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Amnesty International

An Adivasi woman carrying a pot of water on her head in front of the Vedanta refinery in Lanjigarh.

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An Adivasi woman carrying a pot of water on her head in front of the Vedanta refinery in Lanjigarh.
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Executive summary

INTRODUCTION

This report highlights deficiencies in the Environmental Impact Assessments (EIAs) undertaken by Vedanta Resources Plc for its proposed bauxite mine in Niyamgiri, Orissa, its alumina refinery in Lanjigarh, Orissa, and the proposed expansion of this refinery.

Vedanta Resources Plc is a UK-registered mining company with strong Indian connections. It owns and controls subsidiaries in India that are engaged in mining and refining activities in the state of Orissa. The company has come under growing national and international scrutiny in recent years, owing to allegations of human rights abuses associated with these operations. Throughout this report 'Vedanta' is used to refer to the corporate group, including the entities operating in Orissa under the effective management control of Vedanta Resources Plc.

Documented abuses of human rights

Amnesty International published a report in February 2010 documenting human rights abuses and demonstrating that plans to mine bauxite and expand the refinery in Orissa are likely to have devastating effects on local communities.[1] This report, based on research conducted over two years and including several field visits, concluded that:

- Pollution associated with Vedanta Aluminium's refinery has seriously undermined human rights, including the right to health and a healthy environment, and the right to water.
- The proposed bauxite mining project threatens the survival of a protected Indigenous community.
- India's governmental bodies have failed to respect and protect the human rights of communities as required under international human rights law.
- The companies involved in the mine and refinery projects have ignored community concerns, breached state and national regulatory frameworks and failed to adhere to accepted international standards and principles in relation to the human rights impact of business.

The failure to ensure proper consultation with the affected communities included serious deficiencies in the public hearings associated with the EIA process. This, combined with inadequate information about the company's plans, has raised fears that the company is seeking to avoid legitimate scrutiny of its operations in Orissa. Many non-governmental organisations (NGOs) besides Amnesty International have raised concerns about Vedanta's operations in Orissa. Survival International, which is particularly concerned about the rights of the Indigenous Dongria Kondh community in the proposed mining area, made a complaint to the UK National Contact Point (NCP).[2] On 25 September 2009, the NCP released its findings, concluding that Vedanta Resources had 'failed to engage the Dongria Kondh in adequate and timely consultations about construction of the mine or to use other mechanisms to assess the implications of its activities on the community such as indigenous or human rights impact assessment.'[3] According to the NCP, it 'has not found any evidence, either in documentary form or video recordings, that confirms that the Dongria Kondh were consulted … and that their views had been collected and taken into account.'[4]

1 Amnesty International, February 2010, *Don't Mine us out of Existence: Bauxite Mine and Refinery Devastate Lives in India*, AI Index: ASA 20/001/2010.

2 The UK authority responsible for examining breaches of the Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises.

3 Final Statement by the UK National Contact Point for the OECD Guidelines for Multinational Enterprises, 25 September 2009, p 1. www.oecd.org/dataoecd/49/16/43884129.pdf

4 *Ibid*, para 49.

In response to such serious concerns about the company's operations, a number of shareholders, including the Norwegian government[5] and the Church of England,[6] divested their holdings in Vedanta. Other investors held meetings with the company's chairman, Anil Agarwal, and other board members, urging them to improve the way the company governs its human rights and environmental impacts.

Ministerial rejection of projects and Vedanta's challenge

In August 2010, following an expert committee report on Vedanta's compliance with India's regulatory requirements commissioned by the Ministry of Environment and Forests (MoEF), the Ministry decided to reject Vedanta's proposed mine and also suspend the clearance process for the alumina refinery expansion. Vedanta Aluminium, however, has challenged the Ministry's decision to suspend the clearance process in the High Court of Orissa. The Orissa Mining Corporation, a joint venture partner of Vedanta, has also challenged the Ministry's rejection of the mining proposal in the Supreme Court of India.

In March 2011 the MoEF's expert committee for the environmental appraisal of mining projects met to consider whether Vedanta's EIAs for the proposed mine in Niyamgiri were an adequate basis for granting environmental clearance. The committee concluded that the two EIAs conducted by Vedanta met the necessary requirements and that the company had in place an effective environmental management plan.[7] The MoEF subsequently issued a press release distancing itself from these findings, pointing out that it is not bound by them and that the question of granting environmental clearance does not arise because it depends on forest clearance[8] which the MoEF has rejected outright.[9]

Given the conflicting perspectives and the two legal challenges, a close scrutiny of Vedanta's EIAs and the degree to which they comply with India's regulatory requirements is vital. Otherwise there is a risk of licences being granted on the basis of flawed processes and deficient baseline data.

An independent review

In September 2010 Vedanta's bank lenders commissioned an independent review of the company's approach to sustainable development.[10] The findings of this review, drawing on evidence from the Lanjigarh refinery, highlight systemic failings in Vedanta's social and environmental stewardship, including deficiencies in the company's EIAs for the Lanjigarh refinery. These criticisms are particularly significant in the light of Vedanta's repeated claims that it performs to the highest environmental standards and that it always complies with regulatory requirements.[11]

The regulatory process

The government of India has duties under international law to protect the human rights of its people: it is obliged to take steps to ensure that companies operating in India do not breach those rights. India should have in place laws and regulatory systems to prevent corporations abusing human rights, and to hold companies accountable for their actions. In particular, India should ensure that licences to carry out mineral and metal exploration, and to construct and operate mines and refineries, are contingent on certain standards of conduct being met.

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5 Council on Ethics to the Government's Pension Fund, 15 May 2007, *Recommendations to the Norwegian Ministry of Finance*. www.regjeringen.no/upload/FIN/Statens%20pensjonsfond/Recommendation_Vedanta.pdf

6 'Church of England Disinvests from Vedanta Resources plc', 5 February 2010. www.cofe.anglican.org/news/pr2010.html

7 Summary record of the 13th meeting of Expert Appraisal Committee for environmental appraisal of mining projects constituted under EIA Notification 2006, 23-25 March 2011.

8 India's environmental and forest laws make it mandatory for companies to obtain prior clearances for new industrial projects involving major changes in land use patterns. The MoEF evaluates applications and grants clearances. The Forest Conservation Act, 1980, regulates forest clearances, while regulation under the 1986 Environment (Protection) Act governs environmental clearances.

9 MoEF Press Note, 2 July 2011, *Reports on Environmental Clearance being Granted to Vedanta at Niyamgiri Incorrect*.

10 Scott Wilson, 17 November 2010, *Vedanta Resources plc and Lanjigarh Refinery: Independent Review of Sustainability Policies and Practices*. http://csr.vedantaresources.com/scottwilson.html

11 See Chapter 2.3 of the main report, *Vedanta's claims about its environmental standards*.

One key measure the Indian government has adopted as part of its environmental regulatory process is an environmental approval mechanism. This requires EIAs to be carried out for projects and to be shared with affected communities at public hearings on or close to the project site.[12]

Vedanta's EIAs

The primary purpose of EIAs in general is to establish pre-project environmental baseline information and consider project-related environmental threats.

In this report, Amnesty International examines whether the EIAs produced by or for Vedanta's subsidiaries and joint ventures in Orissa to gain clearances for the Lanjigarh refinery and the Niyamgiri mine are consistent with the specifications required in India's regulations. The report also considers how far these EIAs could have enabled the company to anticipate and address the consequences of its proposed activities on the human rights of the people affected by them.

The report considers the five EIAs produced for Vedanta from 2002 until 2008 by three different consultancies (see box). The main findings, conclusions and recommendations are set out below.

The EIAs for Vedanta's refinery and mine in Orissa

- **The 2002 Lanjigarh refinery EIA**
  Tata AIG Risk Management Services Ltd, 2002a.
- **The 2002 Niyamgiri mine EIA**
  Tata AIG Risk Management Services Ltd, 2002b.
- **The 2005 Lanjigarh refinery EIA**
  Vimta Labs, 2005a.
- **The 2005 Niyamgiri mine EIA**
  Vimta Labs, 2005b.
- **The 2008 Lanjigarh refinery expansion EIA**
  Global Experts, 2008.[13]

The findings are presented in three categories:

- **Technical findings** (Chapter 3) on the extent to which Vedanta's EIAs meet the environmental criteria required by the MoEF. These have been informed by advice from international experts on the social and environmental impacts of mining operations.
- **Findings on the limited number of socio-economic issues** that the MoEF expects companies to address (Chapter 4). These include land use, land clearance, displacement of villages and population, and rehabilitation and resettlement packages, as well as sites of cultural, historic or religious importance.
- **Findings on the human rights dimension** of the mine and refinery (Chapter 5), looking at the human rights issues which were implicit but not addressed in the EIAs. This chapter looks specifically at how the gaps and deficiencies highlighted in the preceding chapters contributed to the failure to properly identify or assess the human impacts of the mine and refinery project. It also looks at the human rights impacts that an environmental assessment would not capture.

12 On 6 July 2011 the *Hindustan Times* reported that the MoEF henceforth would undertake EIAs for projects in ecologically sensitive zones and for large multi-sectoral projects.

13 Tata AIG Risk Management Services Ltd, 2002a, *Rapid environmental impact assessment report for 1.0 mtpa alumina refinery proposed by Sterlite Industries Ltd. at Lanjigarh*. Tata AIG Risk Management Services Ltd, 2002b, *Rapid environmental impact assessment report for bauxite mine proposed by Sterlite Industries Ltd. at Lanjigarh*. Vimta Labs, 2005a, *Comprehensive environmental impact assessment for the 1.0 mtpa alumina refinery and captive power plant at Lanjigarh*. Vimta Labs, 2005b. *Rapid environmental impact assessment for the proposed bauxite mines (3110 mtpa) at Lanjigarh*. Global Experts, 2008, *REIA & EMP Report of expansion of Alumina Refinery from 1 MMTPA to 6 MMTPA Capacity of M/s Vedanta Aluminium Limited, Lanjigarh*.

TECHNICAL FINDINGS

Overview of environmental analysis

Vedanta's EIAs are public documents that should be an important and reliable source of information on the company's activities. In particular, these documents should enable communities that may be affected by the company's proposed activities to take an informed decision on how to respond. This can only happen if the EIAs are comprehensive, accurate and relevant, and if they are presented in a way that is meaningful and accessible to these communities.

Vedanta's EIAs fail on all these counts. For instance, the EIA reports prepared for the proposed mine are not accompanied by detailed management and monitoring plans designed to mitigate and minimise any identified impacts. The technical complexity of the documents is problematic in the light of the requirement to consult with affected people through a public hearing, and with regard to the vast disparities that exist in India in terms of education. An abundance of technical language and mathematical models is clearly not the best way to communicate with illiterate or disempowered people with a stake in outcomes. The balance between the need to present technical detail for environmental mitigation and the rights of people to be consulted and informed is not an easy one to strike. International experience, however, provides examples of ways forward, which could meet both needs.[14]

Choice of mine and refinery locations

The choice of locating an alumina complex in the Lanjigarh area has never been properly assessed in the EIAs alongside potential alternatives. No data has been presented on the cumulative impact of multiple projects, including the expansion plan for the refinery. This is a failure to comply with the requirement of India's 1994 and 2006 EIA Notifications to consider alternatives, and additionally a failure of the 2008 EIA to examine the cumulative impact of current and potential future projects.

Within the chosen area, the location of the refinery poses threats to affected communities. The refinery EIAs fail to take into account the fundamental risk of locating an alumina refinery next to the Vamsadhara River which is in close proximity to several villages whose inhabitants use it for drinking and bathing. The only rationale for site choice presented in the refinery EIAs relates to economic considerations, which raises concerns that environmental and social considerations were given little weight.

Refinery and mine air emissions

The model used to predict air pollution from the refinery is unreliable, because the EIAs fail to identify all sources and types of pollution, neglect the impact of topography and rely on inadequate weather data. The choice of air quality sampling locations fails to include a number of affected sites and there is no clear justification for the choice of sites for sampling. The omission of any account of dust from the waste ponds is a direct failure to comply with India's EIA Notifications requirement to list all sources of air pollution (1994 Notification), and include sources of dust and odour (2006 Notification).

The 2005 mining EIA acknowledges dust pollution but does not propose to measure baseline data, does not discuss potentially affected locations on Niyamgiri Hill and also does not propose to monitor the dust. The stipulation of the 1994 EIA Notification to establish all sources of air pollution has not been followed. This failure is even more critical in view of the specific requirement of the MoEF's 2009 environmental clearance to study the impact of air pollution in the nearest habitation.

14 See for example: Howitt, R, 2001, *Rethinking resource management: justice, sustainability and indigenous peoples*; O'Faircheallaigh, C, 'Negotiating Cultural Heritage? Aboriginal-Mining Company Agreements in Australia' in *Development and Change*, 2008, 39(1), 25-51; Scholtz, C S, 2006, *Negotiating claims: the emergence of indigenous land claim negotiation policies in Australia, Canada, New Zealand, and the United States*.

Disposal of waste

Pollution control at the site of the refinery has been compromised from the outset by the choice of a high risk location next to a river. The failure to disclose the design criteria of the containment ponds makes expert assessment of the robustness of the waste containment measures impossible.

