact assessment.

A recent example is an initiative by the African Development Bank to integrate and update its policies and procedures on the crosscutting themes of environment, gender, poverty reduction, health, participation, and population. The bank has established Environmental and Social Assessment Procedures (ESAP) to improve decision-making and project results in order to ensure that bank-financed projects, plans and programmes are environmentally and socially sustainable as well as in line with Bank's policies and guidelines.

In common with many institutions, the Bank regards human health as a sub-component of environmental and social concerns (African Development Bank, 2001). The Bank's procedures formalise the use of environmental and social impact assessment (SIA), environmental and social management plans and environmental and social audits as instruments to enhance project benefits and to prevent, minimise, mitigate, or compensate for adverse impacts.

A set of integrated environmental and social impact assessment guidelines has been prepared, but not yet finalised, to assist with the implementation of the procedures. As in the previous examples, many of the questions in the guidelines are concerned with the broader determinants of health. For example, a project that reduces crop production may lead to an increase in poverty and, in turn, to a decrease in population health. Similarly, a project that excludes specific groups from accessing irrigated land is likely to increase health inequalities.

Integrated assessment in the European Commission

The Commission of the European Communities has proposed a new integrated impact assessment method to replace a number of partial and sectoral assessment tools with a global approach (European Commission, 2002). According to the Commission, the partial approach has made it difficult for policy

makers to assess trade-offs and compare different scenarios. The integrated approach is intended to improve quality and coherence of policy design by acting as an aid to final policy choice. It focuses on the sustainability of economic, environmental and social trends for particular social groups, economic sectors, and geographical regions. As in some of the other examples, health is considered a component of the social and environmental assessment.

A two-cycle approach is adopted: a preliminary assessment is submitted to the Commission which may then decide that an extended impact assessment is required. The principle of proportionate analysis is used to ensure that the depth of the assessment is dependent on the likely significance of the impact. The new method provides a number of basic questions, analytic tools and a common reporting format. At the time of writing (January 2003), the analytic tools had not been specified but technical guidelines were due to be issued.

Integrated assessment in transnational corporations

The impacts of transnational corporations may be as large and diverse as the policies and projects of nation states. In the case of the oil and gas industry, operations take place in sensitive locations subject to the licensing requirements of diverse governments and require private borrowing from lending banks that have their own safeguard policies (International Finance Corporation, 2002). The success of future operations is partly determined by past reputation. Royal Dutch/Shell, for example, is a diverse and decentralised group of companies where the actions of any one company could either damage or enhance the reputation of the others (Shell International, 1997; Maier, 2000; Doyle, 2002; Hastings, 2002). Here, too, there is a trend to enhance and integrate impact assessment procedures. The Royal Dutch/Shell Group has published minimum health standards (Shell International, 2001). These state that:

“a Health Impact Assessment is to be made in conjunction with any Environmental and Social Impact Assessments that are required for all new projects, major modifications and prior to abandonment of existing projects where there is the potential to impact on the health of the local community, company and contract workers, or their families.”

This is a powerful policy statement and is backed up by guidelines consisting of an overview manual plus specific health, social and environmental guidelines (Shell International, 2000a; 2000b; 2002a; 2002b). Together these make up Shell's integrated approach to environmental, social and health impact assessment (ESHIA). The documents describe the procedure and how it is aligned with the business process or project cycle, from project identification to

decommissioning and abandonment. The audience is assumed to have a business management, scientific or engineering background, without an extensive knowledge of environment, social or health impact assessment. The guidelines recommend integration and stakeholder involvement at all stages and seek both the mitigation of negative impacts and the enhancement of positive impacts.

As in the other examples, there is evidence of a gradual evolution over a ten-year period from an approach that was limited to environmental impact assessment of major new projects and to health safety issues within the project boundary ('within the fence'). Now there is a broader acceptance that business impacts on the wider environment and society through many different routes.

Critical review or appraisal

The move towards integration is occurring before some of the basic issues of health impact assessment have been worked out. One example of this is quality

assurance. The following discussion focuses on critical appraisal as a mechanism for quality assurance. There is a problem of terminology and the terms critical appraisal and critical review are used interchangeably and as components of a larger process of evaluation.

