



Integrating Environmental Assessment into Project Development Studies

*Plant nursery in Ghana
(in preparation for rehabilitation
of disturbed areas)*

Project development decisions for mining and large infrastructure projects are generally based on feasibility studies. These studies usually take into account an Environmental and Social Impact Assessment (ESIA) which are driven by international best practice and host country legislation but which, like feasibility studies, may need to meet corporate standards and/or lender requirements.

There are no internationally accepted guidelines for linking the contents and timing of feasibility studies and environmental and social impact assessments, though many mining companies have their own Corporate standards. To support project development studies, SRK's environmental and social impact specialists have been working with their mining and geology counterparts to compare processes and define minimum 'standards' for the level of detail required at different stages of a project's development.

First, it is important to understand the different stages of the two processes. In project development, the stages include the Concept (or Scoping), Pre-Feasibility and Feasibility Study stages. For the environmental and social assessment, the stages include Screening, Scoping (or Plan of Study), Baseline Studies, Environmental and Social Impact Assessment and Environmental and Social Management Planning stages. All of the ESIA stages need stakeholder engagement.

Second, the decision-makers relying on the results of these studies need to be identified. Their decision-making processes often run in parallel and include:

- Go/No Go decision – project developers, including the project design team, the future operations management team and shareholders need to determine if the project is economically viable and technically feasible. This decision will be influenced by the risks and opportunities posed by the environmental and social consequences of the project

...2

Fiona Cessford

Fiona Cessford is currently a Director of SRK Consulting (UK) Ltd and is head of the Geo-Environmental Department in Cardiff, having transferred from SRK's South African practice in 2005 where she was based for 7 years. Prior to working for SRK, Fiona spent 8 years with the UK's Environment Agency (environmental regulator) dealing with integrated pollution control and licensing of effluents. Fiona has managed and supported major environmental and social impact assessments all over the world, including projects in Greenland, Pakistan, Surinam, Russia, Kazakhstan, Zambia and South Africa. Working with international Lenders (including Equator Principles Financial Institutions), her mining/geology colleagues and major, mid-tier and minor mining companies, Fiona has used the experienced gained from these often challenging projects to support SRK's environmental due diligence and third party review processes.



Fiona Cessford

Fiona Cessford: fcessford@srk.co.uk

Integrating Environmental Assessment into



Rehabilitated mine area in Jamaica

...Cover continued

- Permitting – the responsible government authority decides whether to legally approve the project and determines the conditions for approval
- Loan agreements – financiers need to determine the risks associated with their possible investments and develop the covenants or conditions that manage these risks and will be included in the loan agreements
- Social licence to operate – other stakeholders, including local communities, need to evaluate the development proposal and the impacts on their community and environment; their agreement may be required or they may decide that more action is needed to overcome threats or harness opportunities posed by the project

In formulating the linkages between these processes, SRK considered the following key points, while acknowledging that this is a simplified view of complex decision-making processes.

1. According to International standards, feasibility studies need to consider environmental and social issues, including health, safety, labour and security. The Equator Principles and International Finance Corporation (IFC) Performance Standards present the minimum standards for environmental and social impact assessment and management acceptable to many major financiers.
2. The description of the project in the ESIA needs to be identical to that in the feasibility study, including any project description revisions made

Project Development Studies

subsequent to the completion of the feasibility study to ensure that the impacts have been correctly evaluated and suitable management plans devised. However, completing the impact assessment and management planning depends on the final project description, which may only be agreed upon at the end of the feasibility study.

3. The information required to support decisions varies according to the parties involved. The legal frameworks of the country and the government's institutional capacity often differ. For example, non-OECD countries are likely to call for less stringent requirements than OECD countries, due to weaker regulatory controls and administration. Developers differ according to their corporate requirements. For example, the Health, Safety, Environment and Community policies and capacity of a junior is likely to be less comprehensive than that of a mid-tier or major company. Investors differ according to their risk position. For example, financial institutions will differ depending on whether or not they have signed Equator Principles.
4. The decision making points of each party may influence the other parties' decision points. For example, some developers will only approve a project once the regulator issues a licence. Investors may manage their risk through the different stages of the lending process (e.g. agreement on the loan, draw downs and completion). The project development deliverables required for each of these stages may vary depending on the financial institution involved (as a function of their risk profile and investing strategy).
5. In our experience feasibility work involving a major mining company or an Equator Principles Financial Institution requires the ESIA process to have proceeded as far as the development of a framework

management system to clearly indicate how implementation will occur. Generally, it takes at least six months after the project description is fixed and a full baseline data set is available to complete the ESIA work to this stage.

The outcome of this evaluation is a simplified statement of what SRK considers the minimum level of environmental and social assessment required at each stage of the project development process. A similar process has been undertaken by our mining, engineering and geology colleagues to ensure that project development influences are considered in an integrated way.

SRK acknowledges that each project is unique and that firm and fixed standards cannot always be applied. However, based on extensive ESIA experience and a good understanding of the development process, SRK can apply these principles when undertaking ESIA's and when reviewing ESIA's prepared by other consultants. To meet the needs of the various decision-making processes, SRK recommends:

- Understanding the decision-making processes to determine the requirements of each decision maker and the key milestones in their respective processes
- Early integration of project development engineering teams with the environmental and social specialists (whether in-house or consultants)
- Regular interaction and communication between the engineering and environmental/social teams at all stages of the project development to ensure optimal project design, prevent environmental damage and obtain the social licence needed from stakeholders

Fiona Cessford: fcessford@srk.co.uk
Allison Burger: aburger@srk.co.za

Allison Burger

Allison Burger is a Principal Consultant in SRK Consulting's Johannesburg office with 18 years of experience as a social and environmental specialist. Allison obtained her Bachelor of Arts



Honours in Environmental and Geographical Science from the University of Cape Town, where she was involved in South Africa's first course on Integrated Environmental Management. She was a Director of SRK Consulting for several years and has made notable contributions to environmental law reform and the development of industry standards. Allison has worked extensively in the mining sector in southern and central Africa and undertaken assignments, including assessments, management systems, due diligence audits, stakeholder engagement and training. At present, she runs Nedbank Capital's Green Mining Awards, undertakes due diligence audits for Equator Principles Financial Institutions, and advises several clients in the mining industry in Africa on complex social and environmental assessments.

Allison Burger: aburger@srk.co.za

SRK Russia

SRK Consulting in Russia employs some 34 people, principally in its Moscow office. Established in August 2006, SRK Russia's team consists of resource geologists, mining engineers, a processing engineer, environmental scientists, financial analysts and technical translators. The team has grown rapidly through its ability to provide the information, international experience and project evaluation. David Pearce, a mining engineer and project manager with 20 years' experience, and Andrey Melnikov, a financial analyst with eight years' experience in the minerals consulting industry and five years' in the banking industry, lead the team. Through their leadership at the Minex Forum, Russia's principal mining conference, and their participation in the GKZ-CRIRSCO joint committee's efforts to explore standardising the links between the Russian and international resource-reserve reporting codes, SRK has established itself as the leading international mining consultancy in Russia and the CIS.

SRK Russia's environmental team consists of three specialists led by senior environmental consultant, Ekaterina Vershinina, and expects to double its size by the end of 2009. Currently, the Russian environmental group provides different environmental services to match the international requirements and practice. With industry expertise and deep knowledge of Russian legislation, SRK's environmental group can help the client meet both Russian and international requirements. The environmental team takes part in technical audits, as part of the SRK technical team, and contributes the environmental development component of documents for successful international funding applications.

Challenges of Merging International and Local

One of the challenges for Russian environmental specialists is combining the international and Russian requirements for environmental and social impact assessment. Although current Russian laws contain no strict requirement to develop an impact assessment, known as OVOS, it continues to be an integral part of the permitting process.

The OVOS process is roughly equivalent in its objectives to the internationally recognised Environmental and Social Impact Assessment (ESIA) procedure, however there are a number of areas where the expectations of an international ESIA differ from those of the OVOS process, namely:

- Audience: The international ESIA document is intended for regulatory

review, public disclosure and is often submitted to financial institutions. The Russian OVOS is prepared for expert review as part of the permitting process, and requires complicated technical language

- Scope of assessment: Infrastructure such as access roads, power lines, and water supply associated with developments, are considered separate projects and are not evaluated within the OVOS whereas they are considered part of the ESIA process
- Technical scope: Issues, such as greenhouse gas emissions, noise, and sustainability are not usually addressed within the OVOS process. Although the OVOS process requires consideration of social issues and closure planning, there is no

Resumption of the mine with 50 year old cyanidation tailings will require both OVOS and ESIA



Requirements in Russia

requirement to address health and safety or labour conditions

- Public consultation and disclosure: Although part of the OVOS process, in practice the quality and extent of public consultation is much less rigorous than would be expected as part of an international ESIA
- Mitigation measures and management systems: Under OVOS traditionally technical design decisions, not management measures, are considered as mitigation measures. Developing a Social and Environmental Management System is not required under OVOS
- Environmental standards: Direct comparison between Russian and international environmental quality standards is not always possible. Some Russian standards fall below

the practical reporting limit and sometimes exceed the natural background concentrations. They are considered to be overly stringent even by the Russian authorities, yet compliance is still required

As a result of these differences, two separate documents need to be prepared – an internationally accepted ESIA and a Russian OVOS for permitting purposes. Both of these documents should be consistent in main statements and conclusions. This can be achieved by close cooperation between the ESIA and OVOS teams, as they carefully discuss the identified issues.

Ekaterina Vershinina:
evershinina@srk.ru.com

Ekaterina Vershinina



Ekaterina Vershinina started working with SRK in 2005 as an associate and joined the SRK UK office in 2006.

Previously, she worked for the Russian environmental authority and then for an international mining company, which had assets in Siberia and Kamchatka in Russia. Now, as senior environmental specialist in SRK's Moscow office, Ekaterina is working on numerous mining projects throughout Russia, C.I.S and other countries. She is currently engaged in preparing an ESIA for an existing mining client.