Some detailed design criteria for waste storage also need to be reconsidered. The waste ponds have been located close to the drainage of the Vamsadhara river. The groundwater has been found to be as little as two metres from the surface during the monsoon, and the soil used to compact the base of the pond has high permeability, indicating it might not be appropriate for the purpose. The natural conditions of the site do not appear to have been taken into account, creating serious risks for pollution in the future.

Breaches in the red mud pond reported by local residents in April and May 2011 have raised serious concerns about pollution of local water bodies.[15]

Water use and pollution

For both the mine and refinery sites there are large gaps in the provision of the detailed information that is essential for the analysis and prevention of water pollution. It is thus not possible to perform a risk assessment of the plans set out in the EIAs. This deficiency is repeated across different EIAs by different consultants. There appears to be a shared complacency and unjustifiable over-confidence in the use of technology to prevent pollution, with no allowance made for the potential fallibility of technologies used. This has led to pollution by the refinery of nearby water bodies and groundwater.[16]

The failure of the refinery expansion EIA of 2008 to give a clear picture of water availability is a serious shortcoming. The mention of an existing agreement for water between Vedanta Aluminium and the Orissa government raises the question as to why the agreement details are not provided: they could have significant implications for the region from which the water is sourced.

Transport

Transport is misleadingly viewed in the EIAs as an activity not essential to the operations of either the mine or refinery. While India's 1994 EIA Notification was not very clear about the details required, the 2006 EIA Notification sets out clear requirements for addressing transport issues. These are further developed in the MoEF's 2008 Terms of Reference document for the refinery expansion. The refinery EIAs of 2005 and 2008 fail to take into account the transport of ore by truck to the refinery, presumably in expectation that the nearby Niyamgiri mine would soon be opened. This expectation has proved to be false and bauxite ore is being transported across long distances. The result is that a large number of trucks each day ply the dusty roads through the villages of rural Orissa, giving rise to complaints of noise, dust and exhaust emissions.[17] Since mid-2010 a railway line to Lanjigarh has been carrying some of this bauxite.

The mine EIA fails to address the potential impacts of the conveyor belt for transportation of ore, which cuts a path up the lower reaches of the hillside past villages and through forested areas. There is no discussion of the potential impacts that will arise from operating the belt, especially with regard to noise, dust and further forest clearance.

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15 Latha Jishnu, 'Vedanta's red mud pond leaks into Vamsadhara river', *Down To Earth*, 11 April 2011, www.downtoearth.org.in/node/33296; Amnesty International, 1 June 2011, *India: Toxic sludge leak from Vedanta's red mud pond threatens rural communities* www.amnesty.org/en/news-and-updates/india-toxic-sludge-leak-vedantas-red-mud-pond-threatens-rural-communities-2011-06-0.
On 3 June 2011 the MoEF issued a statement reporting that on inspection ,no breaches in the red mud pond had been found. Amnesty International consequently raised further questions with the MoEF regarding the inspection process.

16 As documented by the Orissa State Pollution Control Board Inspection Report on Vedanta Aluminium, 29-30 January 2008.

17 Amnesty International, February 2010, *Don't Mine us out of Existence: Bauxite Mine and Refinery Devastate Lives in India*, AI Index: ASA 20/001/2010, pp69-70.

Environmental management

An Environmental Management Plan (EMP) is an essential part of an EIA to ensure that the company acts on its findings and operates according to specified plans and requirements. Where the EIA attempts to predict certain unacceptable environmental impacts in order to adopt measures to avoid or mitigate them, the EMP should ensure that such measures are actually taken. Effective implementation of an EMP and use of pollution control equipment necessitates ongoing monitoring of operations, including environmental emissions. None of the EIAs for the Lanjigarh refinery and Niyamgiri mine make provision for this. There is no clarity on who has the responsibility to monitor conditions and validate the data that Vedanta submits. There is also no risk analysis to identify the consequences of potential system failures, and therefore no management strategies for such events.

De-commissioning and the future of the area

The EIAs deal only in a very cursory way with long-term effects and the possibilities of rehabilitating the mine and refinery sites for a return to former land uses after closure. The mining EIAs fail to address concerns relating to hydrological changes due to mining. Potential changes to local water streams have been highlighted in various expert reports but are not mentioned in the mining EIAs. Reforestation is presented as a goal without taking into account current environmental attributes or the interests and wishes of the local population who are now in a position to stake a claim to the area via India's Forest Rights Act. There is no account of how all the waste products from the mine and refinery will be stored and treated following closure of the facilities.

SOCIO-ECONOMIC FINDINGS

Land, livelihoods and displacement

In agrarian communities, change in land-use caused by major development projects has a deep socio-economic impact. India's regulatory system has very limited requirements for assessment of social impacts. Even in this limited context, Vedanta's EIAs are inadequate.

The failure on the part of all Vedanta's EIAs to provide detailed, specific and accurate information on land use in the project areas undermines the possibility of proper analysis of the project's impacts on the lives and livelihoods of affected persons, many of whom are landless. Substantive details should have been provided about the people displaced by the projects and those who would lose access to common land or to agrarian-based employment. The data provided by the consultancies producing the EIAs is sometimes inconsistent: for example they differ on the numbers of people that would be displaced by Vedanta's mining operations. These inconsistencies are not explained .

The EIAs state that the company will rely on the Orissa government's Resettlement and Rehabilitation policy, but ignore that policy's deficiencies. For instance, only those who have formal land titles are entitled to compensation as displaced or affected persons. The EIAs should address the consequences of displacement for those who are dependent for their livelihood on land they do not own.

Inadequate information on affected populations

The EIAs provide scant information on the communities that will be affected by the mine and refinery projects. They refer to broad classifications of people in a way that fails to acknowledge or address cultural, social, and livelihood specificities of the affected communities, and the impact of gender roles. This ignores the different modes of subsistence of these communities that may be affected by mining and refining activities in different ways. Some of the groups most at risk are not even identified. Vedanta's failure to disaggregate data by class, caste, tribe and gender makes it impossible to assess the degree to which affected individuals and communities can adapt to a loss of livelihood by learning new skills or taking up job opportunities offered by the proposed projects and avoid even greater poverty.

Ignoring cultural significance

Neither of the EIAs for the mine refers to the cultural significance of the Niyamgiri Hills to the Dongria Kondh. This is in breach of India's EIA regulatory requirements. It also falls far short of international industry standards, such as those of the International Council on Mining and Metals (ICMM), whose guidelines state that companies should respect the culture and heritage of Indigenous peoples.[18] The Niyamgiri Hills are revered as sacred by the Dongria Kondh, and the group's sense of identity and community is intrinsically linked to residing on the hills.[19] Vedanta's failure to collect baseline information on religious places and community structure ignores the Indian government's guidelines for data to be provided in an EIA.

HUMAN RIGHTS FINDINGS

Overview of human rights analysis

EIAs are not intended to be a mechanism to assess the potential human rights impacts of a project. At present, few governments require any assessment of the human rights impacts of projects such as mining and refining, despite substantial evidence that human rights are frequently adversely affected by such projects. UN human rights experts have noted that this can undermine states' ability to discharge their legal obligation to protect human rights.

However, there is an emerging consensus on corporate responsibility for human rights that companies – as a minimum – must respect all human rights. This is the position articulated by Professor John Ruggie, the UN Special Representative of the Secretary-General (UN SRSG) on the issue of human rights and transnational corporations and other business enterprises,[20] in his 2011 report to the Human Rights Council.[21]

The UN SRSG has emphasised the need for companies to undertake 'due diligence', which involves taking proactive measures to become aware of, prevent and address adverse human rights impacts. Assessment of human rights impact is increasingly seen as vital for businesses, particularly in sectors that are highly physically invasive, such as the extractive industries. According to the UN SRSG:

18 ICMM, 2010, *Indigenous Peoples and Mining: Good Practice Guide*. www.icmm.com/page/208/indigenous-peoples

19 Bhushan C and M Zeya Hazra, 2008, *Rich lands poor people: Is 'sustainable' mining possible?*, p239; Amnesty International, February 2010, *Don't Mine us out of Existence: Bauxite Mine and Refinery Devastate Lives in India*, AI Index: ASA 20/001/2010.

20 Also referred to here as the UN Special Representative on business and human rights.

21 Ruggie, J, 21 March 2011, *Guiding Principles on Business and Human Rights: Implementing the United Nations "Protect, Respect and Remedy" Framework*, A/HRC/17/31.

> In order to identify, prevent, mitigate and account for how they address their adverse human rights impacts, business enterprises should carry out human rights due diligence. The process should include assessing actual and potential human rights impacts, integrating and acting upon the findings, tracking responses, and communicating how impacts are addressed.[22]

The EIAs reviewed for this report identify a number of issues and environmental impacts that would have negative human impacts. However, the EIAs do not consider or assess the repercussions of the environmental impacts on human rights.

The rights of Indigenous Peoples

As a party to the International Covenant on Civil and Political Rights (ICCPR), International Covenant on Economic Social and Cultural Rights (ICESCR), International Convention on the Elimination of All Forms of Racial Discrimination and the International Labour Organisation's Indigenous and Tribal Populations Convention (Convention No. 107), India is under an obligation to protect the rights of Indigenous peoples over the lands and territories they traditionally occupy.

The Niyamgiri Hills are home to the Dongria Kondh, an 8,000-strong *adivasi* (Indigenous) community spread over 90 villages in and around the hills. The EIAs do not consider existing uses of land in the Niyamgiri Hills, or assess the potential for land use to be affected by mining and associated processes such as transportation and an influx of workers into the area. Nor do the EIAs consider that air pollution from the mine, including dust, overburden and possible pollution of water, may affect the lives or livelihoods of Indigenous communities. In respect of air quality, no baseline sampling was done in any of the villages in the Niyamgiri Hill range and no subsequent monitoring of air pollution is proposed.

At no point, while undertaking assessments or otherwise, have the companies involved in the proposed mine consulted with, or made any attempt to seek the consent of, the Dongria Kondh to the lease of the lands or any other aspect of the Niyamgiri mining project. Nor have the communities been provided with adequate and timely information on the proposed mining project on their traditional lands.

Effects of land acquisition and evictions in relation to the refinery

While the EIAs provide some data on the potential displacement, this data is largely technical, and does not consider the impact of land acquisition and eviction on the people affected. The impacts of loss of access to, or eviction from, privately owned or common public lands can be wide-ranging. For example, loss of land can negatively affect people's livelihoods and food security, even when people are compensated for the land itself; rural communities may struggle with the challenges of moving from an agricultural-based subsistence way of life to a monetised or wage-based one. These issues are not considered in the EIAs. Moreover, the EIAs fail to consider the loss of access to public lands, or the impacts this may have on the ability of people to secure their livelihood and access to food.

Impacts on the right to health and a healthy environment

The ICESCR guarantees the right to health. In elaborating the content of this human right the UN Committee on Economic, Social and Cultural Rights (CESCR) has clarified that:

> the right to health embraces a wide range of socio-economic factors that promote conditions in which people can lead a healthy life, and extends to the underlying determinants of health, such as access to safe and potable water … and a healthy environment.

The EIAs note that a buffer zone will be put in place between the boundary of the refinery and the local villages. However, the EIAs are silent on the implications for the communities in the period

22 *Ibid*, para 17.

before the buffer zone is in place. There is no assessment of the cumulative impact of exposure to a range of emissions on the nearby villages. The refinery EIAs fail to take into account the fundamental risk of locating an alumina refinery next to the Vamsadhara river and in close proximity to several villages. Nor do the EIAs identify how the river is used by local people. The EIAs do not identify any need to have plans in place for failures to meet the zero emissions scenario or to ensure local people are properly informed of any risks to their health in the event of any leakages.

The mine EIAs also fail to adequately consider issues of air and water pollution and the risks these pose to human health or access to drinking water. Neither the health risks posed by water pollution, nor the ability of people to access water for drinking and other domestic purposes, are given adequate attention in the EIAs.

Failure to consider gender issues

The Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) imposes a legal obligation on state parties to respect, protect and fulfill the rights of women to equality and non-discrimination. The Convention obliges state parties to ensure that:

- there is no direct or indirect discrimination against women in their laws
- women are protected against discrimination – whether committed by public authorities, the judiciary, organisations, enterprises or private individuals, in public or in private – by competent tribunals, sanctions and other remedies.

A significant omission in the EIAs is the absence of any qualitative information and analysis of how men and women will be affected differently as a result of their gender-specific social and economic roles and status in their communities. Instead, the EIAs rely on a cursory recognition of the impoverishment and low literacy rates of the affected women. The EIA's lack the baseline information to capture how displacement, reduced access to communal property, the inward migration of workers and environmental pollution and degradation are likely to impact upon women's lives in a different way from men's.

The premise underpinning the EIAs that the projects will benefit all the affected communities, combined with the lack of gender analysis, leads to the assumption that women will automatically benefit from the proposed projects. The reality is different: the proposed project may well expose women and girls to greater poverty and dependence.

Evidence from other extractive projects in India shows a number of predictable human rights impacts on women, including loss of access to resources and livelihood, greater insecurity and increased vulnerability to violence. Vedanta's EIAs failed to identify any of these.