Impact assessment turns a complex problem into a practical undertaking by creating a taxonomy of categories and components, procedures and methods (Scott-Samuel *et al*, 2001) (see Figure 1 and Table 1). Procedural steps can be sub-divided into those required before and after the assessment. The steps required before include screening, scoping, preparing terms of reference, choosing the assessor, forming a steering committee and facilitating the assessment. The steps required after the assessment include review or critical appraisal, negotiation of options, monitoring implementation of safeguard measures, and evaluation of the whole process.

When a health impact assessment report is complete it should be critically appraised or reviewed before being accepted for action. The result of critical appraisal can be acceptance of the report as it

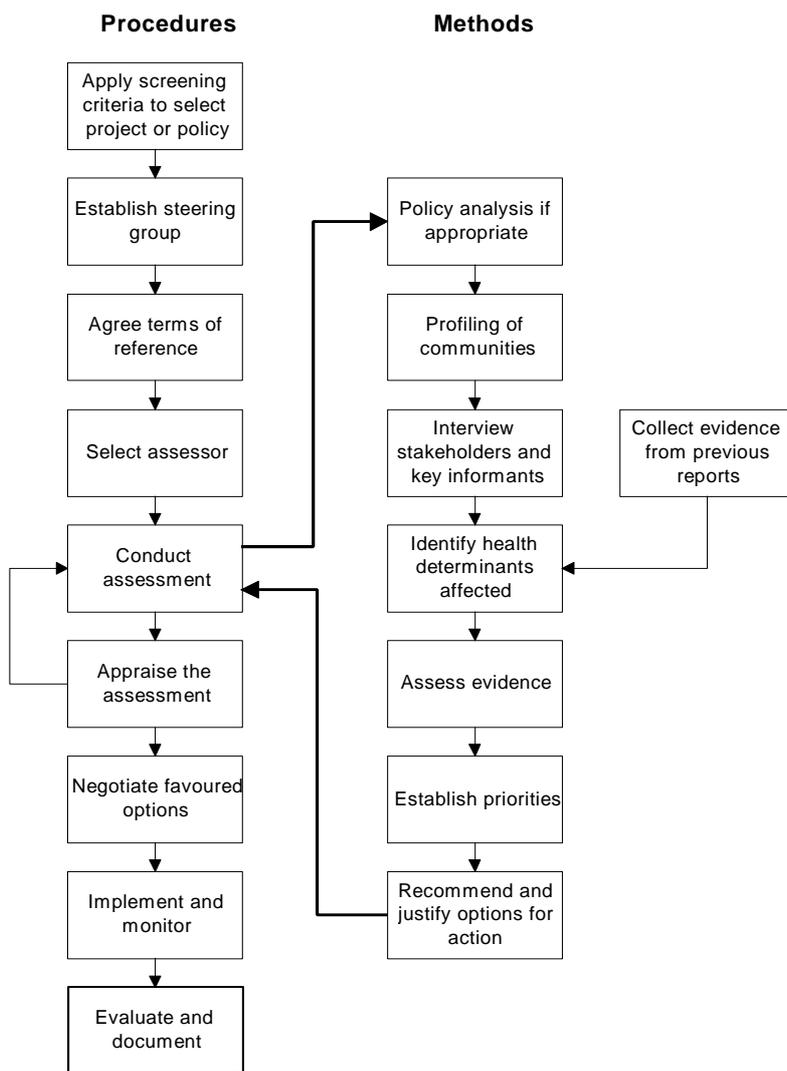


Figure 1. Procedures and methods used in health impact assessment
 Source: Scott-Samuel *et al* (2001)

Table 1. Health determinants associated with a project, programme, or policy

Categories	Sub-categories	Examples of health determinants
Individual/family	Biological	Genetics, age, senses, sex, immunity, nutritional status
	Behavioural/lifestyle	Risk acceptance and behaviour, occupation, education
	Circumstantial	Poverty, empowerment, family structure
Environmental	Physical	Air, water and soil media, infrastructure, vectors, housing, energy, land use, pollution, crops and foods, traffic, green space, climate
	Social	Community structure, culture, crime, discrimination, social cohesion, gender
	Economic/financial	Unemployment rate, investment rate, interest rate, inflation rate
Institutional	Health services	Primary care, specialist services, access
	Other services	Police, transport, public works, municipal authorities, local government, project sector ministry, local community organisations, NGOs, emergency services, access
	Public policy	Regulations, jurisdictions, laws, goals, thresholds, priorities, standards, targets

Source: Scott-Samuel *et al* (2001); Birley *et al* (1998); Will *et al* (1994)

stands, a request for amendment, or rejection. The review may be carried out by the steering committee, or by an independent reviewer. It may, or may not, be anonymous. In the case of controversial projects, it may be used in a judicial process. In the case of international projects, such as Sakhalin Energy, the lending institutions may require an independent review as part of compliance with international guidelines and best practice.