Ekaterina Vershinina:
evershinina@srk.ru.com



Chris Dalgliesh

Chris Dalgliesh is a Partner at SRK who runs the Cape Town Environmental Department. He has over 15 years of experience in a range of environmental projects including strategic environmental



Chris Dalgliesh

assessment environmental planning, audits, ESIA's (including port and dredging ESIA's) and economics. His main experience is in ESIA's and he has worked extensively in South Africa, Angola, Nigeria and Suriname, often in the mining and Oil and Gas sectors.

Chris Dalgliesh: cdalgliesh@srk.co.za

Sharon Jones

Sharon Jones is a senior environmental scientist in the Cape Town office, with over 10 years of experience in environmental management, working on a broad range of projects in the Western Cape, as well as in Suriname, South America. Sharon has undertaken a number of EIA's for a variety of activities, including port upgrades, development and dredging, has compiled numerous construction and operational phase EMPs for a range of projects, and has audited compliance with EMPs on a number of sites.



Sharon Jones

Sharon Jones: sjones@srk.co.za

ESIA's for Marine Works



Back hoe dredger at work

Even in the face of potential global recession, the demand for natural resources driven largely by China and India, continues unabated. Demand for raw materials such as iron ore and coal remains buoyant and, in response, mining companies throughout the world have ramped up production. One of the potential bottlenecks in the supply chain is capacity at export ports and terminals, and South Africa is no exception in facing this problem. Environmental approvals are required before port expansions can proceed and, given the sensitive nature of port environments, obtaining such approvals can be a protracted process.

SRK Cape Town has been involved in Environmental and Social Impact Assessments (ESIA's) for a number of port and terminal expansion projects in recent years. Preparing ESIA's for upgrading both the Ports of Cape Town and Saldanha has presented a number of challenges concerning potential impacts on the marine environment. One key component, with the potential to generate significant impacts, is dredging. As the size of vessels being used internationally increases, port upgrades must make allowance for larger vessels, with deeper draughts that in some cases require large turning circles.

As a result, entrance channels, berths and turning circles must be dredged.

Dredging activities in themselves cause impacts, such as:

- Disturbance and destruction of coastal and benthic flora and fauna (i.e. organisms that live on the ocean floor)
- Increases in sediment loads in the water column, with secondary impacts on the marine ecosystem
- Impacts on water quality, which could affect other users in the area (e.g. mariculture industries)
- Impacts associated with blasting (noise, vibrations and shock waves) with effects on marine mammals and birds as well as potential impacts on port and surrounding structures

In addition, a range of potential impacts is associated with the disposal of dredge spoil, which often takes place offshore. These include:

- Disturbance of benthic flora and fauna at and around the disposal site
- Increased sediment loads in the water column, with the effects of smothering benthic organisms, as well as temporarily reducing the amount of light that can penetrate the water column

- Increases in shipping traffic due to interruptions in regular ship movements, as well as increased risks of collisions between barges transporting dredge material and regular shipping traffic
- Possible interference with fishing and navigation
- Potential for dredge material to wash up onshore, if not disposed of at a suitable depth

Port upgrades are usually undertaken in phases, allowing areas of the port to continue operating normally, while other portions are undergoing upgrade. However, impacts are especially significant where ports are located near wetland sites identified by the 1971 Ramsar Convention as needing protection, which occurs surprisingly often: both Cape Town and Saldanha are near Ramsar sites, as is a new project for the expansion of a Namibian port which SRK is working on.

Apart from the ESIA required for upgrades of harbours, offshore disposal of dredged material – “dumping of waste at sea” – requires additional permits, which are often driven by international conventions and protocols.

South Africa is a signatory to the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter, an international treaty that limits the discharge of wastes that are generated on land and disposed of at sea. The London Protocol 1996 is a separate agreement that modernised and updated the 1972 London Convention, and will eventually replace it. South Africa is a Contracting Party to the London Protocol 1996 and must adhere to its stipulations.

Due to the nature of port activities, sediment within and surrounding ports (including approach channels) is highly likely to contain pollutants, e.g. heavy metals and associated compounds, listed as substances whose dumping is restricted. A permit must be obtained to dispose of sediment containing such “restricted” substances. Therefore, the ESIA, which provides much of the information required for the permit, should include detailed marine and sediment studies that aim to:

- Characterise the dredged material to be dumped offshore
- Identify suitable sites for its disposal, taking into consideration:

- The nature of the material to be dumped compared to the nature of the seabed at potential disposal sites
- The water depths, current and wave patterns at disposal sites, which would affect whether the material might be contained, moved around, or potentially washed onshore after dumping
- The benthic flora and fauna that would be disturbed by dumping, and their relevant abundance in the surrounding area
- Model the distribution and movement of sediments in the water column both during dredging activities, and dumping of dredge spoil, to determine the areas to be disturbed and other water users that might be affected

SRK has developed a very good understanding of the obligations imposed by international protocols and the studies required to ensure that permissions and authorisations are expedited. This experience is readily transferable to other coastal waters where the same set of protocols apply, and SRK has recently embarked on similar projects in South America and elsewhere in Africa.

Chris Dalgliesh: cdalgliesh@srk.co.za
Sharon Jones: sjones@srk.co.za



*Port of Saldanha and
associated Iron Ore Terminal*

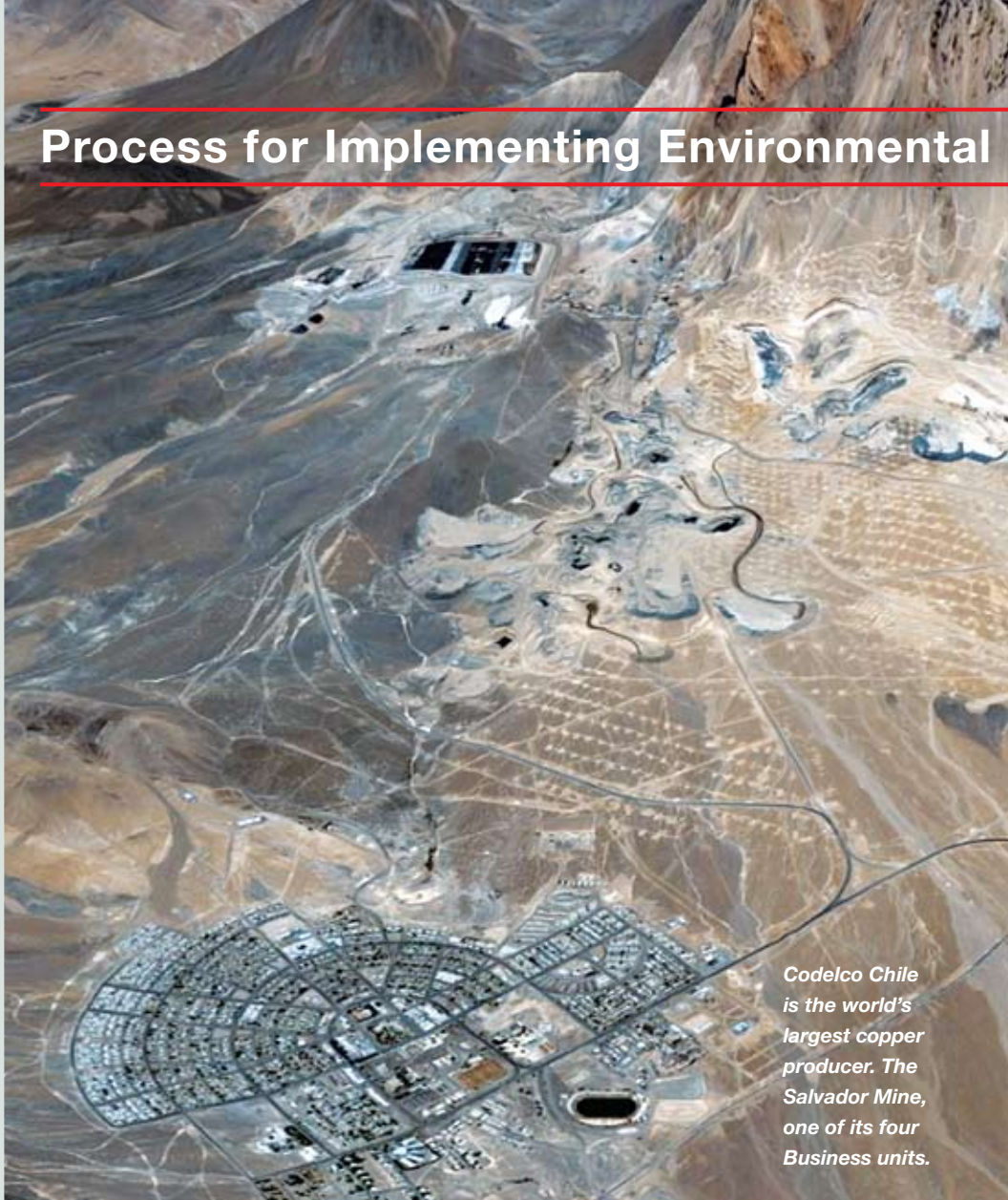
María Inés Vidal

María Inés Vidal is the Principal Environmental Consultant with SRK in Chile. She has 18 years of experience in environmental studies, including Environmental Baseline Studies and Environmental Impact Assessments, mainly for mining and hydraulic projects. She has managed work groups consisting of local and international specialists and liaised with client project leaders and local environmental authorities. As part of her work with EIAs, Ms. Vidal has led the development of social studies, including resettlement and community participation plans. She has experience in environmental auditing and due diligence work, along with the integration of environmental aspects into basic and conceptual engineering for mining projects. Ms Vidal has acquired a broad knowledge of different types of mining environments through her involvement in environmental studies for numerous mining projects in Chile, Peru, Argentina and Bolivia.



María Inés Vidal: mvidal@srk.cl

Process for Implementing Environmental



Codelco Chile is the world's largest copper producer. The Salvador Mine, one of its four Business units.