Right to information and participation

The principles of transparency, consultation and participation are embedded in international human rights law and standards. Expert bodies of the UN and regional human rights institutions have made clear the importance to human rights of ensuring that people have access to information and can participate meaningfully in decisions that affect their rights. In major commercial projects, both the government and the companies involved should ensure that affected people have adequate access to information, that they are consulted, and that their views are taken into account before the project goes ahead.

However, the requirement for public consultations or public hearings under India's EIA process is minimal, and does not conform with international human rights standards. The EIA process includes public participation in the form of the dissemination of the EIA report and a public hearing. While this is an important aspect of the process, it has significant shortcomings. Very limited information is provided to communities, and much of what is provided is not accessible. The information is usually in writing, in technical language and often not in local languages. Those who are not literate or who do not have the capacity to understand technical reports cannot access the written information. Public meetings are limited and the evidence available suggests that major

issues are not explained, nor are possible risks discussed with those who attend. No effort is made to ensure that marginalised groups can obtain and understand the information or attend the meetings, and little attention appears to have been paid to the views that community members expressed.

These shortcomings were reflected in misinformation and lack of consultation on the refinery plans, and a failure to consult on the mining plan. An assessment of this is presented in Amnesty International's 2010 report.[23]

Right to liberty and security of the person, and freedom of expression and assembly

Among the human rights issues that an EIA process would be very unlikely to touch upon are the rights to freedom of expression, association and assembly, and the rights to liberty and security of the person. However, these human rights are frequently relevant in the context of extractive industries, such as oil, gas and mining. This is because extractive industries are often very physically invasive and when they operate in areas of poverty and marginalisation, without adequate measures to protect human rights, local people protest. In India, as in several other countries, such protests by local communities often meet with a repressive response from the state, and in some instances from private security companies, leading to violations of human rights.

These rights are particularly relevant in the context of Vedanta's Orissa operations because of accusations that the police, cooperating with security guards employed by Vedanta, were used to intimidate villagers in Lanjigarh and Niyamgiri in order to suppress dissent.[24]

CONCLUSIONS

Amnesty International's analysis of Vedanta's EIAs for the Lanjigarh refinery and proposed Niyamgiri mine demonstrates that they fail to do what they are supposed to do – which is to assess the potential environmental and social impacts of the company's mining and refining operations. The EIAs are also inadequate to ensure that the company is fulfilling its responsibility to respect human rights. While EIAs are not intended as tools to assess human rights impact, Vedanta carried out no other impact assessment process in relation to human rights, even after serious human rights problems were brought to the company's attention.

In allowing the company to construct and operate the refinery on the basis of these EIAs, the Indian government failed to fulfil its duty to protect the human rights of people who are and who will be affected by the refinery. The same consideration would apply to the expanded refinery and the mine, although currently clearance for each of these developments to proceed has been withheld by India's Minister of the Environment.

The EIAs contain insufficient detail of the populations that will be affected by Vedanta's mining operations. They fail to disaggregate data to enable an understanding of the differential impacts on women and on the social and cultural groups that will be disproportionately affected. The EIAs for the mine and refinery provide identical information on population, land use and cropping patterns,

23 Amnesty International, February 2010, *Don't Mine Us Out of Existence: Bauxite Mine and Refinery Devastate Lives in India*, pp27-32, pp34-40.

24 *Ibid*, pp27-32.

despite the demographic differences between the two areas. This raises serious concerns about the quality of the research underpinning the EIAs.

The availability of accurate information and the recognition of communities beyond broad categories are critical for shaping understanding of how these communities relate to and depend on their environment, including their use of land and forests. It is also key to anticipating risks and taking adequate mitigation measures. A human rights perspective would insist that impact assessment processes include detailed information on the needs and capacities of particular communities affected, the disparities within and between communities in access to resources, their levels of education and the skills that they possess. A human rights perspective would also address risks posed to particular groups within these communities as a result of pre-existing factors such as discrimination and lack of decision-making power. These groups include women, children and the elderly. Finally, a human rights approach would embody meaningful consultation and participation to ensure that the process of impact assessment, the conclusions drawn and the mitigation measures undertaken are effective in enabling respect for human rights.

Where full EIAs were not completed, as was the case with most of those submitted by Vedanta, the MoEF should not have accepted the 'rapid EIAs' as adequate for projects of this scale. But even the rapid EIAs submitted by Vedanta should have alerted the MoEF to systematic deficiencies in the company's approach. These are characterised by sweeping generalisations, glaring omissions and unwarranted assumptions.

Generalisations on affected communities: The assessments do not accurately portray who will be affected by the projects. Through reliance on out-dated government data, the assessments homogenise and mask the affected populations. In reality, communities affected by the projects have distinct characteristics in relation to labour, livelihoods, culture, and gender divisions. The assessments also fail to acknowledge the existence of some affected communities, particularly the Dongria Kondh, whose villages or hamlets may not be listed in official governmental records.

Generalisations on the usefulness of technology for environmental control: Any technology is liable to fail if it is not sensitive to the local context, or if not used according to a well-specified environmental management plan. The EIA reports appear to be underpinned by an unchallenged assumption that technology will overcome natural conditions. They do not discuss inherent pollution risks associated with locating a mine or a refinery next to a river. The refinery EIAs fail to discuss risks of water pollution during construction, nor is there any concern for the de-commissioning of large waste ponds. The reliance on technology is also reflected in the failure to provide for continuous monitoring, which would have enabled early detection of spills. This has already proved to be a problem, as revealed in Orissa State Pollution Control Board reports of pollution from the refinery.[25]

Omission of any consideration of risks to human rights: The assessments fail to identify or address serious risks to human rights. There are no baseline studies to accurately represent who will be affected by the projects, and how the exploitation of natural resources and associated environmental pollution may impact upon the health, livelihoods and culture of the women, men and children of these communities. The cultural and spiritual value of the land to some affected communities is not addressed.

Omissions on displacement and migration: The assessments do not accurately portray who will be affected by displacement, land loss and migration. Where they acknowledge the broad need for 'resettlement', they give minimal details on how this will be in done in a just manner or how people who are landless but who rely on common land for their livelihoods, or on labouring on the land of others, will be compensated for their loss.

25 Orissa State Pollution Control Board, 2008, *Inspection Report on M/S Vedanta Aluminium Limited Lanjigarh, Dist: Kalahandi*; Orissa State Pollution Control Board, 2007, *Inspection Report on M/S Vedanta Aluminium Limited Lanjigarh, Dist: Kalahandi*, Orissa.

Summary of failings in Vedanta's EIAs to meet India's regulatory requirements

Failing in EIAs	Requirement breached
There is no substantive discussion of alternative sites for the mine and refinery	EIA Notifications 1994 and 2006
The cumulative impacts of mining and refining activities in close proximity are not drawn out	EIA Notification 2006
Choice of air quality sampling locations does not include all affected sites	MoEF's 2004 Terms of Reference for refinery
Not all sources of emissions and pollutants are clearly identified	EIA Notifications 1994 and 2006; MoEF's 2008 Terms of Reference for refinery expansion
Dust and odour are not acknowledged as potential sources of pollution	EIA Notifications 1994 and 2006
No ongoing monitoring of dust or mitigation measures is proposed	MoEF's 2004 Terms of Reference for refinery
There is insufficient discussion and justification of design criteria for the red mud and fly ash ponds, and the exact location of expanded ponds is not specified	MoEF's 2008 Terms of Reference for refinery expansion
No means are suggested for monitoring continuous and incremental pollution	EIA Notification 2006
No detailed hydrological maps are provided to show information about surface water	MoEF's 2008 Terms of Reference for refinery expansion
No adequate information is provided on water usage	EIA Notifications 1994 and 2006
No details are provided of water availability in the Tel River to supply all the refining and mining complex's needs	EIA Notification 2006
No acknowledgement is given of the impacts caused by transportation of bauxite from other mines to the refinery or the impacts of the conveyor belt used to transport ore from Niyamgiri to the refinery	EIA Notification 2006; MoEF's 2008 Terms of Reference for refinery expansion
No detailed and specific information is given on land use by local communities and numbers of villages and population to be displaced	EIA Notifications 1994 and 2006; MoEF's 2008 Terms of Reference for refinery expansion
There is no reference to the cultural significance of the Niyamgiri Hills to the Dongria Kondh	EIA Notifications 1994 and 2006

Omission of gender: The assessments are devoid of any gendered analysis of the impacts of the projects or the proposed mitigation measures. Specific impacts on women are not identified, for example:

- Displacement without adequate compensation because of lack of formal land ownership
- Loss of access to common grazing land and livelihood
- Lack of personal safety and increased insecurity associated with an influx of migrant population, greater vulnerability to harassment and prostitution, and decreased space for women to congregate safely.

Omission of information and detail: The assessments lack detail and information regarding the overall environmental impact of both the refinery and mine. The mining EIAs largely ignore the environmental consequences of the mine, and how the environmental impact of mining could be minimised. There is no detailed investigation of the actual vegetation of the proposed mining area, nor of those locations affected by road and conveyor belt transport, or affected by the dumping of overburden waste. Local streams and water bodies have not been investigated despite being clearly visible on detailed topographical maps.

Assumptions on livelihoods: A broad assumption is made that people who have historically been involved with a set of activities for their livelihood and sustenance can alter their practices in response to the encroachment of major industrial projects. While some individuals may be able to make this change, the disturbance could lead to poverty, marginalisation and alienation of some communities. Indigenous and dalit communities are among those most likely to lack the necessary qualifications for any new jobs that are provided. The assessments do not reflect the importance of forest resources for local livelihoods, nor do they reflect how a loss or change in access to forest goods will affect the capacity of people to meet their subsistence requirements.

Assumptions on location: The choice of location for the refinery just next to the Vamsadhara river is highly questionable, because it increases the potential consequences of any spill or other polluting event. This problem is compounded by the proposed six-fold expansion in production, the consequent increase in red mud storage area, and the failure to measure the quality of river water, deemed unnecessary because it was assumed there would be zero emissions. Since the EIAs were produced, inspection reports have revealed that spills have occurred.

Assumptions on air pollution: The air pollution monitoring stations are not located in or near to the villages closest to the mine and refinery sites. Moreover, these stations are not in the locations that the EIAs predict will be the most likely to be affected by pollution. Therefore, not only is the information about current pollution incomplete, but the inadequate monitoring structure ensures that the true air pollution levels will not be adequately captured in future. In terms of air emissions from the refinery, only a narrow range of pollutants are being monitored compared to what would be considered leading practice, and the number of sources of pollution examined is limited. This means it will be impossible to detect high levels of many air pollutants. The failure to assess air pollution from dust and odour is an additional weakness.

Vedanta claims that it ensures its projects are carried out in accordance with 'international best practice'.[26] However, Vedanta's impact assessments are well behind their international counterparts, as acknowledged in the Scott Wilson report prepared for Vedanta's bankers.[27] While there are widespread problems in the mining industry as a whole, the ICMM guidelines on *Human Rights in the Mining and Metals Industry* reflect the fact that many other mining companies, including the major international competitors of Vedanta, have taken some measures to assess their human rights impacts.[28] Some mining companies have recognised that it is essential to address the environmental, social, cultural, economic and human rights issues associated with their operations. This approach

26 See, for example, Vedanta's rebuttal of Amnesty International's claims, February 2010. www.mineweb.com/mineweb/view/mineweb/en/page674?oid=97837&sn=Detail&pid=1

27 Scott Wilson Ltd, November 2010, *Vedanta Resources plc and Lanjigarh Refinery: Independent Review of Sustainability Policies and Practices*. http://csr.vedantaresources.com/scottwilson.html

28 ICMM, 2009, *Human Rights in the Mining & Metals Industry: Overview, management approach and issues*.

is identified by these companies as ensuring long-term sustainability for their business. It is also more consistent with the approach urged by the UN Special Representative on business and human rights. An examination of Vedanta's EIAs demonstrates that the company does not subscribe to this approach in the Indian context. It performs well below international best practice, and in so doing exposes affected communities to a range of risks that it could – and should – address.

As an internationally listed corporate entity, Vedanta should hold itself to a higher standard. It should avoid making claims about its impacts on the environment and on sustainable development that misrepresent the full breadth of the possible impacts and it should aim to meet international leading practice. For this to happen, the company would have to acknowledge the true impacts of mining and refining on the local environment and affected communities, and develop robust mitigation responses. A properly conducted impact assessment would be an important step in the right direction.

RECOMMENDATIONS

To the government of India

- Strengthen existing socio-economic requirements and indicators for the EIA process, including those on gender, to ensure that impact assessments can more accurately capture the impacts on specific groups within the affected population.
- Amend the legal framework so as to require companies to carry out environmental, social and human rights impact assessments, particularly for all high-risk projects and activities, including extractive industry projects.
- Require that environmental, social and human rights impact assessments are undertaken by competent and impartial institutions that are suitably qualified.
- Require that impact assessments look at cumulative impacts; this should apply to related projects; for example a related refinery and mine would need to be assessed together for their cumulative impact on a given area.
- Amend the requirements on public participation in the assessment process to ensure that affected communities can participate in the process; provide specific guidance in relation to issues of gender and marginalisation; and require full disclosure of the assessments in a form that is accessible to the affected communities and to particular groups within those communities, including women.
- Bridge the knowledge gap by requiring the production of non-technical impact assessment documents and by appointing an ombudsperson to work on behalf of potentially affected communities.
- Require Vedanta to conduct fresh impact assessments for the Lanjigarh refinery and Niyamgiri mine that conform fully with current regulatory requirements
- Introduce strict penalties and/or disqualify projects where the EIA requirements are not met or where proper and effective environmental management plans are not implemented.
- Suspend all clearances and licences for the Niyamgiri mine and expanded Lanjigarh refinery until Vedanta has cleaned up existing pollution, compensated victims adequately, sought the free, prior and informed consent of the Dongria Kondh in relation to the mine, and addressed the human rights impacts of the project.