The review sub-components can be divided into those that could be common to all kinds of impact assessment and those that are specific to health impact assessment. The sub-components can also be divided into those that relate to the procedure and those that relate to the method and tools used.

Critical appraisal of procedure

The procedural sub-components that may need to be appraised include (Wood, 1995; Vanclay and Bronstein, 1995; Bos *et al*, 2003):

- There may be evidence of bias associated with conflict of interest and financial obligations. For example, the assessor may be paid directly by the project proponent.
- The timeliness of the assessment may be inappropriate with regard to the project cycle. For example, an assessment that starts after the concrete has been poured is untimely.
- The suitability and adequacy of the terms of reference is crucial, as the report should address all the issues identified in it. It should be available to the appraiser.
- The competence and experience of the assessment team may be judged by their *curriculum vitae*. A common problem is that the assessors are specialists in a small component of the problem and give this excessive attention, at the expense of less familiar and more important components (personal observation). For example, infantile diarrhoea is far more important than outdoor air pollution

related disease in most developing countries (World Bank, 1993) but outdoor air pollution may receive more attention because it is a standard component of EIA (personal observation).

- The budget for the assessment should be identified as a percentage of the total project budget and for comparison with the EIA budget. As a very rough guide, a suggested budget is in the range 0.01–0.1% of the project budget and of similar size to the EIA budget.
- The report should be written for a specific audience and its accessibility judged by the writing style and organisation.
- Public participation may be inadequate.

There are many additional procedural problems that are outside the scope of a critical appraisal (Vanclay and Bronstein, 1995). For example, the proposed mitigations and monitoring may not be implemented; and governments may circumvent their own regulations when expedient.

Method and tools

The methodological sub-components include the determinants of health. There are several ways of classifying these such as social and biophysical or individual/family, environmental and institutional (see Table 1). A broad and balanced assessment is required that takes account of a wide range of determinants. The institutional determinants of health include the health service itself and the many other institutions that are responsible for safeguarding human health.

For example, the Sakhalin Energy HIA described below included a health needs assessment that judged the adequacy of local medical services but little attention was paid to the adequacy of other institutions in the project area. Missing components included the capacity and capability of the local water company to supply drinking quality water, and of the local police force to regulate traffic flow.

Another common missing component is an analysis of the jurisdictional boundaries. For example, a sewage treatment plant in the Middle East was designed to discharge its product into a channel that was in the jurisdiction of the municipal authority. The plant manager observed illegal abstraction of the product from the channel for irrigation of salad crops, but could not take action because the product had left his jurisdiction (personal observation).

The review should ascertain that the affected stakeholder communities have been identified, their differential vulnerability and inequality considered and they have been consulted. The appraisal should also consider whether the assessor had reasonable access to available evidence, whether the evidence was collected and used appropriately, and whether any important references were missed. The evidence regarding changes in the determinants of health must be logically presented and analysed. Many reports contain too much information about the tools used, too much unused factual material, and too little analysis. A common problem is to present the evidence, but not infer any conclusions from it (personal observation).

The appraisal should consider whether the evidence supports the conclusions that are reached. There will always be great uncertainty and assumptions must be made explicit. The objective of impact assessment is not the discovery of absolute scientific truth or publication in peer-reviewed journals. Rather it is to make practical and acceptable recommendations to policy and project proponents and stakeholders for safeguarding and promoting human health based on a reasoned judgement about health outcome. The report should be read with this objective in mind.

Critical appraisal of integration

Health impacts are the consequence of interactions among a wide range of health determinants. The health determinants are broadly: biological; environmental; and social. Many of the outputs of environmental and social assessments can be

Health impacts are the consequence of interactions among a wide range of health determinants, which are broadly biological, environmental, and social: many outputs of environmental and social assessments can be regarded as inputs to health impact assessment

regarded as statements about changes in the determinants of health and, therefore, as inputs to health impact assessment. For example, the impact on air quality is considered in the EIA. Air quality is a determinant of the health of asthmatic stakeholders.