The magnitude of change in environmental awareness in Chile from the 1990s through the 2000s has been extraordinary. Historically, Chile has grown from a mining country with little consideration for environmental concerns, to a nation where public participation in the environmental process of a mining project can make or break its approval.

SRK has long played a key role in many projects by serving as an environmental consultant in the environmental process, especially for foreign companies with projects in Chile. In addition, the company has enjoyed a long-term relationship with Codelco, the world's largest copper producer and

Chile's largest state-owned mining company. SRK worked closely with two of Codelco's divisions, Andina and El Salvador, over a number of years to assist in implementing their environmental management systems.

Between 1996 and 2005, SRK provided close support and assistance on site to Codelco Andina and its newly formed environmental task force.

Initially, SRK provided guidance to the client's team in understanding environmental legislation and developing the company's internal framework for compliance. Subsequently, SRK's environmental staff were located on site at Andina, where their tasks

Management Systems in Chile

included identifying the processes and regulatory framework that still needed to be implemented at the mine and in its support facilities. Working hand-in-hand with the environmental task leaders, the SRK team developed environmental manuals and procedures, both general and specific, and additional documents related to the environmental management systems.

Codelco Andina and its environmental group were responsible for implementing the new environmental management systems. SRK then returned for a second period at the mine, which consisted of an extensive compliance follow up. On this occasion, SRK's role was specifically to review the systems that had been implemented and support an update of the systems to the standards required by the 2004 version of ISO 14.001 environmental certification.

In between the two periods at Andina, another SRK team moved on site at Codelco's El Salvador Division to assist

with the implementation and certification of El Salvador's environmental management system. In this project, the SRK team worked closely with the client's team to both develop the system's documentation and retrain staff to comply with environmental procedures. The project culminated with the successful certification of the El Salvador Division as an ISO 14.001 certified company.

"The hardest part was to change the mentality of the workers," says Marcela Curotto, Senior Chemical Engineer and a key member of SRK's environmental team. Considerable effort was spent on training so that the staff could integrate the new concepts and embrace them as part of their own process.

Both Codelco divisions remain ISO 14.001 certified.

María Inés Vidal: mvidal@srk.cl
Marcela Curotto: mcurotto@srk.cl

Marcela Curotto

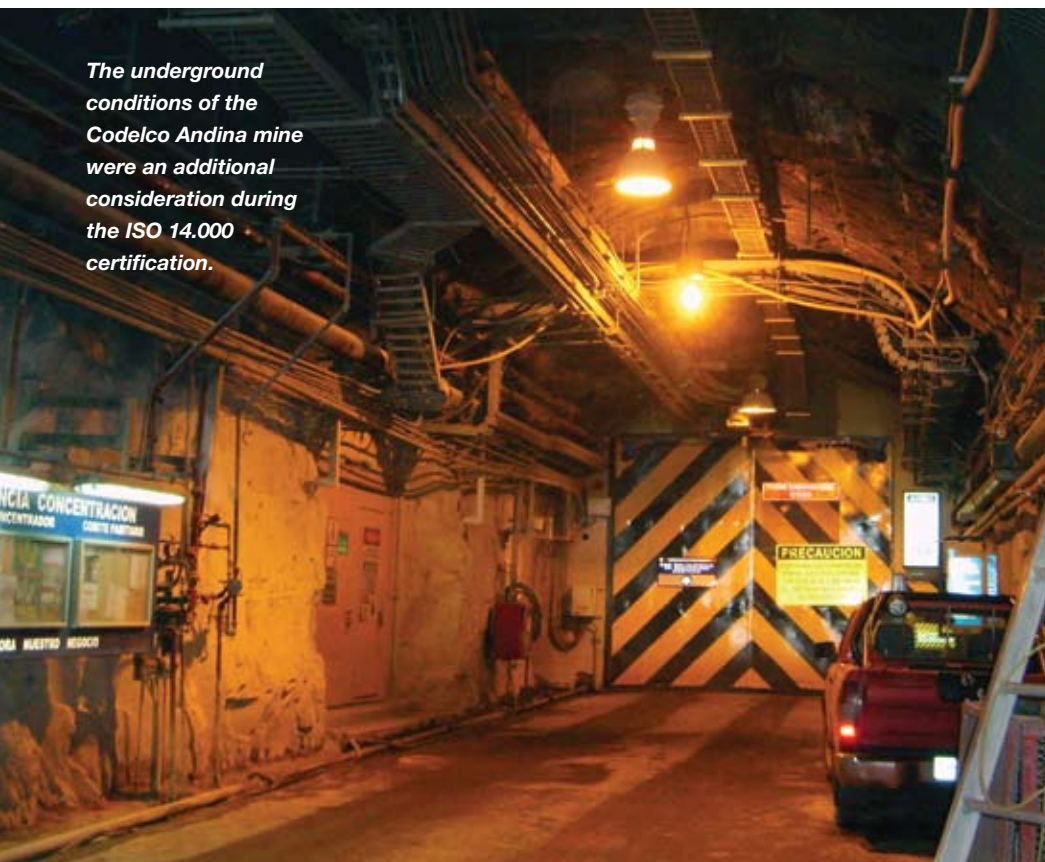
Marcela Curotto is a Chemical Engineer with a degree in Engineering Sciences. She has 11 years of professional experience in environmental fields having participated in mining and agricultural industries and civil works. She has been Project Manager and Specialised Engineer on different environmental studies, and has completed environmental engineering consulting projects, developing environmental solutions for conceptual, basic and detailed engineering projects, as well as environmental impact studies and declarations. Marcela has specialised in the management of solid waste (hazardous and non-hazardous) from mining and metallurgical processes, the characterisation, management and treatment of liquid industrial waste and waste water, and the management, control and evaluation of air quality, environmental legislation and environmental evaluation.



Marcela Curotto

Marcela Curotto: mcurotto@srk.cl

The underground conditions of the Codelco Andina mine were an additional consideration during the ISO 14.000 certification.



William Morrill

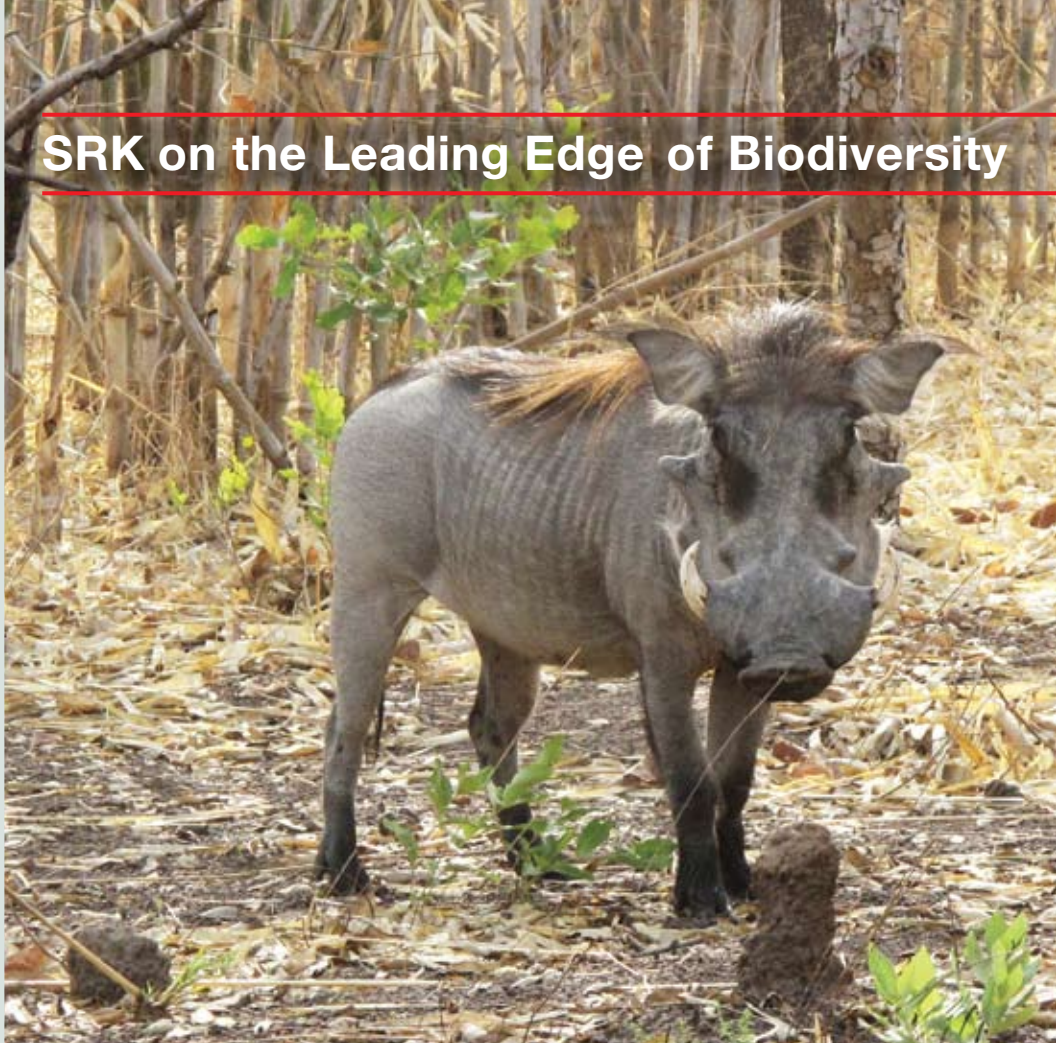
Dr. Bill Morrill joined SRK US in 2005, bringing a varied international background in building and managing multi-disciplinary teams to the work of meeting program goals and completing projects. For over 25 years, he has used his facilitating and interpersonal skills, coupled with his recognised expertise in environmental sciences, to produce results, whether for impact analysis, stakeholder recognition, community development or the sustainable use of natural resources. Most recently, Bill has been an SRK project manager for large, and often complex, projects concerned with environmental and social impact assessments, including closure planning, as well as being a participant in environmental due diligence evaluations. With his experience in biodiversity, ecosystem management, resource economics and sustainable use, he works with SRK's environmental and social impact assessment teams in Africa and Asia as well as North America.