To Vedanta and its subsidiaries and joint ventures

- Suspend all plans to mine or expand the refinery until the human rights issues are properly addressed.
- Adopt leading international industry methods for managing the environmental impacts of bauxite mining and alumina refining.
- Ensure that impact assessments address all human rights that could potentially be affected by the project.
- Complete baseline socio-economic surveys to understand who will be affected.
- Ensure that any displacement or land loss is fully compensated, regardless of formal land ownership.
- Make a clear commitment to respect the right to free, prior, informed consent of Indigenous peoples.
- Put in place policies and process to ensure that all affected individuals have timely access to full information about projects that may affect them.
- Recognise cultural values attached to the proposed mine site.
- Implement proper pollution control measures.
- Ensure that impact assessments have a gender dimension so that the differential impacts on women and men are considered.
- Ensure full disclosure of impact assessments in a format that is accessible to those affected, as well as full disclosure of management and implementation plans to address the findings of the assessment.
- Urgently and fully address the existing negative environmental, health, social and human rights impacts of the Lanjigarh refinery, in open consultation with the affected communities.

To Vedanta's bankers and investors

- Express concern to Vedanta about the actual and potential impacts of its operations in Orissa on human rights and call on the company to implement the above recommendations.
- Ask Vedanta to report regularly on its progress to address the environmental and human rights concerns surrounding its operations in Orissa.
- Call for a suspension of all plans to mine or expand the refinery until the human rights issues are properly addressed.
- Develop an engagement and escalation strategy that will bring about changes in Vedanta's conduct, including effective forms of pressure and sanctions.

Vedanta's refinery has brought heavy traffic to the area
© Sanjit Das

1 Introduction

1.1 Vedanta's operations in Orissa

Vedanta Resources Plc is a FTSE 100 diversified metal and mining company registered in the United Kingdom since 2003, with strong Indian connections. The group produces aluminium, copper, silver, zinc, lead, iron ore and commercial energy in a number of locations across India, Zambia, Namibia, South Africa, Ireland and Australia.[1] Most of the corporate group's operations are in India. The company has come under increasing national and international scrutiny in recent years because of serious concerns about the human rights impacts of its operations in Lanjigarh in the eastern state of Orissa.[2] As a consequence, a number of shareholders – including the Norwegian Government, the Church of England, Martin Currie Investment Management, and the Joseph Rowntree Trust[3] – have divested their holdings in Vedanta Resources and its subsidiaries (collectively, Vedanta).

Despite being relatively new to the aluminium industry, Vedanta Resources, through its subsidiaries, has managed to acquire substantial operations in India. The starting point was the privatisation of Malco (Madras Aluminium Corporation) and Balco (Bharat Aluminium Corporation) in the late 1990s and early 2000s. Both were formerly state-owned companies. Since taking control of Balco, Vedanta's operations have expanded to include a new alumina refinery and aluminium smelter in the old premises at Korba in the central Indian state of Chhattisgarh. In addition Vedanta has built a new aluminium smelter in Jharsuguda (close to Sambalpur) in Orissa.

Plans for the refinery in Lanjigarh and for the mine in the nearby Niyamgiri Hills date back to April 1997, when the state-owned Orissa Mining Corporation (OMC) signed over its rights to mine bauxite in the Niyamgiri Hills to a Vedanta Resources subsidiary, Sterlite India.[4]

Compulsory land acquisition for the Lanjigarh refinery began in 2002. Construction was completed by 2007 at which point the refinery, operated by another Vedanta Resources subsidiary, Vedanta Aluminium, moved to full operation. In October 2007, although local communities had already expressed serious concern about the impacts of the refinery, Vedanta Aluminium sought an environmental clearance from India's Ministry of the Environment and Forests (MoEF) for a sixfold expansion of the refinery's capacity. However, the company began work on the expansion before receiving clearance. On 12 January 2009, the Orissa State Pollution Control Board (OSPCB) told Vedanta Aluminium to immediately cease construction activities related to expansion of the refinery.[5]

In April 2009, the Indian authorities approved a joint venture to mine bauxite in the Niyamgiri Hills for the next 25 years. The bauxite is sited on land considered sacred by the Dongria Kondh, an Adivasi community who have lived exclusively in and around the hills for centuries. The companies involved are Sterlite Industries and the state-owned OMC.

In August 2010, following a Ministry-commissioned expert report on Vedanta's compliance with India's regulatory requirements, the MoEF decided to reject Vedanta's proposed mine and also suspended the clearance process for the alumina refinery expansion. Vedanta Aluminum, however,

1 Vedanta Resources, 2011, *Annual report 2011*, London: Vedanta Resources Plc.

2 Amnesty International, 2010, *Don't Mine Us Out of Existence: Bauxite Mine and Refinery Devastate Lives in India*; Council of Ethics of the Ministry of Finance, 2007, *Recommendation to disinvest in Vedanta Resources*, Oslo; Moody, R, 2007, 'The Base Alchemist' in *Caterpillar and the Mahua Flower: Tremors in India's Mining Fields*. New Delhi: Panos South Asia, pp83-102.

3 Council of Ethics of the Ministry of Finance, 2007, *Recommendation to disinvest in Vedanta Resources*, Oslo; Moody, R 'Church of England disinvests from Vedanta Resources plc' available at: www.cofe.anglican.org/news/pr2010.html, Joseph Rowntree Charitable Trust, 2010, 'Rowntree sells £1.9M Vedanta shares over human rights'. www.jrct.org.uk/core/documents/download.asp?id=420

4 Memorandum of Understanding between the Orissa Mining Corporation and Sterlite India, 3 April 1997.

5 Orissa State Pollution Control Board Memo to Vedanta Aluminium, 12 January 2009.

has challenged the Ministry's decision to suspend the clearance process in the High Court of Orissa. OMC has also challenged the Ministry's rejection of the mining proposal in the Supreme Court of India. Another Vedanta subsidiary, Sterlite Industries, has challenged the Ministry's denial of environmental clearance for the mine at India's National Green Tribunal.

In March 2011 an expert committee of the ministry recommended to the MoEF that environmental clearance be given for the mining project, after reaching the conclusion that the company's EIAs and Environmental Management Plan (EMP) met the necessary requirements. The MoEF subsequently issued a press release distancing itself from these recommendations, pointing out that it is not bound by them and that the question of granting environmental clearance does not arise because this is dependent on forest clearance, which the MoEF has rejected outright.

1.2 **Focus of the report**

The focus of this report is on the environmental impact assessments (EIAs) underpinning Vedanta's existing and proposed alumina complex in Lanjigarh, Orissa (see map, Figure 1), which includes a bauxite mine and an alumina refinery. Despite widespread criticism of its operations in Orissa, Vedanta has represented its operations as consistent with the highest environmental standards. In stating the grounds for challenging the Ministry's decision to suspend the clearance for the refinery expansion, Vedanta's petition to the High Court of Orissa maintains 'That the Opp Parties [the Ministry] have failed to appreciate that besides compliance of regulatory norms in all its operations, … all efforts are made from the commencement of the project that no compromise is made in design, procurement and operation, in achieving the basic objective of the Environment Protection Act, 1986.'[6] Moreover the company has also stated that the mine and refinery project will bring substantial socio-economic benefits to the area and to the affected communities. These include the Dongria Kondh, an Indigenous community of 8,000, which is considered endangered (the mining project will be located on their traditional lands) and some 4,000 to 5,000 people, including *adivasi* and *dalit* communities, who live in the 12 villages that surround the refinery, some of them barely 150-300 metres from its boundary walls.

The affected communities, as well as environmental and human rights groups, have challenged Vedanta's assertions of benefit, and have highlighted evidence of serious negative social, human rights and environmental impacts.

This report examines the EIAs that Vedanta undertook to obtain the necessary clearances for their proposed mine in Niyamgiri and refinery in Lanjigarh. A close scrutiny of Vedanta's EIAs and the degree to which they comply with India's regulatory requirements is important in the context of the legal challenges referred to above.

These impact assessments were produced to conform to India's regulatory requirements. Beginning in 2002, five EIAs have been commissioned for the mine and refinery by various Vedanta entities (see box opposite). Although the projects are inter-linked, the EIAs treat the mining and refining activities as separate, and are addressed in different assessments.

The oldest EIAs analysed in this report, the mine and refinery EIAs from 2002,[7] were commissioned by Sterlite India. Vedanta Alumina Ltd (now known as Vedanta Aluminium) commissioned the 2005 refinery EIA,[8] while OMC sponsored the mining EIA.[9] The 2008 refinery expansion EIA was commissioned by Vedanta Aluminium.[10]

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6 Vedanta Aluminium vs. Union of India and Others, High Court of Orissa, Cuttack, W.P. (c) No. 19605 of 2010, para Q.

7 Tata AIG Risk Management Services Ltd, 2002a, *Rapid environmental impact assessment report for 1.0 mtpa alumina refinery proposed by Sterlite Industries Ltd. at Lanjigarh*, and Tata AIG Risk Management Services Ltd, 2002b, *Rapid environmental impact assessment report for bauxite mine proposed by Sterlite Industries Ltd. at Lanjigarh*.

8 Vimta Labs, 2005a, *Comprehensive environmental impact assessment for the 1.0 mtpa alumina refinery and captive power plant at Lanjigarh*.

9 Vimta Labs, 2005b, *Rapid environmental impact assessment for the proposed bauxite mines (3110 mtpa) at Lanjigarh*.

10 Global Experts, 2008, *REIA and EMP Report of expansion of Alumina Refinery from 1 MMTPA to 6 MMTPA Capacity of M/s Vedanta Aluminium Limited, Lanjigarh*.

For the purposes of this report, the term Vedanta is used as shorthand for all entities that are under the effective management control of Vedanta Resources Plc, including all its subsidiaries and joint venture partnerships.

The findings of this report are presented in three categories. First, there are the technical findings (Chapter 3) on the extent to which Vedanta's EIAs meet the environmental criteria required by the MoEF. Second, there are the findings on the very limited number of socio-economic issues that the MoEF expects companies to address (Chapter 4) within the EIA process. These include land use, land clearance, displacement of villages and population, rehabilitation and resettlement packages, as well as sites of cultural, historic or religious importance. The third category of findings focuses on the human rights dimension of the mine and refinery (Chapter 5).

Companies involved in the mine and refinery

Vedanta Resources Plc (Vedanta Resources) A metals and mining group headquartered in London. The company was first listed on the London Stock Exchange in December 2003. Vedanta has its principal operations in India and also has mines and production centres in Australia, Zambia, Namibia, South Africa and Ireland.

Sterlite Industries India Ltd (Sterlite) Headquartered in Mumbai. Sterlite has been a public listed company in India since 1988. Its equity shares are listed and traded on the National Stock Exchange and the Bombay Stock Exchange and are also listed and traded on the New York Stock Exchange in the form of American Depository Shares. Vedanta Resources owns 54 per cent of Sterlite and has management control of the company.

Vedanta Aluminium Ltd (Vedanta Aluminium) Headquartered in Lanjigarh, Orissa. Vedanta Resources owns 70.5 per cent of the share capital of Vedanta Aluminium and Sterlite owns the remaining 29.5 per cent.

Orissa Mining Corporation (OMC) A wholly owned company of the Orissa state government, mining chrome, iron and manganese in the state. OMC has formed a joint venture with Sterlite Industries to mine Niyamgiri.

South-West Orissa Bauxite Mining Corporation (SWOBMC) This joint venture was formed in early 2009 specifically to mine bauxite on Niyamgiri. Sterlite Industries (India) owns 74 per cent of its shares and the Orissa Mining Corporation 26 per cent.

Source: Vedanta Resources (2009, 2010)

1.3 The refinery and the mine

The refinery project was originally planned for about 1 million tonnes of alumina per year, a standard size among planned Indian alumina refineries. In 2007, Vedanta Aluminium applied for a massive expansion of the refinery so as to increase the capacity from a rate of 1 million tonnes per annum to 6 million tonnes of alumina a year.[11] This expansion, if it is allowed to proceed, would make the Lanjigarh refinery among the largest in the world.

The Niyamgiri mine, which Vedanta originally planned to open along with the refinery in 2002, was stalled owing to a prolonged case in the Supreme Court. It was a public interest litigation case brought by a number of activists who alleged that mining in environmentally valuable forest should not be allowed. The case was heard between November 2004 and August 2008. The verdict

11 The planned size of the expanded refinery is significant. In comparison, total Indian production in 2008 was estimated at 3 million tonnes in total, Canadian production at 7 million tonnes, US production at 4.3 million tonnes. Only Chinese and Australian production was significantly larger at 23 and 19 million tonnes in 2008 respectively (US Geological Survey 2010).

of the Supreme Court in 2008 allowed Sterlite and OMC to proceed with the application for environmental clearance for the mine. While the mine was being contested in the Supreme Court, the refinery was supplied with bauxite ore from other domestic and international sources, which was transported to Lanjigarh by truck.