As another example, the impact on income distribution is considered in the SIA. Income distribution is a determinant of health inequalities. It follows that there is both a parallel and a sequential component to integration. As the outputs from the EIA/SIA are often inputs to the HIA, there are likely to be more cross-references from the HIA to the EIA and SIA than vice versa. Figure 2 illustrates a possible management procedure. It expands the conduct/appraise components of Figure 1.

In the case of full integration, the outputs of the other assessments would be incorporated fully in the HIA. This, in turn, would lead to a set of integrated recommendations for safeguarding and enhancing the health of stakeholders, environmental quality, and social well-being. The executive summary would provide the final opportunity for integration.

A critical appraisal of integration should seek to classify the assessment on a spectrum from no integration, through weak integration, to full integration. In the case of full integration, the HIA component may include the following characteristics:

- It will have many cross-references to the other impact assessment reports.
- The results of the social and environmental assessments will be used in the analysis of health impacts.
- There will be evidence that health, social and environmental assessors worked together.
- The health recommendations will be related to other recommendations.
- The stakeholders will be identified consistently with the social assessment.
- The geographical and time phase boundaries will be identified consistently in all the assessments.

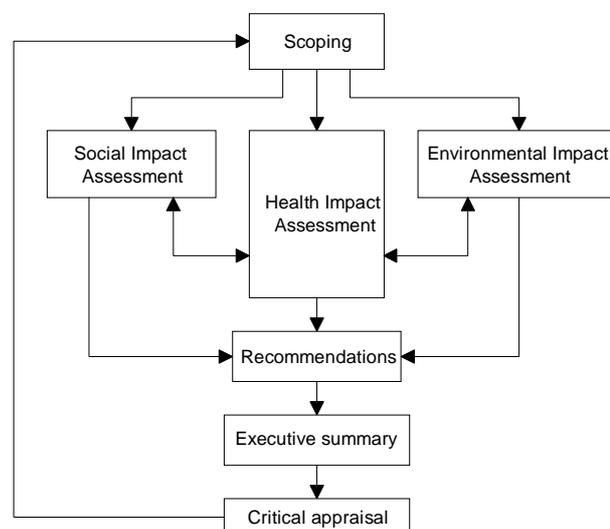


Figure 2. Management of integrated impact assessment

There will always be considerable overlap among the three assessments, and decisions will have to be made pragmatically during the scoping stage about allocating elements to each. The scope may need refining as the assessment proceeds. The critical appraisal could determine whether all the elements identified during scoping have been addressed in one or other of the reports, with suitable cross-references. The drafts would then be revised and finalised.

Case study: Sakhalin Energy

Integration in the SEIC impact assessments was apparent both in the executive summary and in the cross-references between reports. The executive summary contained 12 pages on EIA, eight on SIA and two on HIA in a document of total length 33 pages. The full EIA was sub-divided into a number of different volumes. Volume 1 covered common issues. Volume 2 covered offshore facilities and landfalls. Volume 3 addressed the onshore processing facility. Volume 4 addressed the onshore pipelines, booster station and gas disposition terminal. Volume 5 covered the liquid natural gas plant and export facilities. Volume 6 covered the island infrastructure upgrading project (IUP), including roads, rail, bridges and ports.

The HIA and SIA were each in a single volume. The scope of the HIA and SIA did not include the IUP, although this project is likely to have a considerable impact on the community. The HIA was conducted by SEIC staff in collaboration with the local medical community.

Cross-references

The number of cross-references between the published reports was counted in order to test the prediction. A simple search was made of the acronyms EIA, SIA and HIA, excluding headings, and the surrounding text was checked to ensure that there was a valid cross-reference. Table 2 lists the result from some of the main reports. As expected, there were far more cross-references from the HIA report to the EIA and SIA reports than the other way round.

Table 2. Number of cross-references between some of the Sakhalin Energy reports

To	From			
	HIA	EIA volumes 1 and 3	EIA volume 6	SIA
HIA	–	0	6	3
EIA	37	–	–	15
SIA	46	3	12	–

Water-borne disease

To obtain more precise information on integration, the single theme of water-borne disease was examined and traced through the three assessments. According to the HIA baseline data, some 36% of the island community of 600,000 people were living below the subsistence level. The island drinking water was sourced from underground and surface water bodies. The supplies on the island were often inadequate, irregular, and contaminated and about 50% of the rural communities were not connected to water mains. Associated infrastructure was often worn-out and poorly maintained.