William (Bill) Morrill: wmorrill@srk.com



William Morrill

SRK on the Leading Edge of Biodiversity



A Phacochère (Warthog) in Senegal

SRK is assisting its clients locally and globally with biodiversity evaluations by addressing the impacts of projects on the environment and providing solutions for the issues facing clients.

Biodiversity refers to the varying levels of living organisms, their interrelationships and their effects upon ecological systems. Simply put, biodiversity is comparable to the threads of a garment, each unique and sometimes fragile, which when interwoven form a diverse, interrelated fabric that has strength, sustainability and a high level of usefulness. Preserving biodiversity is keeping the threads and fabric of life intact. Conservation is a cooperative

method of managing biodiversity for the benefit of humans; it uses the fabric while preserving its integrity.

Many of SRK's clients seek to capture resources in remote regions of the world, which naturally host environmentally significant (and often sensitive) plants and animals. Governments, interest groups, stakeholders, as well as involved industry recognise biodiversity impact evaluations globally as a critical component of any project. Lenders, such as the International Finance Corporation, have also expressed concern for the environment in the requirements of their Equator Principles.

SRK's professional staff recognises that the diversity of plants and living organisms and their interrelationships determine the quality of life for humans. We use the best science: first, to avoid impacts; second, to minimise those impacts; next, to restore after an impact; and as a last resort, to create

*True Forester Butterfly,
Sierra Leone*





Erich Heymann

Erich joined SRK Sydney in 2008 as Principal Consultant, Geoenvironmental. He has extensive experience as a consultant and senior manager in the petrochemical and mining industries in the areas of environmental impact and risk assessment, compliance assessment, environmental management systems, corporate sustainable development reporting, public consultation, mine closure planning and due diligence.



Before joining SRK, Erich was the Group Environmental Consultant at Anglo Platinum for over 12 years, where he was responsible for the environmental function of the company across all the mines, concentrators, smelters and metal refineries. He was also responsible for the EIA processes for all expansions and new projects. Prior to that he held various positions in environmental management at Engen Petroleum and worked as a consultant and process engineer in the chemical industry in South Africa. He has a BEng (Chemical Engineering, Extractive Metallurgy) and a MBA from the University of Stellenbosch in South Africa. Erich is registered as a Professional Engineer in South Africa and is a member of the South African Institute for Mining and Metallurgy as well as the South African Institute for Chemical Engineers.

Erich will focus on expanding the geoenvironmental capabilities of SRK in Australasia to include environmental impact assessments and review, environmental due diligence, environmental compliance assessments, environmental management systems and sustainable development reporting.

Erich Heymann: eheymann@srk.com.au

biodiversity offsets for impacts that cannot otherwise be addressed.

SRK has many examples; including using Conservation Development Frameworks at our Port Elizabeth Office in South Africa to designate use zones and special management areas for protection. By guiding developments and facilities, SRK simultaneously meets the community's conservation, economic development, recreation and tourism mandates.

SRK North America is involved in innovative approaches to minimise impacts to Endangered Species Act (ESA) species such as the desert tortoise.

SRK UK and SRK South Africa have been involved in ESIA's for mining, transport and dredging in the undisturbed rainforest of the Guiana Shield. As well, SRK UK undertook an environmental

and social impact assessment (ESIA) for the Malmbjerg Molybdenum Project in Greenland within the Arctic Circle, where breeding and moulting areas for Pink-footed geese and Barnacle geese exist. Both these species have high global conservation value. We are working to recommend appropriate offset areas that help protect these valuable species.

In addition to our expertise in biological resources we have experience in community development, establishing sustainable use programs, assessing markets and creating bio-conservancies, SRK has the ability to meet our client's challenges and provide workable solutions from the arctic to the equator.

William (Bill) Morrill: wmorrill@srk.com

**Snow Buntings,
Northern Russia**



Don Hovdebo

As a Principal Consultant in SRK's Saskatoon office, Don Hovdebo has successfully concluded an extensive list of projects with a particular focus on the uranium and gold mining industry in western and northern Canada.

The projects range from collecting required baseline environmental and socio-economic data, preparing permit applications, environmental protection plans, environmental management systems, and environmental impact assessments to conducting audits and preparing annual compliance reports.

Don served as an advisor to a federal/provincial public review panel on environmental assessment that was appointed to review the development of 9 uranium deposits in northern Saskatchewan. In addition, he led a team of 5 government departments in developing a policy and management framework for the institutional control of mineral properties, including nuclear sites, that have been successfully decommissioned and reached a closed site status.

Don Hovdebo: dhovdebo@srk.com



Case Study from the Land Use Planning Sector,

When development policies, plans, programs and other strategic actions are implemented, varied economic, social and environmental effects result, some of which are unforeseen. In order to identify, assess and address undesirable negative impacts and maximise positive impacts before such initiatives are carried out, it is useful to undertake Strategic Environmental Assessments (SEAs) to inform and guide decision-making.

An SEA process extends the aims and principles of an Environmental Impact Assessment (EIA) for a specific project upstream, into the decision-making process, where major alternatives can still be identified and adopted.

SRK Consulting recently completed an SEA of the draft Spatial Development Framework (SDF) for the Nelson Mandela Bay Municipality in the Eastern

Cape Province, South Africa. The project included a revision of the conservation component of the Metropolitan Open Space System (MOSS) for the municipal area. The SEA process achieved the following objectives:

- Identified opportunities and constraints for various land uses, including agriculture, housing, biodiversity conservation, service infrastructure and industry, among others
- Assessed potential conflicts between the various land uses
- Updated and improved the Conservation Assessment and Plan for the municipal area by applying systematic conservation planning principles, namely: representation, complementarity and efficiency. Using C-Plan, a computer-based decision-support system (Pressey et al 1995), it was possible to design a conservation

The southern coastline of Nelson Mandela Bay is of high biodiversity conservation



in Nelson Mandela Bay, South Africa

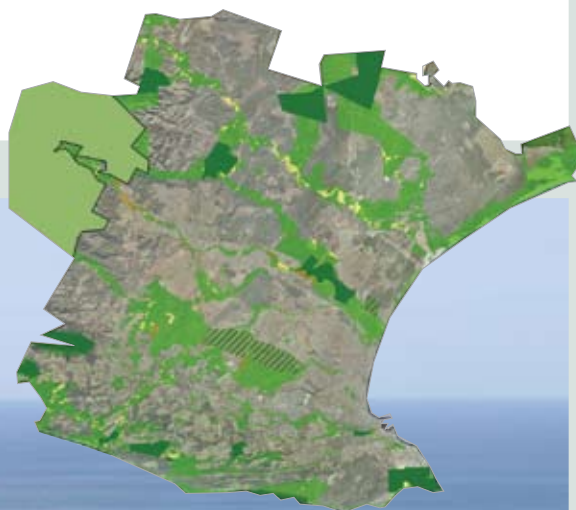
system, which will enable the long-term persistence of key ecological processes, habitats and species of special concern, but also be in least conflict with development objectives. Targets for habitats were determined using species-area relationship curves, targets for ecological processes derived from national targets and the latest methods in Freshwater Biodiversity Conservation Assessment, and targets for species of special concern were set to facilitate the protection of at least the single largest population of each species

- Identified infrastructure planning gaps, as well as opportunities for improved efficiency
- Made necessary amendments to the SDF plan to reconcile conflicts and improve integration

- Compiled implementation guidelines to further promote sustainable planning and development

The integrated manner in which the SDF and conservation plan were simultaneously assessed and revised provided the ideal opportunity to identify options to reconcile land use conflicts and achieve desirable outcomes for the city's land use planners, conservation practitioners, and political decision-makers. This integrated product is expected to greatly assist in the achievement of service delivery and land development targets and sustainability development.

For further information regarding SRK's services in SEAs and conservation planning, contact Warrick Stewart wstewart@srk.co.za.



The conservation system developed for the Nelson Mandela Bay municipal area, Cape Floristic Region, South Africa

and ecotourism importance

Warrick Stewart

Warrick Stewart (MSc, MSAPI) is a senior environmental scientist based in SRK's Port Elizabeth office, South Africa. He has eight years of experience in project management, systematic conservation planning, conservation strategy development, environmental management, ecological management, public participation facilitation, land-use planning and management, and conservation and land-use training and skills development.



Warrick Stewart

Warrick Stewart: wstewart@srk.co.za

Wouter Jordaan

Wouter Jordaan is an Environmental Scientist in SRK's Durban office; he holds the degree of Bachelor of Science in Earth Sciences and a BSc (Hons) degree in Geography and Environmental Management. He has 6 years of experience in undertaking and managing Environmental Impact Assessments and environmental audits, mainly associated with industrial developments, bulk liquid handling facilities in harbors, long-distance electricity distribution projects, and the oil and petroleum industry.



Wouter Jordaan

In addition, Wouter has 9 years of experience in taking on projects that require the specialised use of Geographic Information Systems (GIS), including but not limited to environmental screening, environmental planning, location strategy, environmental constraint analysis, Visual Impact Assessment (VIA), crime prevention through environmental design (CPTED), and Disaster Management Risk Assessment.

Wouter Jordaan: wjordaan@srk.co.za

Application of GIS in the EIA Process

The application of Geographic Information Systems (GIS) in the Environmental Impact Assessment (EIA) process has gained substantial momentum over the past few years. Even so, the misconception exists that GIS involves mapping only, and many companies are still unaware of the robust solutions and cost savings this tool has to offer, when correctly implemented.

The SRK Natal team has been at the forefront of developing the applied specialist skills required to integrate the use of GIS as

a spatial information, decision-making tool in EIAs internationally. The focus here is on applied integration, as it requires the person undertaking the analysis to understand the project, the potential environmental issues associated with it, and how the GIS can assist in obtaining the desired results. Accessibility to good quality, up-to-date spatial information has improved significantly and data is becoming more accurate. Inferior quality spatial data still exists, however, and it is essential that the

GIS user is familiar with the quality of the spatial data prior to use.