1.4 **Location: social and environmental setting**

The mine and refinery sites are about 7km from one another by road, but socially and geographically they are quite distinct. The refinery, in the Kalahandi district of Orissa, is in a flat, agriculturally dependent area. The available imagery on Google Earth is from 2005, when the original 1 mtpa (million tonnes per annum) refinery was under construction. The image gives a view of the boundaries of the alumina refinery and the surrounding villages. The waste containment area known as the red mud pond was already a significant part of the refinery area in 2005.

The proposed mine would be located on Niyamgiri hilltop, an area where people survive on shifting cultivation and the gathering of forest produce. The Google Earth satellite image (Figure 1) shows the location of the bauxite complex at Lanjigarh. The mining areas are the bald spots near the top of the hill (the mining lease area is approximated with red borders). At 1,300 metres above sea level, the mine is located at the highest point in the Niyamgiri Hills. Nearby villages across the mountain are all adivasi Dongria Kondh villages, with small populations of *dalits* and Majhi Kondhs. Two rivers originate from the Niyamgiri Hills. The main river is the Vamsadhara which has most of the catchment of the proposed mining area. It initially flows to the north-west, and then changes course in the valley and continues past the refinery eastwards until it eventually drains in the Bay of Bengal. The Nagavalli River flows from the proposed mine site to the south-west before eventually joining the large Godavari River. Water for both the refinery and mine is taken via pipeline from the Tel River, 67km north of the site.

The bauxite ore occurs in a 2-18 metre thick layer on gently sloping terrain close to the top of Niyamgiri hill at 1,000-1,300 metres above sea level.[12] It is located mainly in two long narrow patches, which are aligned roughly in a south to north direction and are separated by a central forested ridge (see Figure 2). The central ridge is the highest part of the hill range, and does not contain ore. The exact boundaries of the proposed mining area are not clearly specified either in the EIAs or in the mining plan.[13] An attempt has been made here to map the limits of the mining boundaries using a combination of information from the mining plan and knowledge of existing villages.[14]

Several villages exist close to the boundaries of the proposed mining area, including Palberi, Phuldumer, Khambesi and Jarapa. The ability of people living there to support themselves depends on streams originating near the top of the mountain, grasslands for livestock, and use of the forest for the collection of various essential products. At the time when the satellite image was taken, the two roads leading up to the mine site from Lanjigarh were yet to be constructed. These roads now pass through a number of villages en route to the site.

The refinery area is largely inhabited by Majhi Kondh adivasi[15] communities, although there are also significant numbers of dalits and other groups. One village, Kinari, was uprooted to make way for the existing refinery, with its inhabitants being offered resettlement. Other villages, such as Kappaguda, Bandaguda, Basantapada, Kothadwar, Rengopalli, Bundel and Chhatarapur all lie just outside the perimeter walls of the refinery.

12 Vimta Labs, 2005b.

13 Tata AIG Risk Management Services, 2002b; Vimta Labs, 2005b; Engineers India Ltd, 2004.

14 Mining boundary 1, 2 and 3 in the figure below are the southern (19°38' N), east/north (83°25' E, 19°41' N), and western (83°22' E) points described in the mining plan as defining its borders.

15 The terms '*adivasi*' and 'tribal' are used interchangeably in this report to signify the original inhabitants of the area.

Figure 1: Satellite image of locations in the Lanjigarh/Niyamgiri area

Source: CNET/Spot satellite imagery accessed via Google Earth. Image date: 5 February 2005. Identification of site based on toposheet maps and EIAs. Note: This map is not aligned to the north to allow both mine and refinery area to be viewed. It has been 'tilted' to give a three-dimensional view of the area.

Agricultural fields can be seen around the refinery area in the satellite image below (see Figure 3). These images were taken in February 2005 at the start of the dry season when less is cultivated in the area.

This land forms a part of what is known as a Scheduled Area in so far as it is demarcated for Indigenous Peoples in India under Schedule V of India's constitution.[16]

Specific information on the identity and composition of people losing their land to the refinery, including communal land, is largely missing. This is because of the lack of any record of those who either used land that was not recognised as theirs by the state, or were surviving on common land for grazing of livestock or for the collection of forest produce.[17]

1.5 **Production process: bauxite and alumina**

The production of aluminium is a three-stage process of bauxite mining, alumina refining and aluminium smelting. Each of the stages has particular characteristics, which have to be taken into account in order to understand its impact on local communities and environments. As this report is concerned with the operations in Lanjigarh and the Niyamgiri Hills, it focuses solely on the implications of mining and refining. Vedanta also operates a number of aluminium smelters of which the closest one, in Jharsuguda, receives alumina produced in Lanjigarh.

Bauxite, an ore containing alumina (aluminium oxide) is the only commercially used source of aluminium in the world. The formation of the ore occurs under certain geological conditions, where high levels of rainfall on rock formations containing aluminium silicate produce solutions of minerals that percolate downwards through the soil and accumulate over time at a level just above the water table.[18] Bauxite deposits exist as a layer ranging from only a few metres thick to as much as 50 metres, on top of certain mountains in Orissa and the neighbouring state of Andhra Pradesh.[19]

Open cast mining is a given for bauxite as the ore is close to the surface. In Orissa, the vast, flat bauxite hills make mining operations particularly attractive since the mining can proceed on top of the same mountain for many years, often excavating a single deposit. Common environmental risks with open cast bauxite mining include environmental degradation, overburden waste,[20] and pollution and siltation due to water run-off and dust emissions.

The Vedanta alumina refinery, like most commercial alumina refineries in the world, uses the Bayer process to extract alumina from bauxite ore.[21] Refining alumina involves grinding and digesting bauxite ore using heat, pressure and a strong caustic soda[22] solution. The alumina, the aluminium oxide of the ore, is dissolved during this process allowing impurities such as iron and other heavy metals to be washed out. The alumina is then crystallised out of the liquid solution and purified at temperatures up to 1,300°C. The final product is a white powder which has its main use as input in aluminium smelters for the production of aluminium metal.[23]

16 State law further affirms this reservation of land for tribal people. The latest amendment of the Orissa Scheduled Areas Transfer of Immovable Properties (OSATIP) act from 2002 not only reaffirms that it is illegal to purchase privately held land if you are not a tribal person, but specifically makes it illegal to make a tribal person landless. A minimum of 2 acres of irrigated or 5 acres of unirrigated land has to remain in the hands of any member of the Scheduled Tribes before land can be acquired.

17 See Amnesty International, February 2010, *Don't Mine us out of Existence: Bauxite Mine and Refinery Devastate Lives in India*, AI Index: ASA 20/001/2010, for an account of issues affecting the people close to the refinery and mine sites.

18 Bunker, S G and P Ciccantell, 1994 'The Evolution of the World Aluminum Industry' in (eds) Barham, B, S G Bunker and D O'Hearn, 1994, *States, Firms, and Raw Materials: The World Economy and Ecology of Aluminum*.

19 Rao, MG and P K Ramam, 1979, *The East Coast Bauxite Deposits of India*, Calcutta: Geological Survey of India.

20 In mining, overburden is the material that lies above the area of economic interest – mainly soil, rocks, etc.

21 Vimta Labs, 2005a:E-2; Global Experts, 2008, p24.

22 Caustic soda, or sodium hydroxide, is a strong alkaline solution and a common chemical base for various industrial purposes.

23 Barham, B, S G Bunker and D O'Hearn, 1994, *States, Firms, and Raw Materials: The World Economy and Ecology of Aluminium*, University of Wisconsin Press.

Figure 2: Proposed mining lease area with nearby villages

Source: CNET/Spot satellite imagery accessed via Google Earth. Image date: 5 February 2005.Mining lease area taken from Tata AIG Risk Management 2002b:Figure 1-6. Identification of villages based on survey by Survival International supported by interviews and toposheet maps resolution 1:50,000. Mining boundaries from mining plan (Engineers India Ltd 2004).

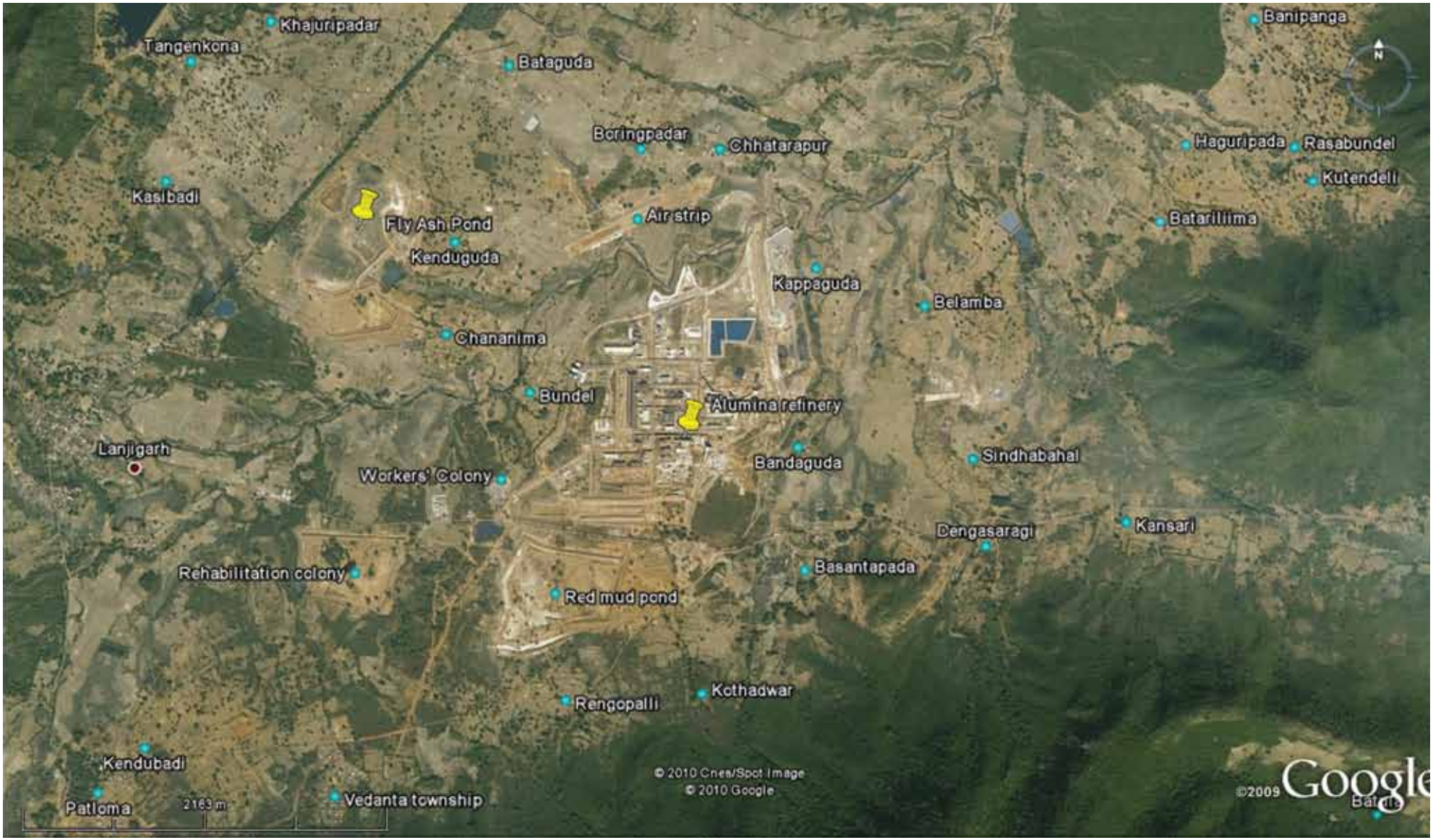

Figure 3: Close-up of Vedanta's Lanjigarh refinery with nearby villages

Source: CNET/Spot satellite imagery accessed via Google Earth. Image date: 5 February 2005.Identification of villages based on toposheet maps of scale 1:50000 in combination with interviews

The existing refinery produces 1 mtpa and needs a supply of about 2.5 million tonnes of bauxite ore a year.[24] Its major waste product, known as red mud, is produced at a rate of 1 to 1.5 tonnes per tonne of alumina. This red mud contains heavy metals and caustic soda which need to be kept away from water sources and prevented from spreading with the wind as dust. Containing and managing red mud poses a serious challenge owing to the large quantities involved and its continued toxicity. Other environmental issues include air pollution arising from the alumina production process and the thermal power plant. Transport of ore, mainly via trucks, can be a significant issue, as can the use of water in a seasonally dry region such as Orissa.