Microbiological contamination was relatively common, and substantial amounts of drinking water were untreated. The incidence of acute intestinal infection was relatively high and increasing, and the community identified drinking water as a major concern. *Shigella*, *Giardia*, *Enterobia*, *Ascaris*, and hepatitis A infections were relatively common. Government expenditure on the water supply utility was increasing and was about US\$3 million in 2002.

A précis of the discussion on drinking water supply in the reports follows.

EIA	Projects were designed to avoid contaminating potential drinking water supplies Safe drinking water supplies would be provided for staff
SIA	Drinking water was identified as a major concern of stakeholders An inventory of existing infrastructure was made
HIA	An inventory of contaminated supplies was made The prevalence of medical conditions associated with contaminated water was listed
Executive summary	The summary acknowledged that many community water supplies would not meet company safety standards without upgrading or repair. It also suggested that some company facilities should use public supplies if there was sufficient surplus.

Impact assessment is as much about enhancing positive impacts as mitigating negative ones. On that basis, a discussion might be expected of the option of upgrading community facilities as a way of supporting public health at the same time as obtaining clean water supplies for SEIC use. The discussion of this option was absent from the reports but it had been debated (personal communication from SEIC). The conclusion of the debate was that water supply upgrades were impractical if project facilities were far from human settlements, if the cost of upgrading was far in excess of sinking wells for

temporary construction camps, or if communities were scheduled for relocation independently of the project. The addition of these conclusions to the reports and the identification of any communities where upgrades were practical would have enhanced the process of integrating the water-borne disease issue.

Conclusion

Health impact assessment is still evolving, as this paper illustrates. On the one hand, policy makers and managers are adopting it as an instrument for ensuring sustainable and healthy development. On the other hand, there is still much to discover about how it can and should be carried out to an assured standard and integrated with other tools. Some institutions have located human health as a sub-component of environmental and social concerns (see, for example, African Development Bank, 2001). Such an approach detracts from the proper integration of health issues and seems to ignore the need for all impact assessment to safeguard human health and well-being. Environmental and social scientists by themselves cannot substitute for public health specialists.

Health impact assessments need evaluation in terms of process, impact and outcome. Evidence is required that they contribute to positive changes in project and policy design that take account of the need to safeguard and enhance human health, and that they are cost-effective. Such evaluations are being compiled (Health Development Agency, 2003) and a recent example reports on the Alconbury airfield development in the UK (Close, 2001).

Critical appraisal forms one component of the evaluation process. Each assessment should be judged fit for purpose, since a poor quality assessment is unlikely to be influential. Relatively little has been published about the critical appraisal of HIAs, although this has long been part of HIA training courses in Liverpool (personal observation) and in less developed economies (Jobin, 1992; Birley *et al*, 1996; Bos *et al*, 2003). These courses were designed

for building capacity both to undertake HIA and to manage the HIA process. Critical appraisal of a completed assessment was regarded as a valuable learning tool that contributed to both objectives.

The Sakhalin Energy case study had a number of strengths and weaknesses. The strengths included the large input of resources, the debate generated among stakeholders, and the concerted attempt made to integrate three conceptually different assessments. The integration added value to the health impact assessment because the environmental and social assessments examined determinants that would otherwise have had to be within the scope of the health assessment. The weaknesses included the potential for bias, the emphasis on a medical model of health, and the limited engagement with other health protection agencies (such as water supply).

The degree of integration must be scored as between weak and full. It supported the model presented in Figure 2 of a parallel process with sequential components. The principles of critical review proposed above could not always be followed; for example there were no terms of reference, CVs (*curriculum vitae*) or scoping studies to examine.

The checklist for critical appraisal requires further modification. It should include an assessment of the regulatory and supervisory environment. In the case of Sakhalin, for example, it was unclear whether the assessment procedures were supervised by a steering group that included local stakeholders (the involuntary risk receivers), or exclusively the project proponents (the voluntary risk takers). The practice in the UK public sector, on which Figure 1 was based, is to devolve control to a steering group (Scott-Samuel *et al*, 2001).

In part, this uncertainty may have arisen because the requirement for an HIA did not originate from the regulations of national or local government, but Shell's own minimum health standards (Shell International, 2001). In part, the uncertainty can be attributed to the lack of experience of HIA in the local government, the contractors and SEIC. The question of where control should properly lie in the case of a multi-billion dollar public-private partnership supported by multiple international lending institutions is outside the scope of this paper.

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