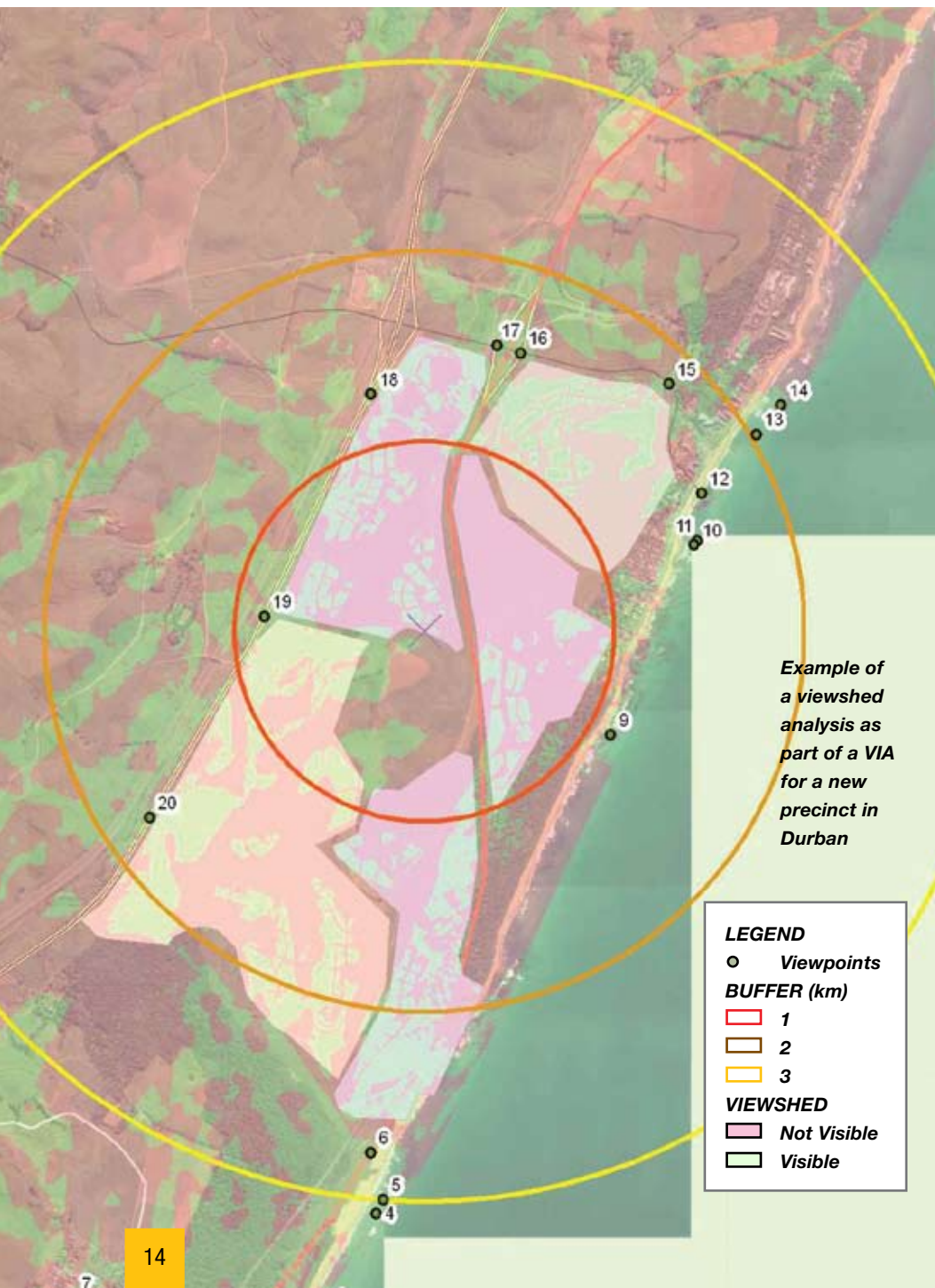
Environmental consultants agree that analyzing developments in their spatial context during the initial stages of the EIA process, in fact, expedites the identification of potential aspects and impacts that may have to be assessed while the process goes on. Potential risk factors may be identified upfront and presented to the client to assess the viability of proceeding with the project. This approach reduces timeframes and usually presents the client with a cost saving.

In addition to identifying and analyzing potential impacts, a GIS is also a powerful spatial planning tool. For example, a GIS is often used to identify sites suitable for establishing cemeteries and waste disposal facilities. Overlaying several spatial datasets (soil type, vegetation, ground and surface water, geology etc.), with specific assessment criteria for each, can produce a map indicating suitable and unsuitable areas. SRK is currently undertaking a similar exercise identifying potential corridors suitable for establishing a 250-kilometer section of powerline on the Makhathini Flats in northern KwaZulu-Natal. The powerline will traverse areas of pristine and highly protected sand forest species. In this instance a GIS is being used to calculate the shortest possible route, taking into consideration the environmental issues in the area. This method has already led to time savings on the project and has achieved a significant cost saving for the client.

SRK uses GIS applications in nearly all specialist studies ranging from air quality to wetland delineation as an integral part of the EIA process. In particular, the SRK Natal office has continued to develop Visual Impact Assessments (VIAs) for the past five years.

The use of GIS in EIAs will continue to evolve as dealing with global warming becomes a worldwide priority. In future, even more careful spatial planning will be required to meet the requirements of authorities and governments and to ensure sustainable development.

Wouter Jordaan: wjordan@srk.co.za



Example of a viewshed analysis as part of a VIA for a new precinct in Durban

LEGEND	
●	Viewpoints
BUFFER (km)	
1	1
2	2
3	3
VIEWSHED	
Not Visible	Not Visible
Visible	Visible

ESIA and Risk Assessment

Defining the significance of potential impacts in an Environmental and Social Impact Assessment (ESIA) is compromised by a poor understanding of what is likely to happen. The likelihood that an impact will be realised is not absolute; many factors ranging from inherent design features to operational management actions can alter the probability of negative impacts being realised. Being aware of the variable likelihood of potential impacts creates a significant opportunity for mines to save money and operate more efficiently.

Although many mines prepare Hazard Identification Studies (HAZIDS) and HAZOPS (Hazard and Operability Studies), they are rarely used to support the ESIA process. This leads to less than optimal mine design, unnecessarily stringent approval conditions and, ultimately, to less effective environmental management during construction, operation and closure. Risk assessment cannot replace good ESIA, but it can make impact assessments, and the Environmental Management Systems (EMS) developed, significantly more effective. Risk assessment provides these key indicators:

- Identifies hazards which can potentially lead to consequences (impacts) with a defined likelihood of occurring (realised risk)
- Quantifies risks to alert management to allocate resources based on priority

Since most engineering designs are made to predefined standards, which themselves are based on levels of confidence or risk assessment, the risks identified in the engineering process are readily available for use in the ESIA. Knowing how likely

a consequence might be provides impact assessors and engineers with the opportunity to refine designs to reduce risk to a level which is either tolerable or acceptable. Risk assessment matrices frequently include a financial calibration axis, which allows the cost of environmental impacts to be quantified. Knowing how much the potential environmental impact will cost makes it possible to set priorities, allowing operational management to make financial provision to avert or minimise negative consequences.

The largest challenge in using risk assessment as a support to ESIA is making sure ESIA practitioners know how to use the information and regulators know how to interpret it. SRK is increasingly using risk assessment on projects and working with regulators to define the level of impact, which can be tolerated and how best to monitor and manage it on an ongoing basis. Development without impacts is impossible, but with ESIA and risk assessment, operational management can carefully manage and constrain impacts to a tolerable level.

By assessing the impacts in terms that engineers can relate to, the environmental consequences are more likely to be averted as the disconnect that frequently occurs between the disciplines is reduced. SRK is currently applying this methodology on two proposed new mine developments, one in a drought-prone region of West Africa and one in the frozen tundra of northern Canada.

Mark Vendrig: mvendrig@srk.com

Mark Vendrig

Mark Vendrig, MSc, University of the Witwatersrand, is a Principal Consultant in SRK's Vancouver office with 17 years of experience working in operations and as a consultant in the exploration, mining and oil and gas

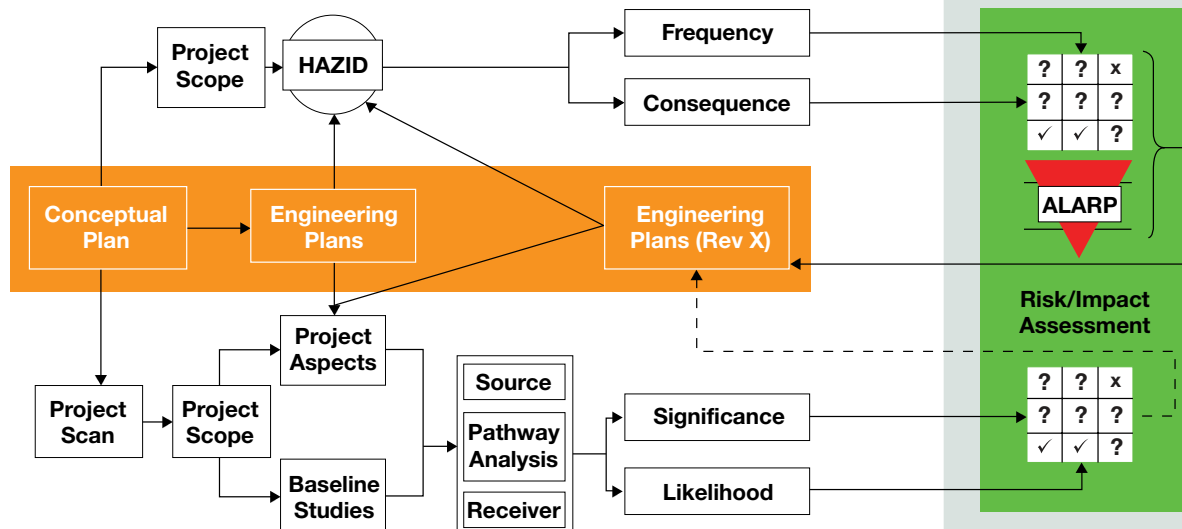


Mark Vendrig

industries. He specialises in environmental and social impact assessment (ESIA), public consultation, risk assessment, development and auditing of integrated health, safety and environmental management systems, climate change strategy, and carbon capture and storage developments.