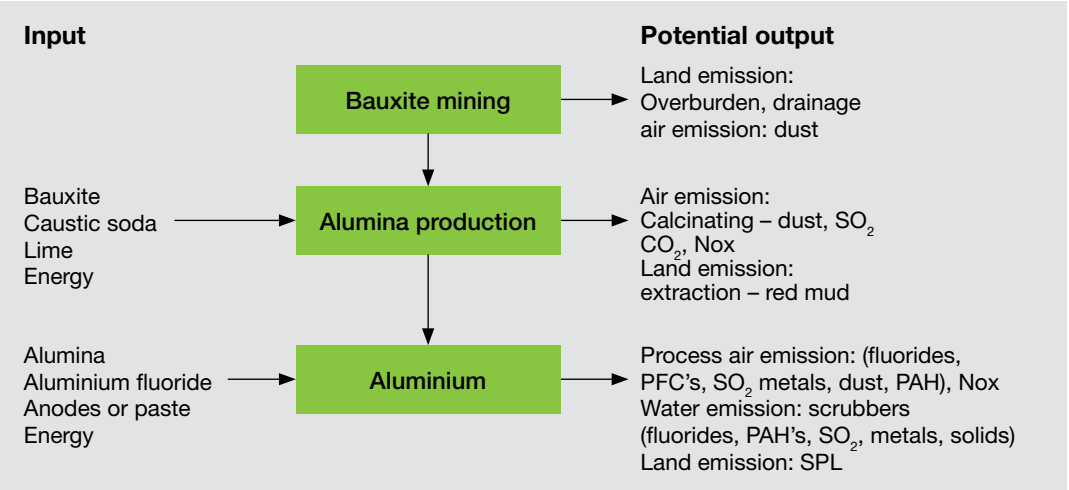

Figure 4: The stages of the aluminium industry and its potential environmental effects

Source: Adapted from European IPPC Bureau, 2001 and BS Envi Tech, 2008

24 Vimta Labs, 2005a. Best practice includes the use of 1.9-2.25 tonnes of bauxite per tonne of alumina according to the European IPPC 2001.

Daka Majhi stands outside his house in Lanjigarh. Vedanta has been involved in controversial negotiations to buy land in the area.
© Sanjit Das

2. Framework of analysis

This report examines Vedanta's EIAs through three lenses:

- The extent to which they comply with the environmental requirements set out in the relevant EIA Notifications and Terms of Reference
- The extent to which they comply with the socio-economic requirements laid down in the relevant EIA notifications
- The extent to which the EIAs anticipate and address human rights concerns arising from environmental impacts.

A central premise of this report is that the environmental impacts of Vedanta's refining and proposed mining activities have far-reaching implications for the human rights of communities affected by the company's operations. These linkages are explained in Chapter 5. The human rights benchmarks used are those established by international human rights treaties and standards.

A further basis of comparison is provided by industry guidance and practices on impact assessments, and specifically on human rights. These include guidelines promoted by the International Council on Mining and Metals (ICMM). Reference is also made to leading impact assessment practices undertaken in other major alumina refining countries, such as Australia.

The analysis of Vedanta's EIAs builds on fieldwork that Amnesty International conducted during 2008 and 2009, visiting the Lanjigarh area and the Niyamgiri Hills, carrying out one-to-one interviews and focus group discussions in communities across eight villages in the Lanjigarh area and 19 hamlets in the Niyamgiri Hills. The EIAs were analysed by a multi-disciplinary team of experts on the social and environmental impacts of mining.

2.1 India's regulatory requirements for EIAs

India has had an over-arching environmental approval mechanism since 1994, which requires EIAs to be carried out for specific types of projects and activities. The EIA must then be discussed at a public hearing on or close to the proposed project site. A number of other laws also relate to protection and management of the environment. Of particular significance to mining and metals are the laws prescribed in the Mines and Minerals Development and Regulation Act 1957,[25] the Forest (Conservation) Act 1980,[26] the Environmental Protection Act and Rules 1986,[27] and the Environmental Impact Assessment Notifications of 1994 and 2006.

Additionally, for certain projects and activities the MoEF may also impose 'Terms of Reference', which are specifically developed for each proposed project. This allows local considerations – such as existence of important biodiversity areas, forests or bodies of water, prevailing levels of pollution – to be included in the EIA requirements.[28]

25 Since 1988 the Indian Bureau of Mining has had the responsibility to monitor all existing mines in India based on the mining plan. A mine closure plan was made mandatory in 2004. See Bhushan, C and M Zeya Hazra, 2008, *Rich lands poor people: Is 'sustainable' mining possible?,* New Delhi: Centre for Science and Environment.

26 The Forest Conservation Act is essential for mining approvals since this almost always concerns forest land. Forest clearance is a separate process from environmental clearance, although both are handled by the MoEF.

27 Under this umbrella legislation there are five main acts; the Water (Prevention and Control of Pollution) Act, 1974 (amended in 1988); the Air (Prevention and Control of Pollution) Act, 1981 (amended in 1988); The Environment (Protection) Act, 1986 (with rules 1986 and 1987); the Forest (Conservation) Act, 1980 (amended in 1988); and the Wildlife (Protection) Act, 1972 (amended in 1991).

28 See MoEF Terms of Reference documents 2009b, 2008b and 2004. The Terms of Reference may in turn refer to additional documents, such as the recommendations of the Charter on Corporate Responsibility for Environmental Protection (CREP) for the aluminium sector mentioned in MoEF, 2008b.

Mine and refinery clearance requirements

The MoEF applied its EIA Notification of 27 January 1994 to the mine and initial refinery applications. The need to apply for environmental approval according to the 1994 Notification was based on the type and scale of proposed operations. For all mining leases with an area of at least 5 hectares, including mining of bauxite, environmental clearance is mandatory. The alumina refinery is one of the 'primary metallurgical industries', which all require environmental clearance.[29]

In 2006 the MoEF issued a new Notification, under which projects are categorised as 'A' or 'B' types. All category A projects need prior central government clearance, while category B projects are handled by state environmental assessment authorities. A change to the requirements has meant that an application to the MoEF as part of category A is required only if the mining lease area is larger than 50 hectares. Any mineral processing of more than 100,000 mtpa places a plant in category A.[30] Both Vedanta's mine and refinery thus require environmental clearance from the MoEF according to both Notifications.

The Notifications stipulate that entities applying for environmental clearance of projects must submit an EIA report and include a set of indicators. The 1994 Notification requires site clearance to be given in advance of an EIA being undertaken to avoid projects being pursued in locations that are clearly unsuitable, such as National Parks. This demand was dropped from the 2006 Notification, which requires details of potential future expansion or cumulative impacts from related projects.[31] Details on the extent of information that must be provided are somewhat cursory, but all applications must contain information on the following:

1. Location
2. Objective of project
3. Land requirements
4. Climate and air quality indicators
5. Water balance
6. Solid waste generation
7. Noise and vibrations
8. Power requirements
9. Peak labour force (including endemic health problems in the area due to waste water/air/soil borne diseases)
10. Number of villages to be displaced
11. Risk assessment and disaster management plan
12. EIA including environmental management plan
13. Details of environmental management organisation

While only items 9 and 10 from this list are direct social considerations, the other requirements have potential implications for people living or working in the project area. For example, the project's land requirements (item 3), in so far as they include agricultural and forest land, could require consideration of impact on the affected population.

Refinery expansion clearance requirements

The EIA Notification of 2006 applies to the request for environmental clearance for the refinery expansion proposed in 2008. Although this is an expansion of an existing project, it is a category A project in itself according to the Notification, and therefore requires prior environmental clearance from the Indian government under the 'primary metallurgical industry' category.[32]

29 MoEF *Environment Impact Assessment Notification 1994*.

30 MoEF *Environmental Impact Assessment Notifications and Amendments 2006*.

31 MoEF, *Environment impact assessment Notification 1994*. New Delhi, Government of India. Incorporating amendments made on 04/05/1994,10/04/1997, 27/1/2000,13/12/2000, 01/08/2001 and 21/11/2001; MoEF, 2006, *Environmental Impact Assessment Notifications and Amendments 2006*.

32 MoEF *Environmental Impact Assessment Notifications and Amendments 2006*, p3.

The 2006 Notification is significantly more detailed than the 1994 Notification in the kind of information it requires: every clause contains a number of detailed sub-clauses which seek detailed answers. The Notification has added requirements that specifically demand information about impact during construction, operation and de-commissioning; transport and handling; dust and odour release; and the emission of light and heat. The following information is required:

1. Construction, operation or decommissioning of the project
2. Use of natural resources for construction or operation
3. Use, storage, transport, handling or production of substances and materials
4. Production of solid wastes during construction, operation and decommissioning
5. Release of pollutants to air
6. Generation of noise and vibration, and emissions of light and heat
7. Risks of contamination of land or water from releases of pollutants
8. Risk of accidents during construction or operation of the project
9. Factors which should be considered (such as consequential development) which could lead to environmental effects or the potential for cumulative impacts
10. Environmental sensitivity.

Other detailed requirements directly related to human impact are:

1. Facilities for long-term housing of operational workers
2. Influx of people to an area either temporarily or permanently
3. Water (expected sources and competing users)
4. Changes in occurrence of disease or affecting disease vectors (for example insect or water borne diseases)
5. Effects on the welfare of people (for example by changing living conditions)
6. Vulnerable groups who could be affected by the project (for example hospital patients, children, the elderly)
7. Risk of accidents during construction or operation of the project, which could affect human health or the environment
8. Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value.[33]

Under the heading 'Generic Structure of EIA Document', the 2006 Notification has a section on the need to detail local benefits arising from the proposed project.[34]

The 2001 EIA manual, prepared by the impact assessment division of the MoEF, is part of the Ministry's ongoing efforts to 'ensure transparency in the procedures of environmental clearance and to assist the project authorities in improving the quality of EIA documents'.[35] The manual provides a degree of guidance for MoEF officials on how to carry out an appraisal of EIA applications. The guidance in the manual is not binding, but officials can use it to assess whether companies have collated the correct data or provided an adequate level of analysis. In common with the Notification requirements, the guidance in the manual does not require companies to adopt a human rights based approach to data collection, impact assessment or proposals for mitigation.

33 MoEF *Environmental Impact Assessment Notification 1994*, pp20-26.

34 MoEF, item 8 'Project Benefits: Improvements in the social infrastructure', *Environment Impact Assessment Notification 2006*, p34.

35 MoEF, 2001, *Environmental Impact Assessment – A Manual*, http://envfor.nic.in/divisions/iass/eia/Cover.htm

Other regulatory considerations

The complexity of India's regulatory system

India's environmental regulatory system has dual compliance requirements in relation to some environmental issues at the national and state level. The Pollution Control Board of each state has the responsibility to monitor the environmental impacts according to the environmental clearance and the EIA report. The Indian Bureau of Mines (IBM), part of the central government's Ministry of Mines, monitors the mining lease conditions. In addition, the Forest Department of each state government is responsible for reforestation. The work of the IBM and the content of the mining plans submitted are restricted knowledge in the hands of a small set of bureaucrats and company representatives.[36]

An added dimension in the case of Lanjigarh and Niyamgiri is the Supreme Court verdict in the case launched by activists in 2004. The environmental clearance for the Niyamgiri mine stated explicitly that: 'The project proponent shall effectively comply with all the directives of the Honourable Supreme Court of India while implementing the project.'[37] As part of the Supreme Court case, a number of additional studies were conducted by a court-appointed committee, research institutions and by mining consultancies that are not normally part of the official framework of consideration for EIAs. Some of these studies are referred to in later sections of this report.[38]

Rapid environmental impact assessment

To increase the speed of environmental approvals, a 'rapid EIA' was introduced. The main difference between a rapid and a comprehensive EIA is that the rapid EIA does not provide environmental data for all seasons of the year. The 1994 EIA Notification describes the rapid EIA in the following terms:

> As a Comprehensive EIA report will normally take at least one year for its preparation, project proponents may furnish Rapid EIA report to the IAA [Impact Assessment Authority] based on one season data (other than monsoon), for examination of the project. Comprehensive EIA report may be submitted later, if so asked for by the IAA.[39]

The norm for a project was supposed to be a comprehensive EIA, although the EIA Notifications 1994 and 2006 have not clarified this point. In practice it appears to have become common to perform rapid EIAs in India: all Vedanta's EIAs examined in this report, other than the 2005 refinery report,[40] are rapid EIAs. The rapid 2005 mining EIA relates to the pre-monsoon, monsoon and post-monsoon seasons of the year, despite the requirement that the monsoon should not be included in the preparation of a rapid EIA report, since extreme rainfall represents conditions where existing pollution issues may go undetected. Conversely, avoiding the autumn and winter seasons could result in a lack of critical information, including the variation of water flows, surface as well as groundwater, and changing wind patterns. [41] For wildlife conservation there is a risk of failing to recognise migrating animals and birds. Limiting the seasonal scope of the assessments yields results that may be quite misleading from an environmental perspective, while also masking important social consequences.

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36 Bhushan, C and M Zeya Hazra, 2008, *Rich lands poor people: Is 'sustainable' mining possible?* Centre for Science and Environment, New Delhi, India.