Mark has developed risk-based ESIA methodologies for the International Energy Agency and governments in Europe, the Middle East and Africa. The projects required a blending of engineering, environmental and risk disciplines to create ESIA processes, which operate efficiently for developers and withstand the close scrutiny of regulators and pressure groups. Mark has trained various governments and companies in risk and environmental impact assessment methodologies to help implement and manage more refined ESIA processes. Recently he has been working on ESIA's for the proposed Pebble mine in Alaska, Copper Mountain mine in BC, Canada, Newmont's exploration and proposed mining activities in Nunavut, Canada, and Oromin's exploration and potential mine in Senegal.

Mark Vendrig: mvendrig@srk.com



Assessing GHGs and Global Climate Change in EIAs

The issue of global climate change remains a highly contentious subject for both layman and world leaders alike. However, regardless of your social, political or scientific position on the root causes, many governments have identified global warming a major threat to the planet in the 21st Century.

As a result, considerable interest has been raised in energy consumption/conservation, emissions and inventory, "green" design, sustainability, environmental management, rehabilitation, and corporate responsibility. Government agencies, financial institutions, and even private corporations are adopting new policies and guidance as part of their project development and approval procedures. In this new arena, the work of assessing and managing "greenhouse gas" (GHG) emissions and potential climate change has become a component of environmental impact assessments, particularly for larger-scale projects such as mine development.

Even the United States, which has yet to ratify its signing of the Kyoto Protocol, has implemented guidance on incorporating the consideration of climate change in planning and National Environmental Policy Act documents. Agencies within the U.S. Department of the Interior, including the Bureau of Land Management, Forest Service, and Fish & Wildlife Service, must now consider GHG emissions in the potential scale of projects, acknowledging the possible contributions of manmade pollutants to global climate change.

New regulations and standards for assessing GHG emissions need to be considered during project development. However, quantifying and projecting the impacts of GHG emissions is not a simple task, and definitive answers remain elusive. A number of carbon dioxide (CO₂) and GHG emissions calculators are currently available online. One of the more common

In one recent example of implementing these new policies and procedures, SRK (UK) calculated GHG emissions as part of an assessment of a new mining project in Greenland for one of its Canadian clients. For the project, SRK was required to quantify the emission of CO₂ from equipment and facilities, and assess the calculated levels against thresholds established by the International Finance Corporation (IFC) under *Performance Standard 3 for Pollution Prevention and Abatement* to determine the likely increase to Greenland's current emission levels. In the final assessment, this particular issue rated as the most significant impact because it appeared that the project could potentially increase Greenland's GHG emissions by 35 percent over current estimates.

This conclusion, which is characterised by all of the uncertainty and variability in assessing global climate change, including factors such as population change, economic change, technological development and other aspects of future human activity, emphasises the need for a better understanding of the real impact of projects in global terms. SRK is poised to meet the challenges of assessing GHG emissions for our world-wide mining clients.

Mark Willow: mwillow@srk.com

methods uses typical combustion product emission factors, which are based on test data for standardised equipment and operations. Another approach follows the *Greenhouse Gas Protocol* (GHG Protocol), an international accounting tool issued by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) that provides step-by-step guidance for governments and businesses to quantify and thereby manage GHG emissions.

Environmental and Safety Management Systems

Over the past decade, Environmental and Safety Management Systems (EMS/ SMS) have increasingly been employed to track and enhance performance within a wide range of both private and public sector institutions. These organisations include small, medium and large companies involved in renewable and non-renewable resources. Organisations increasingly want to improve their corporate responsibility performance and return greater value to shareholders. SRK has been developing effective EMS systems which serve as a tool to improve environmental performance by providing a systematic way of managing an organisation's environmental affairs, such as planning, permitting, implementing, monitoring, reviewing, and reporting enhanced processes.

The SRK approach to management plan and system development is based on a partnership with clients to capture knowledge and nurture ownership of pragmatic implementable systems. Often, the ESIA is developed for permitting and forgotten by organisations as they move through development to operation; yet, by combining ESIA with risk assessment, there is a solid basis for good EMS development. Impact assessment reveals the likely consequences of plans while risk assessment tells us how likely they are to occur. This allows management to prioritise their response and creates a culture of efficient resource use for managing potential environmental and social impacts. Potentially, clients can realise significant construction and operational savings by knowing where they need to focus their energy, activities and capital.

The EMS can result in both business and environmental benefits, such as:

- Risk identification, mitigation planning and enhanced compliance
- Improved environmental performance and certification to standards such as ISO 14000

- Pollution prevention and conservation of resources
- Increased efficiency and cost reduction
- Attraction of potential new customers and wider market access
- Enhanced image with the public, regulators, lenders, investors
- Improved employee awareness of environmental issues and responsibilities
- Results eligible for recognition and incentive programs, such as the EPA Performance Track Program
- Enhanced employee morale and possibly enhanced recruitment of new employees

An effective EMS developed with SRK support is flexible and does not require the organisation to "retool". SRK first creates management "buy in" and a Policy Statement. Then, working with operators and engineers, SRK identifies significant environmental impacts, applies risk assessment to prioritise their importance and develops objectives, targets and an implementation strategy. SRK supports organisational development, ownership and empowerment by providing training and regular audits to inform management's review of the EMS in an effort to achieve ongoing improvement.

The EMS covers existing activities and builds immediate and long-term plans to secure and improve performance. SRK is currently working with Newmont in the development of risk-based management plans that can be incorporated into an overall Environmental and Safety Management System. SRK is also assisting Oromin with environmental and safety management planning. The systems developed improve clients' operational, environmental, business and corporate performance.

Don Hovdebo: dhovdebo@srk.com

Mark Vendrig: mvendrig@srk.com

Mark Willow

Mark Willow, MSc, CEM, has been an Environmental Scientist with SRK for over 13 years and is currently a Principal Consultant in the U.S.

He has a Bachelor's degree in fisheries and wildlife management from the University of Missouri and a Master's degree in environmental science and engineering from the Colorado School of Mines. As an Environmental Manager, Mark has been certified by the State of Nevada to handle the management of hazardous materials, investigate the potential release of hazardous substances, and respond to the cleanup and remediation of contaminated soil or water.

Mark focuses primarily on environmental permitting and impact assessment, including site characterisation, baseline data collection, closure planning, pit lake studies, and compliance auditing. He draws upon a diverse background for assessing ecological risks associated with mining projects. Building on these skills, Mark brings a unique perspective to environmental due diligence and competent person evaluations of developmental and operational mining projects to our clients throughout the world.

Mark Willow: mwillow@srk.com



Donald Gibson

Donald Gibson is an Associate and Principal in the environmental practice of SRK Consulting. His consulting experience lies mainly in the field of sustainable development policy, planning, strategy and reporting in the South African public sector. Donald is also the Director of the Transnet Programme in Sustainable Development at the Gordon Institute of Business Science, University of Pretoria, where he lectures and researches on corporate sustainability and corporate social responsibility. He holds a Bachelor of Science in Agriculture degree, and a Master of Science degree in Resource Conservation Biology from the University of the Witwatersrand.

Donald Gibson: dgibson@srk.co.za



Influencing Sustainable Development Policy and Strategy in South Africa



Environmental issues and others that influence the sustainability of development and progress in emerging markets are often perceived as peripheral. As is the case in South Africa, a lack of awareness and understanding about the interdependence of society, the economy and the environment is striking. Environmental and social practitioners, therefore, often question whether their work is of value and has real impact.

While SRK's environmental practice has been engaging in public sector policy and planning for a number of years, two recent projects undertaken by SRK's environmental business unit in Johannesburg stand out as

having contributed substantially to the national debate on sustainable development.

The first involved compiling and publishing a book on the environmental outlook for South Africa. On behalf of the national

Department of Environmental Affairs and Tourism (DEAT), SRK commissioned 12 background papers by South Africa's leading specialists on subjects ranging from climate change and corporate governance, to biodiversity, water, economics, waste management and

energy. SRK edited and integrated the papers into a 372-page book, called the South Africa Environment Outlook, that reflects on past and current trends in the environment and development, but, more importantly, presents a rather grim 'current future' scenario and four alternative future scenarios that provide a framework for decision making. The book serves as a strategic planning tool for politicians and government, a guide for academics, and a tool to raise the awareness of the general public. Electronic versions of the book can be downloaded from: www.environment.gov.za.

In the second project, closely linked to the first, SRK was appointed as a policy advisor to the DEAT, and was responsible, in part, for compiling the National Framework for Sustainable Development, which was approved by Cabinet in 2008. This framework sets the basis for future policy, strategy and action for enhancing progress towards sustainable development. Part of the research conducted for the environmental outlook was used as the basis for much of the framework.

SRK believes that these projects have contributed significantly to the current state of knowledge on the centrality of environmental issues to social and economic progress in South Africa.

Donald Gibson: dgibson@srk.co.za



Suriname River Dredging Project

The Maritime Authority Suriname (MAS) and the project financing consortium (BMS, Suralco, Staatsoile) commissioned SRK Consulting (UK) Ltd to conduct an Environmental and Social Impact Assessment (ESIA) for dredging the Suriname River in South America.

The project area covered a 90km stretch of the lower section of the Suriname River estuary that acts as a major transport link for connecting the industrial centres of Paranam and Paramaribo with the Atlantic Ocean. The capital, Paramaribo is home to approximately 50% of Suriname's population.

The aim of the project was to undertake a capital dredging program to last approximately 9-12 months and remove 10 – 11Mm³ of sediment. It was designed to alter the existing navigation channel and create a larger, more-defined channel to allow an increase in the operational draught of vessels and increase the cargo efficiency

(imports and exports) from Suriname. Over a period of 10 years, the project also involved a maintenance dredging program and ocean and in-river disposal of sediments, including the creation of a habitat island in the mouth of the river.

Planning for the Suriname River Dredging Project was carried out in line with Suriname legislation and international standards and guidelines, such as the Equator Principles, International Finance Corporation (IFC) Performance Standards and IFC Environmental Health and Safety (EHS) Guidelines. Other international guidelines specific to dredging, such as the Australian National Ocean Disposal Guidelines (ANODG) for Dredged Material (2002), were considered, along with the corporate standards of BHP Billiton.

The biophysical and socio-economic baseline studies, as well as key stakeholder consultations, demonstrated that the Suriname River is a very diverse

and biologically-rich aquatic environment with great importance both for the functioning of the natural environment and the sustainability of the economic livelihood of local inhabitants. The project presented many challenges and potential impacts with the main ones being:

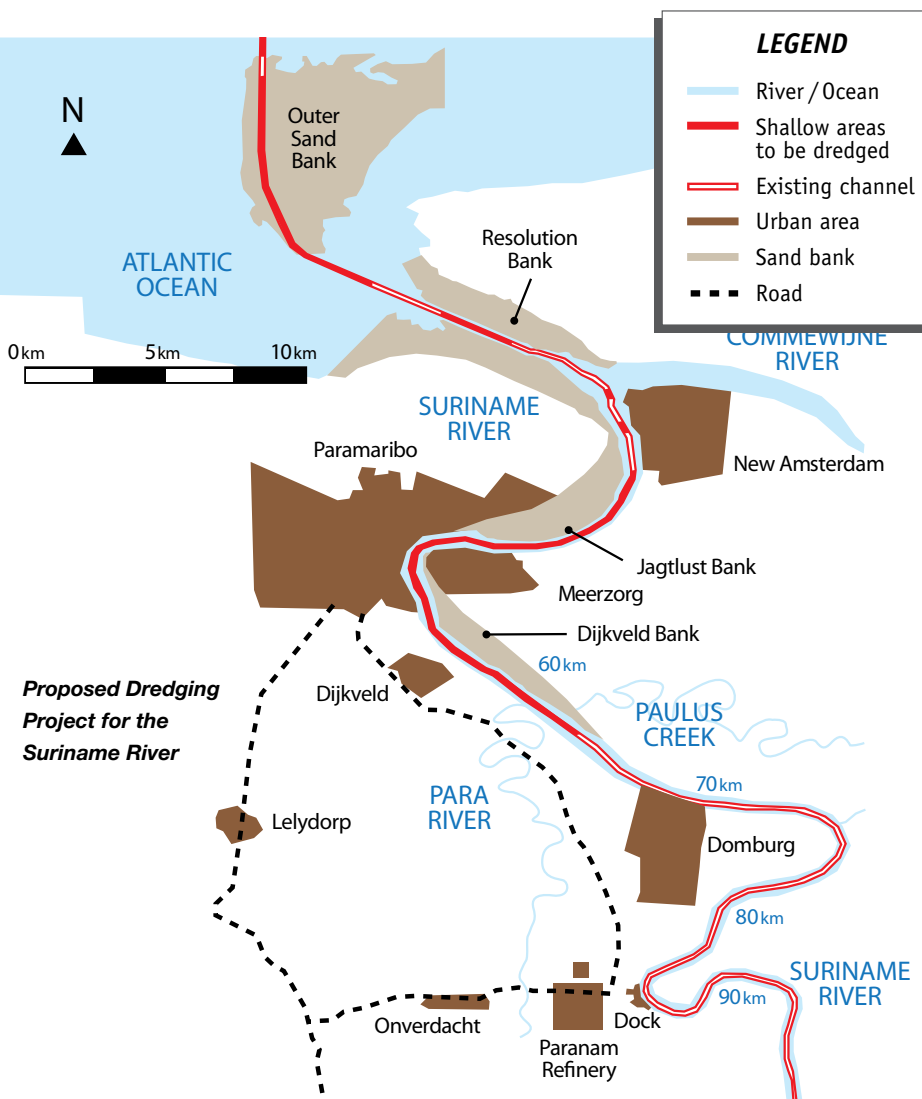
- Changes to the aquatic environment caused by disturbance to fish habitats from the removal, suspension and settling of sediments due to capital dredging and disposal operations
- Effects on fishermen livelihoods due to their restricted access to fishing grounds during dredging, and changes in the fish species and populations, resulting in a reduction in fish catches and income
- The potential impacts to the emerging eco-tourism industry in Suriname from the disturbance of aquatic species that were of conservation significance, such as the river dolphins and sea turtles

Due to the importance of the river to residents of Paramaribo, there was significant interest in the project from a diverse range of industries, such as shipping, fishing (large and small scale), tourism, oil and mining, as well as the environmental protection agency (NIMOS) and riverside residents. As a result, significant consultation was undertaken with key stakeholders and the public to explain the project and consider the views of the government, industry and the community.

Generally, the project was well received and supported by interested parties as the benefits to the economy in terms of trade were quite significant for the country. One of the main issues centred on paying compensation to Project Affected People (PAP), primarily fishermen, who were likely to have their incomes and livelihoods affected or lost.

The Surinamese Government considered the project and it appeared likely to receive approval. Unfortunately, the decision by BHP Billiton to cease mining operations in Suriname has meant that the main financier and beneficiary of the project no longer has a vested interest in dredging the Suriname River and, therefore, the project is currently no longer under consideration.

Craig Watt: cwatt@srk.co.uk



Craig Watt

Craig Watt, BEng, MPhil., is a Principal Environmental Engineer with over 14 years of experience in Australia, the Middle East, Russia/CIS, South America, Europe, West Africa and the United



Kingdom. He has worked on projects related to mining, dredging, waste, water and wastewater management, contaminated land remediation, hazardous materials identification/management and environmental management systems.

His experience includes project managing Social and Environmental Impact Assessments (ESIA) to meet Equator Principles and IFC Performance Standards for mining and river dredging projects, and independent assessments of mining assets for listings and financing purposes.

For 3 years Craig researched the composting of biodegradable community waste using outdoor windrow techniques to produce material suitable for mine-site rehabilitation.

Craig specialises in project management, environmental, scoping and feasibility studies, environmental impact assessments and audits, management planning, and mine closure costing.

Craig Watt: cwatt@srk.co.uk

Key International Initiatives Influencing

1987



"Our Common Future" introduced the notion of sustainable development

1998



Several International Labour Organization Conventions were recognised as standards of fundamental importance from a human-rights perspective

2001



The International Council on Mining and Metals was formed

2000



The United Nations Millennium Declaration was produced



2001-2002
The Millennium Development Goals were published

1992



The United Nations Conference on Environment and Development produced the Rio Declaration, several important treaties and Agenda 21



The United Nations Global Compact was officially launched

1992-1998

ESIA became established as a key tool for environmental decision making throughout the world



The Voluntary Principles on Security and Human Rights were launched

Key international initiatives that shape current approaches

By means of the 1991 Rio Declaration, ESIA has become established as key for environmental decision making throughout the world. Since that time, there have been remarkable developments in ESIA and there are more still to come, particularly with respect to the social equity dimension of sustainable development.

In the 1990s the main developments were refinements of ESIA procedures and linking ESIA to management systems. The technical content of ESIA was also improved.

The socio-economic elements of the environment have been given more consideration following these international initiatives: the 2000 United Nations Millennium Declaration, the 2000 United Nations Global Compact, the 2002 Global Reporting Initiative, the 2002 Millennium Development Goals, and the 2007 United Nations Declaration on the Rights of Indigenous Peoples. For the mining industry, further impetus has been added by the findings of research projects from 2000 to 2005 – including the Global Mining Initiative; the Mining, Minerals and Sustainable

Approaches to ESIA



Jane Joughin

Jane Joughin, MSc, University of the Witwatersrand, is a Principal Environmental Scientist at SRK's Cardiff office with 18 years of experience in the preparation of environmental and social impact



Jane Joughin

assessments (ESIAs), including management plans, as part of project feasibility studies and applications for environmental authorisations, permits and/or licences. Most of her experience has been gained on large-scale industrial projects, mainly mining and mineral processing projects. The ESIA for these projects have involved meticulous information sharing with regulatory authorities, other interested and affected parties, ESIA specialists, the project proponents and the project engineering teams. Jane's ESIA experience is complemented with work on existing operations, including environmental auditing and due diligence reviews. Jane also has experience working on projects involving the development of new dams, roads and railways.

Jane Joughin: jjoughin@srk.co.uk

to ESIA for mining and mining-related developments

Development Project, and the World Bank Extractive Industries Review.

The International Finance Corporation's Performance Standards reflect these developments and have become the new international benchmark for good practice when ESIA are undertaken. The International Council on Mining and Metals' Sustainable Development Framework also reflects and reinforces these developments.

The scope of socio-economic issues tackled in an ESIA is expanding to cover human rights and labor

standards, particularly those standards considered to be of fundamental importance from a human-rights perspective. In addition, indigenous people require special consideration in modern ESIA's. Furthermore, there is an increasing demand for developers to define the socio-economic benefits of their projects explicitly, and provide convincing evidence that they have planned and provided for the realisation of the benefits.

Jane Joughin: jjoughin@srk.co.uk

SRK China

SRK Consulting China Limited (SRK China) was formed in 2005 to provide technical support for the growing Asian mining and mineral processing industry, with the Beijing office being established to deal with the expansion of demand for SRK services in the China and the Greater Asia Region. SRK China currently employs 30 staff, providing services in geology, mining, mineral processing and environmental management. Increasing demand within China for technical support services for coal mining projects resulted in the establishment of a coal division within SRK China in 2007. In January 2009, SRK China opened an additional office in Nanchang (Jiangxi Province) to meet the growing demand for mine feasibility and design services.