37 MoEF, 2009b, *Environmetal clearance for Lanjigarh bauxite mining project*.

38 These studies included: CEC, 2005, *Site Inspection Report of the Fact Finding Committee Regarding its Visit to Orissa from 18th-23rd December 2004*, New Delhi; CEC, 2007, *Supplementary report in No. 1324 and No. 1474 regarding the alumina refinery plant being set up by M/s Vedanta Alumina Ltd*., New Delhi; Wildlife Institute of India, 2006a, *Studies on impact of proposed Lanjigarh bauxite mining on biodiversity including wildlife and its habitat*, Dehradun, India; Wildlife Institute of India, 2006b, *Supplementary report on impact of proposed Lanjigarh bauxite mining on biodiversity including wildlife and its habitat*, Dehradun, India; CMPDI, 2006, *Interim report on hydrological investigations Lanjigarh bauxite mines M/S Orissa Mining Corporation*, Ranchi, India.

39 MoEF *Environmental Impact Assessment Notification 1994*.

40 Vimta Labs, 2005a, *Comprehensive environmental impact assessment for the 1.0 mtpa alumina refinery and captive power plant at Lanjigarh, Kalahandi district, Orissa*.

41 Many of these seasonal patterns such as groundwater flow are not set out in the comprehensive refinery EIA (Vimta Labs, 2005a).

Accessibility of information

EIAs are public documents. However, in practice affected individuals and communities face significant challenges in accessing the information in EIAs, which is often lengthy, technical and in English; no adequate summary in the local language is required, and public fora to discuss EIAs are reported to be of very variable quality. Supplementary information that may influence regulatory processes – for example, additional studies – is often not made public. Reports produced by Vedanta as part of the design of its alumina refinery are not public documents, as the company is not obliged to share information. The existence of additional special reports becomes publicly known only if it is referred to either in the EIA or in the Terms of Reference document. It is then up to interested parties to use the Right to Information Act 2005 to demand copies of the reports. However, poor, rural communities lack the resources to do this. They are also unlikely to be able to understand technical documents written in English.

2.2 International leading practice: human rights and environmental management

Industry standards on human rights

The UN Special Representative on business and human rights

Professor John Ruggie has served since 2005 as the United Nations Special Representative of the Secretary-General on human rights and transnational corporations and other business enterprises (UN SRSG). The UN SRSG developed the 'Protect, Respect and Remedy' framework for business and human rights to protect against corporate-related human rights abuses. The framework is premised around the following core principles:

- The state has an obligation to protect against human rights abuses by other entities, including businesses.
- Corporations have a responsibility to respect basic human rights.
- There is a need for effective and accessible remedies for victims of corporate abuses.[42]

The UN SRSG views impact assessments as a key element of the responsibility of corporations to respect human rights. He stated in his 2007 report to the UN Human Rights Council: 'No single measure would yield more immediate results in the human rights performance of firms than conducting such assessments where appropriate.'[43] The UN SRSG positions human rights impact assessments within the framework of 'due diligence' asserting that companies routinely conduct due diligence to ensure that a contemplated transaction has no hidden risk.[44] He argues: 'This process must go beyond simply identifying and managing material risks to the company itself to include risks a company's activities and associated relationships may pose to the rights of affected individuals and communities.'[45]

The International Council on Mining and Metals

The ICMM represents a range of multinational mining and metal companies. It has developed a set of guidelines on sustainable development, Indigenous rights and human rights, to which members are expected to adhere. These guidelines reflect the fact that many mining companies have accepted the need for voluntary measures to move beyond state requirements for EIAs. Some mining companies have recognised that it is essential to address the environmental, social, cultural, economic and human rights issues associated with their operations. This approach is identified by the companies as ensuring longer-term sustainability for their business. Vedanta is not a member of the ICMM.

42 Ruggie, J, 2008, *Protect, Respect and Remedy: A Framework for Business and Human Rights*, Report to the Human Rights Council, p4.

43 Ruggie, J, *Report to the Human Rights Council*, 2007, p21.

44 Ruggie, J, *Report to the Human Rights Council*, 2010, p16.

45 *Ibid*, p17.

Leading practice in environmental management of alumina refineries

To complement India's environmental regulations, this report compares Vedanta's EIAs with international leading practice standards. For bauxite mining and alumina refining Australia is taken as a reference country because of the long-standing work which has been done together with affected communities to improve the environment, and to respect the rights and cultures of the Indigenous Peoples of the country. This is not to suggest that Australia is a beacon of leading practice, but rather that it offers lessons that other countries can draw on.

According to European Union best practice, as reflected in the EU Directive on Integrated Pollution Prevention and Control,[46] alumina refineries should use the Bayer process as the standard technique. Within this process there are several variations which may depend on the type of ore used and other conditions, including:

- Handling, storage and grinding of bauxite, lime and other materials to minimise dust
- Design and operation of digesters to minimise energy use, eg the use of tube digesters and thermal heat exchanger oils to allow maximum heat recovery and higher digestion temperature
- Use of fluidised bed calciners with preheating to use the heat content of the off gases
- Use of fabric filters or EPs to remove calcined alumina and dust
- Disposal of red mud in sealed areas with the reuse of transport and surface water from the ponds.[47]

2.3 **Vedanta's claims about its environmental standards**

Vedanta has adopted a company-wide policy stating it will 'strive to develop, implement and maintain health, safety and environment management systems aligned with our commitments and beliefs and consistent with world-class standards'.[48] Directly related to its Lanjigarh operations, full-page ads have appeared across India (in, for example, the newspaper *Mint* on 11 March 2010) where the company described its operations in Lanjigarh as 'Vedanta's world-class, state-of-the-art alumina project'. It went on to claim: 'Vedanta's alumina refinery is amongst the most environment friendly plants in the world with "zero discharge" and moving towards "zero waste".'

Similar statements were made in a 2009 press release that said Vedanta Aluminium 'has adopted benchmarked technology with best operational practices and superior environment management practices in order to develop the Alumina Refinery as one of the world's model Alumina refining complex'. In the same press release Dr Mukesh Kumar, chief operating officer of Vedanta Aluminium, stated: 'Being present in an Eco-sensitive area it is the responsibility of Vedanta to improve ecological condition of the locality. Vedanta is deeply committed to follow world class practices in Environment Management and the principles of sustainable prosperity of the area.'[49]

In Vedanta's 2010 petition to the High Court of Orissa to seek reinstatement of the refinery expansion project, the company claims that the environmental performance of the existing refinery is 'excellent and unimpeachable' and that the company has 'always complied with the conditions, guidelines or instructions issued from time to time by the regulatory bodies'.[50]

Vedanta's 2009 *Sustainable Development Report* refers to the company's aim 'not only to minimise damage to the environment from our projects but to make a net positive impact on the environment wherever we work'.[51]

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46 EU Directive on Integrated Pollution Prevention and Control 2001, http://ec.europa.eu/environment/air/pollutants/stationary/ippc/general_guidance.htm.

47 Best practice includes the use of 1.9-2.25 tonnes of bauxite per tonne of alumina according to the European IPPC 2001.

48 Vedanta Resources Plc, *Annual Report*, 2005.

49 On the Vedanta Aluminium website it is stated that, 'The greenfield aluminium refinery at Lanjigarh became operational in 2008 and has carved out a niche for itself as one of the world's premier alumina refining complex. In January 2009, VAL was awarded the ISO 9001:2008, ISO 14001:2004 and OHSAS 18001-2007 certificates for adopting global standards in quality, environment and health and safety systems. The certificates were awarded after a five-day audit by British Standard Institute (BSI) covering quality, environment and safety standards.' www.vedantaaluminium.com/history.htm.

50 Vedanta Aluminium vs. Union of India and Others, High Court of Orissa, Cuttack, W P (c) No. 19605 of 2010, paras P and Q.

51 Vedanta Resources Plc, *Sustainable Development Report 2009*.

2.4 **Independent view of Vedanta commissioned by its bankers**

In September 2010 Standard Chartered, in conjunction with other bank lenders to Vedanta, appointed a consultancy, Scott Wilson Ltd, to undertake a review of Vedanta's approach to sustainable development. The terms of reference of this assignment included an assessment of social and environmental issues relating to Vedanta Aluminium's Lanjigarh refinery, and a review of Vedanta's policies and practice against international standards.

A summary of the report published on 17 November 2010 is available on Vedanta's website.[52] The findings of this report, drawing on evidence from the Lanjigarh refinery, highlight a number of deficiencies in the company's approach to addressing its social and environmental impacts:

- Lack of oversight and integration of sustainability issues, including human rights
- Lack of recognition of local communities as a key stakeholder
- Failure to provide timely, accurate and complete information in response to public requests
- Lack of consistency and uniformity of approach to sustainable development across subsidiary companies
- Inadequate conception of sustainability that does not reflect the International Finance Corporation's Social and Environmental Sustainability Performance Standards
- Inadequate management of land in the company's ownership with regard to environmental impacts and biodiversity
- Inadequate monitoring of environmental impacts
- Failure to benchmark environmental and social impact assessments against industry standards
- Failure to recognise needs of indigenous and vulnerable groups
- Absence of an accessible grievance procedure for communities to raise concerns
- Lack of commitment to securing the Free, Prior and Informed Consent of local communities when proposing new developments
- Lack of an independent audit of compliance with international standards, such as those of the International Finance Corporation (IFC), ICMM and Organisation for Economic Cooperation and Development (OECD)
- Lack of a clear human rights policy that seeks to comply with international human rights standards.

The Scott Wilson report identifies systemic failings of Vedanta's stewardship of social and environmental issues with regard to oversight, policy, benchmarking, monitoring, disclosure and auditing. The report makes recommendations to address these deficits, including improvements to Vedanta's EIA and consultation process.

The report makes a specific proposal to augment and update the existing EIA for the refinery expansion and acknowledges that the original EIAs for the refinery:

> did not incorporate the Industry Best Practice criteria used in this review and further information could have been provided in relation to supply chain impacts, consultation, socio-economic impacts (especially in relation to vulnerable groups or 'indigenous peoples'), biodiversity, ionising radiation, greenhouse gases and climate change.[53]

The Scott Wilson report proposes a deadline of June 2012 for Vedanta to implement its recommendations.[54]

52 Scott Wilson, 2010, *Vedanta Resources plc and Lanjigarh Refinery: Independent Review of Sustainability Policies and Practices*, 17 November 2010, http://csr.vedantaresources.com/scottwilson.html.

53 *Ibid*, p15.

54 Presumably the deadline was set by the banks that commissioned the report.

2.5 **Documents analysed**

The EIAs analysed in this report are the full set of documents that are known to have been produced for Vedanta and submitted by the company to demonstrate conformity with India's regulatory requirements for environmental clearance. The EIA documents are:

- **The 2002 Lanjigarh refinery EIA**
  Tata AIG Risk Management Services Ltd., 2002a, *Rapid environmental impact assessment report for 1.0 mtpa alumina refinery proposed by Sterlite Industries Ltd. at Lanjigarh.*
- **The 2002 Niyamgiri mine EIA**
  Tata AIG Risk Management Services Ltd, *2002b, Rapid environmental impact assessment report for bauxite mine proposed by Sterlite Industries Ltd. near Lanjigarh, Orissa.*
- **The 2005 Lanjigarh refinery EIA**
  Vimta Labs, 2005a, *Comprehensive environmental impact assessment for the 1.0 mtpa alumina refinery and captive power plant at Lanjigarh.*
- **The 2005 Niyamgiri mine EIA**
  Vimta Labs, 2005b. *Rapid environmental impact assessment for the proposed bauxite mines at Lanjigarh, Kalahandi district, Orissa.*
- **The 2008 Lanjigarh refinery expansion EIA**
  Global Experts, 2008, *REIA and EMP Report of expansion of Alumina Refinery from 1 MMTPA to 6 MMTPA Capacity of M/s Vedanta Aluminium Limited, Lanjigarh, Kalahandi, Orissa, Bhubaneshwar, Orissa.*

The EIAs are very similar in style and content. They all take a strictly technical approach to environmental management where the pollution sources are measured and compared to standards prescribed by the Indian government. They make limited reference to human settlements and water bodies, as well as forests and other specific locations where people and the environment are especially likely to suffer negative consequences.

Contents of the EIAs

The 2002 Refinery EIA and the 2002 Mine EIA

by Tata AIG Risk Management Services

Tata AIG Risk Management Services is a joint venture between Tata & Sons of India and American Insurance General (AIG) of the United States formed in 1998. The company stopped undertaking environmental assessments in 2003.

Both EIAs were prepared at the same time and they are structured in exactly the same way. The two projects were initially presented by Vedanta as interlinked. It was only later that the mine and refinery came to be treated as completely separate entities undertaken by different operating companies. This was done to meet the concerns of India's Supreme Court, which granted approval to enable refinery construction to begin in 2003, but delayed approval for the mine until 2008.[55]

Outline

Executive summary
Introduction
Environmental setting and potential environmental impact:
• Water environment • Air environment • Noise level • Land environment
• Ecological environment • Socio-economic environment • Environmental management plan
• Environmental impact summary • Risk analysis • Disaster management plan

55 The approval of the Supreme Court meant only that the mine was allowed to proceed according to normal regulatory procedures including the environmental clearance.