SRK China specialises in Independent Technical Reviews of mining projects for stock exchange listing, acquisition and/or financing. SRK China has completed over 200 Independent Technical Reviews since 2005; approximately 60% of these are reviews of geological/mineral resources, with approximately 40% being full-project, due diligence reviews. SRK China has completed Independent Technical Reviews on a wide range of mineral projects located across China (within 21 provinces and all of the autonomous regions). SRK China has also completed Independent Technical Reviews for international Chinese mining projects and/or investments in Mongolia, Vietnam, Indonesia, Kyrgyzstan, Gabon, Zambia, Australia and Ecuador.

Promoting Compliance in Non-Compliant

The Chinese National environmental regulatory system is administered across the following five levels of government, each of which has specific roles and responsibilities:

- **National** – sets National environmental legislation and undertakes approval of major projects (i.e., projects of national significance)
- **Provincial** – administers most of the National environmental legislation and can set provincial legislation to complement the National legislation
- **City/Prefecture** – undertakes minor project environmental approvals, can be delegated as an operational environmental regulator and a provider of operational environmental monitoring services
- **County/District** – undertakes minor project environmental approvals, can be delegated as an operational environmental regulator and a provider of operational environmental monitoring services

- **Town/Village** – coordinates and resolves issues concerning local community/land compensation issues and generally resolves issues among final land users (key site closure stakeholders)

There is significant involvement in and delegation of environmental regulatory responsibilities between the Provincial Government level and the other three lower levels of Government.

Traditionally, the Chinese mining industry has operated under a culture of environmental non-compliance. It has been culturally acceptable for a mine operator to pay the fine and/or discharge fee for a project's environmental emission, rather than address or resolve the cause of that emission. In addition, another key contributing factor to this culture of environmental non-compliance is that the regulatory advice and enforcement set out in the Chinese National environmental legislation is not consistent with enforcement actions occurring at the Provincial/City/County levels of Government.



Markets – A Chinese Perspective

In a new initiative, the Chinese mining industry is adopting the international technical due diligence process for stock exchange listing, acquisition and/or financing of projects. SRK China has completed over 200 Independent Technical Reviews (ITR) of Chinese mining projects since the process was established in 2005. The environmental component of these ITRs comprises reviews of:

- Project compliance with Chinese National environmental regulatory requirements
- Project conformance to World Bank/ International Finance Corporation (IFC) environmental standards and guidelines, and internationally-recognised environmental management practices

By adopting the international ITR process, the Chinese mining industry can be seen as promoting a culture of environmental compliance. Specifically, the industry's adoption of the international ITR process is producing the following environmental outcomes:

- Demonstrating an industry trend towards adopting international environmental management practices and systems.
- Developing an industry culture of environmental compliance by defining the environmental compliance gap and requiring the production of Action Plans to address identified non-compliance issues
- Increasing the awareness within the industry of international technical and management solutions to environmental issues
- Providing Chinese regulatory feedback by verifying regulatory advice/enforcement at the local level

In the view of SRK China, the adoption of international environmental management practices and systems by the Chinese mining industry is a cultural shift, and the promotion of environmental management awareness within the industry, through the international ITR process, is providing further impetus to change this industry culture.

Andrew Lewis: alewis@srk.cn

Andrew Lewis

Andrew Lewis, BSc Environmental Science, MAusIMM is a Senior Environmental Consultant with SRK China. He has worked extensively in China and Asia for a decade, as well



Andrew Lewis

as on projects in Australia, Africa and South America, on a wide variety of projects ranging from technology transfer to environmental health and safety and community consultation programs. Andrew's current focus is on environmental compliance, permitting, auditing and impact assessments on mining, mineral processing, refining, smelting and infrastructure projects in China and Greater Asia. He also works on environmental management systems, pollution prevention and mitigation, remediation of contaminated sites and site closure planning.

Andrew Lewis: alewis@srk.cn



Acid plant – reprocessing sulphidic tails

Nikki Fisher

Nikki recently joined the environmental department at SRK Johannesburg. She has 3 years of experience in risk assessment, environmental impact assessment and management planning for coal mining projects, in due diligence auditing, and in the development of Environmental Management Frameworks and Strategies covering areas heavily affected by coal mining and agriculture. Her climate change experience lies in monitoring trace gas emissions and regulating mechanisms in natural systems and in studying the feasibility of using the CO₂ by-product from a coal-fed boiler to enhance production and growth in the cut flower industry. Nikki holds a Master of Science degree in Ecology and Environmental Conservation from the University of the Witwatersrand.



Nikki Fisher: nfisher@srk.co.za

Corporate Sustainability in a Carbon-Constrained Economy

The strategies of successful corporations are increasingly being shaped by environmental and social issues. Climate change is a multi-faceted issue and the inclusion of climate change imperatives into full cost accounting and corporate sustainability is rapidly gaining momentum in a world where a shift towards a low-carbon economy is already taking place. Media pressure is high and there is intense political debate in the buildup towards the UN Climate Change Conference, to be held in Copenhagen in December 2009, where the successor to the Kyoto Protocol is likely to be determined.

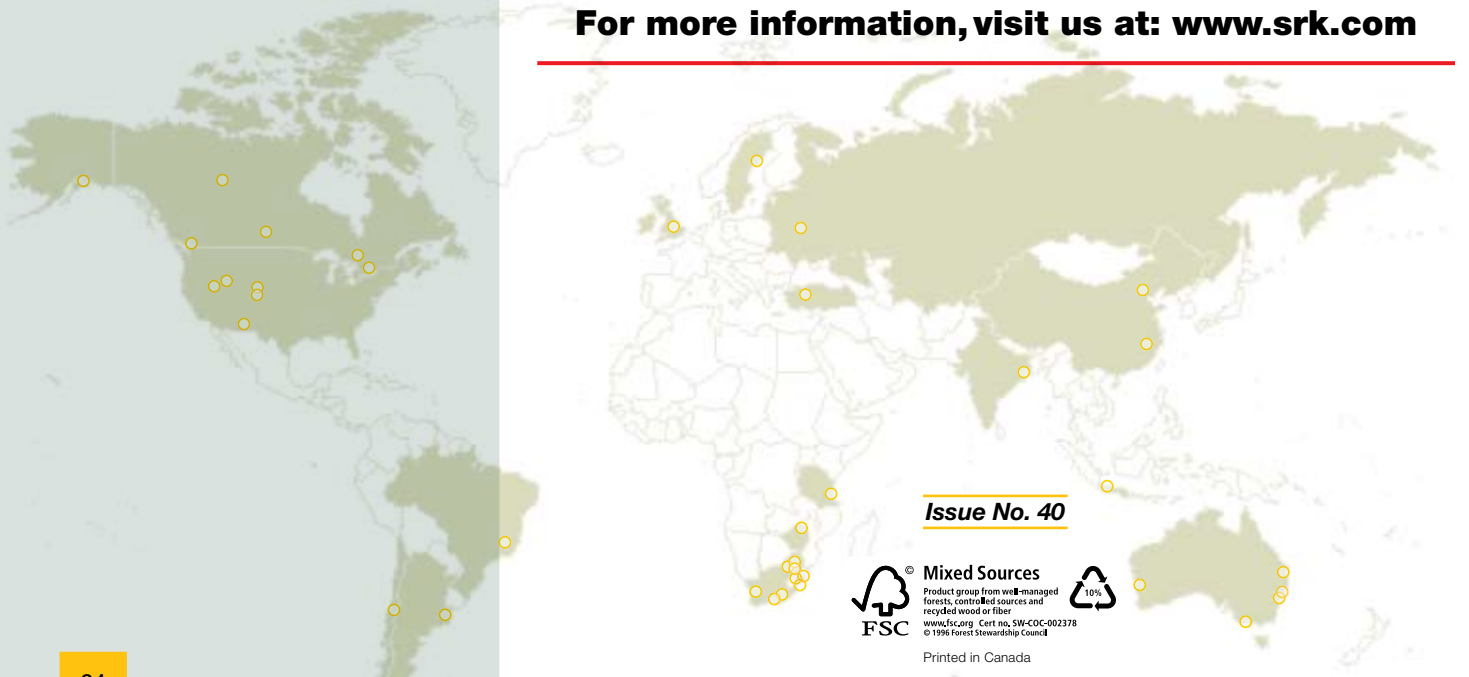
Climate change presents both risks and opportunities for businesses. Reputational and market risks, such as shareholder and consumer expectation; physical risks associated with the impacts on climate, and regulatory risks, such as emission caps and carbon taxes, pose significant threats to carbon-intensive industries. Similarly, considerable opportunities exist and there is strong incentive for companies to develop robust carbon strategies in order to capitalise on the rapidly-growing carbon market and to reduce energy consumption costs. Quantifying the carbon footprint has become a hot topic among senior executives as has the need for strategies to improve energy efficiency,

shift to renewable energy, and develop new low-carbon solutions, which take advantage of such financing mechanisms as the clean development mechanism (CDM). Companies that reposition themselves to take advantage of the opportunities presented by a low-carbon future stand to gain competitive advantage, exceed shareholder expectations, and project a positive environmental image.

SRK, globally, has experience and currently provides climate change-related services that range from carbon accounting and greenhouse gas inventory development, to strategy development and mitigation and adaptation planning, as well as disaster management planning. Carbon accounting and assessing the impact of climate change already constitute a component of EIAs in many countries, and the importance of including climate change risk and carbon liability assessment in due diligence work is increasingly being recognised. SRK has both the technical and project management skills required for CDM project identification and development. The firm also boasts a cross-disciplinary approach to climate change, placing SRK as a leader in carbon consulting.

Nikki Fisher: nfisher@srk.co.za

For more information, visit us at: www.srk.com



Issue No. 40



Mixed Sources
Product group from well-managed
forests, controlled sources and
recycled wood or fiber
www.fsc.org Cert no. SW-COC-002378
© 1996 Forest Stewardship Council



Printed in Canada