2005 Refinery EIA

by Vimta Labs

Vimta Labs is an environmental consultancy based in Hyderabad, India. Established in 1984 the company refers to itself as a 'contract research and testing organisation' and has more than 820 employees.[56] It has significant experience of undertaking EIAs across India and has been responsible for a number of recent bauxite mining and refining EIAs.[57] The 2005 refinery EIA is the only 'comprehensive' EIA among all the EIAs analysed; ie it contains measurements from all the seasons of the year. Although this makes the set of data presented in the report more complete, the EIA is not significantly different from the other 'rapid EIAs'.

Outline

Executive summary
Project description
Process details and sources of pollution
Process description
Air pollution
Wastewater
Solid wastes
Noise pollution
Baseline environmental status
Impact assessment
Identification of impacts
Construction
Operational phase
Indirect impacts (public health and safety, cultural resources)
Environment management plan
Risk assessment and disaster management plan
Comparison of baseline environmental status
Appendix (land use pattern, demographic data, emission calculations)

56 Vimta Labs, www.vimta.com.

57 See Vimta Labs, 2005a; Vimta Labs, 2005b; Vimta Labs, 2006, *Rapid Environmental Impact Assessment for the Proposed Capacity Expansion of Utkal Alumina Refinery from 1.0 Mtpa to 3.0 Mtpa at Doragurha, Rayagada Dist, Orissa*; Vimta Labs, 2007, *Rapid Environmental Impact Assessment For the Proposed 1.4 Mtpa Alumina Refinery and Co-generation Plant at Srungavarapu Kota, Vizianagaram District, Andhra Pradesh*.

2005 Mine EIA

by Vimta Labs

Outline

Introduction
Proposed mining and sources of pollution
Introduction, geology, ore reserves
Air pollution
Water pollution
Land despoliation
Disposal of solid waste
Noise pollution
Baseline environmental status
Geology, hydrogeology
Meteorology
Air quality
Water quality
Soil characteristics
Noise levels
Biodiversity
Land use studies
Demography and socio-economic data
Impact assessment
Impact on topography, climate and land
Impact on water quality
Impact on noise levels and ground vibrations
Impact on soil
Impact on biodiversity (flora and fauna, plus forest land)
Impact on demography and socio-economic data
Environment management plan
Risk assessment and disaster management plan
Appendix (emission data, land use data, demographic details, list of plant species)

2008 Refinery Expansion EIA

by Global Experts

Global Experts is an environmental consultancy based in the state capital of Orissa, Bhubaneshwar. Its website lists no details of the kind of experience the consultants possess or anything about its history. The list of clients is quite lengthy, indicating a focus on metals and mining in the state of Orissa.

Outline

Introduction
Project profile
Location
Process description
Raw material and water supply
Organisation, manpower and capital cost
Present environmental setting
Land environment
Climate and micrometeorology
Ambient air quality
Noise characteristics
Water environment
Soil quality
Ecological assessment
Baseline socio-economic status
Impact identification
Impact prediction and evaluation
Environmental impacts during construction
Pollution potential during operational phase
Impact assessment and prediction during operational phase
Evaluation of impacts
Environmental management plan
Solid waste management
Wastewater management
Measures for improvement of ecology
Socio-economic development
Risk assessment and disaster management plan
Environmental management system and implementation of EMP
Project benefits and conclusion
Appendix (compliance of existing refinery to EIA regulations, Vedanta Corporate Social Responsibility report, demographic data about Dongria Kondh)

A worker leaves Vedanta's alumina refinery in Lanjigarh.
© Gethin Chamberlain

3 Environmental analysis

3.1 Overview of environmental analysis

This chapter presents an analysis of the Environmental Impact Assessments (EIAs) of the Niyamgiri mine and Lanjigarh refinery with a focus on sources of pollution and their consequences for the local population. The analysis presented in this chapter has been informed by the views of international experts on the social and environmental impacts of the mining industry, who reviewed all the relevant documentation.

Each sub-section starts with an overview of the relevant requirements from India's Ministry of the Environment and Forests (MoEF) with regard to EIA Notifications and Terms of Reference documents. Throughout this chapter the analysis relates to the EIAs for both the mine and the refinery.

EIAs have been public documents in India since 2002. While the quality of EIAs is variable, the documents are an important source of information about what is being planned for mining and industrial projects.[58] Once an EIA has been conducted for a project, the project proponent is required to hold a public consultation. However, the technical complexity of the documents presents challenges for many affected communities. Indian regulations do not, as yet, require project proponents to take specific measures to ensure all relevant information is fully accessible to individuals and communities that may be affected, although some good practice does exist internationally in this area.[59]

Overall the EIAs examined contain very little information on the existing social and natural environment at locations that are particularly important for an understanding of potential environmental impacts of the mine and refinery. While some environmental data is presented for a 10km range[60] around the mine and refinery sites, there is insufficient information about the villages close to the refinery and mine, for example on land use and natural features within a few kilometres of the sites. There is very little information on water bodies, groundwater, forest and other environmental features, on how many people live at each location and what resources they depend on for their livelihoods. When such information is unavailable the reader must try to determine what the nature and scale of local impacts will be by interpreting the regional data.

The information-gathering on site by the EIA consultants was restricted to taking samples of soil, water and air for measurement. Other information – environmental, geological and social – was gathered from secondary sources in the absence of other baseline studies. The information presented in the EIAs broadly details the various potential sources of pollution from the mine and refinery operations, and the measures that would be taken to mitigate these, as required by India's EIA Notifications, albeit with some significant omissions which are analysed in more detail below.

58 Vagholikar, N and K A Moghe, 2003, *Undermining India: Impacts of mining on ecologically sensitive areas.*

59 See for example: Howitt, R, 2001, *Rethinking resource management: justice, sustainability and indigenous peoples*; O'Faircheallaigh, C, 2008, 'Negotiating Cultural Heritage? Aboriginal-Mining Company Agreements in Australia' in Development and Change, 39(1), 25-51; Scholtz, C S, 2006, *Negotiating claims: the emergence of indigenous land claim negotiation policies in Australia, Canada, New Zealand, and the United States.*

60 This is the prescribed 'study area' for EIAs as defined by the Indian government.

EIA requirements on the provision of information

EIA Notification 1994

Concealing factual data or submission of false, misleading data/reports, decisions or recommendations would lead to the project being rejected. Approval, if granted earlier on the basis of false data would also be revoked. Misleading and wrong information will cover the following:

- False information
- False data
- Engineered reports
- Concealing of factual data
- False recommendations or decisions

EIA Notification 2006

Deliberate concealment and/or submission of false or misleading information or data which is material to screening or scoping or appraisal or decision on the application shall make the application liable for rejection, and cancellation of prior environmental clearance granted on that basis. Rejection of an application or cancellation of a prior environmental clearance already granted, on such ground, shall be decided by the regulatory authority, after giving a personal hearing to the applicant, and following the principles of natural justice.

Source: Ministry of Environment and Forests (1994, 2006)

The EIAs contain very little information on or analysis of the human dimension of environmental issues, even when this is clearly relevant. When inhabitants of the area, including their homes, places of work and worship, are not examined it becomes impossible to understand the human implications of the proposed project. For example, a significant number of people live just outside the boundary walls of the refinery. Despite this, there is no discussion in the 2002 and 2005 refinery EIAs of the likely impacts of a major industrial plant on this population. The 2008 EIA for the expanded refinery also fails to look at the impacts on these villages from the operations of the existing refinery.[61] This is inexcusable, given that villagers and various civil society organisations had previously raised serious concerns about impacts – including pollution, noise and dust – affecting the communities.

Similar failure to consider the human dimension is also apparent in the EIAs for the mine site. The EIA documents lack data setting out the precise limits of the proposed mining operations, and provide very little information on the immediate surrounding area and the people who live there.[62]

61 Tata AIG Risk Management Ltd, 2002a; Vimta Labs, 2005a; Global Experts, 2008.
62 Vimta Labs, 2005b; Engineers India Ltd, 2004.

3.2 **Choice of mine and refinery locations**

EIA requirements on choice of site

EIA Notification 1994

Site clearance was required before preparing the mining EIA, but not for alumina refining:

- The project authorities will intimate the location of the project site to the Central Government in the Ministry of Environment and Forests while initiating any investigation and surveys. The Central Government in the Ministry of Environment and Forests will convey a decision regarding suitability or otherwise of the proposed site within a maximum period of thirty days. The said site clearance shall be granted for a sanctioned capacity and shall be valid for a period of five years for commencing the construction, operation or mining.
- The application for site clearance includes a risk analysis report, a clearance from the state government pollution control board of the choice of location, a commitment on availability of water and power, a project or feasibility report.

Along with a clear identification of the site, potential alternatives should also be analysed:

- Location of the project
- Alternate sites examined and the reasons for selecting the proposed site
- Does the site conform to stipulated land use as per local land use plan?

EIA Manual 2001

- For every project, possible alternatives should be identified and environmental attributes compared. Alternatives should cover both project location and process technologies. Alternatives should consider 'no project' option also. Alternatives should then be ranked for selection of the best environmental option for optimum economic benefits to the community at large.

Terms of Reference, refinery 2004

- Green belt of adequate width and density shall be provided to mitigate the effects of fugitive emission all around the plant. A minimum of 25% of the area shall be developed as green belt with local species in consultation with the DFO, and as per CPCB's guidelines.

EIA Notification 2006

- Factors which should be considered (such as consequential development) which could
  - Lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality
  - Set a precedent for later developments
  - Have cumulative effects due to proximity to other existing or planned projects with similar effects.

Terms of Reference, refinery expansion 2008

- Possibility of reducing requirement of private land.

Source: Ministry of Environment and Forests (1994, 2001, 2004, 2006, 2008b)

Main shortcomings of Vedanta's EIAs

- No substantive discussion of alternative sites.
- Failure to draw out cumulative impacts of mining and refining activities in close proximity.

Choice of site

The choice of location for mining and refining bauxite, and the potential cumulative impacts arising from the two processes being in close proximity, are complex matters, which might have far-reaching consequences for the people affected. Any such choice needs to take social, environmental, cultural, technical and economic costs and benefits into account. For Vedanta's EIAs to be consistent with the requirements of India's 1994 and 2006 EIA Notifications, they should have included a discussion on the merits of the proposed location with regard to environmental impacts and in the light of other potential options.

The choice of locating a bauxite complex in the Lanjigarh area has never been properly assessed in the EIAs. No potential alternative sites were explored. No assessment has been presented of the cumulative impact of multiple projects including the expansion plan for the refinery. This represents a failure to comply with the requirement of the 1994 and 2006 EIA Notifications. In the case of the 2008 EIA there is also a failure to examine the cumulative impact of current and potential future projects as required.

The refinery EIAs fail to take into account the fundamental risk of locating an alumina refinery next to the Vamsadhara river and in close proximity to several villages. In the EIAs the justification for the location of the refinery is that it will be cost effective because it is as close as possible to the proposed mine.[63]

For both mine EIAs and the 2005 refinery EIA, initial site clearances were required prior to the EIA being conducted. For the refinery expansion the 2006 EIA Notification demanded a pre-screening by the Orissa state government. No documents related to the initial site clearances or screening are available, making it impossible to know what analysis went into the original approval of the sites or the proposed refinery expansion. What is known is that the site clearance for the mine was granted by the MoEF on 12 July 2004 with a five-year validity.[64] Because this period has expired and forest clearance for the mine has been rejected, the original site clearance would appear to be no longer valid.

Given that bauxite ore is available only in certain locations, the choice of mine site inevitably depends on where the ore is situated. Once these locations have been identified it would be expected to place the refinery in the vicinity of the mine to reduce the cost of transporting the ore, based on a careful analysis of site suitability in terms of social and environmental risks.

The justification for the location of the refinery given in the 2002 refinery EIA is, word for word, the same as for the mine.[65] Additionally, the refinery EIA states:

> To be competitive, the 1.0 MTPA Alumina refinery will need a captive bauxite mine having approximately 75 million tons of mineable reserve to ensure supply for about 25 years life of the project.[66] Also, the refinery should be preferably located near the bauxite mine for logistical reasons. Considering these factors the Alumina refinery site is chosen near to the bauxite deposit near Lanjigarh in Kalahandi and Rayagada districts of Orissa.[67]

63 Tata AIG Risk Management Services Ltd, 2002a:2.
64 Dutta, R, 2010, *Opinion on Legal Issues concerning Vedanta Alumina Ltd Operation in Orissa*, Report submitted to Amnesty International UK.
65 Tata AIG Risk Management Services Ltd, 2002a:2.
66 Tata AIG Risk Management Services Ltd, 2002a:1.
67 Tata AIG Risk Management Services Ltd, 2002a:1.

The subsequent 2005 refinery EIA states a cost-saving reason for choosing the Lanjigarh refinery site, 'to avoid huge raw material transportation through rail network the Alumina refinery site is chosen near to the Bauxite deposit in Lanjigarh, Kalahandi district'.[68]

In the 2005 refinery EIA the Lanjigarh site is described as having the characteristics of a suitable location:

> The Plant Site is well accessed by road network connected to all major towns/cities of the state, availability of bountiful water resources are some of the justification for the existence of the Plant. Further the proposed expansion will lead to socio-economic growth and development of the local area.[69]

While the proximity of the refinery to the river was considered important as a source of water for the refinery, the implications for the environment and people that use the river did not appear to merit consideration of an alternative location. Yet in 2005 the Site Inspection Report of the Centrally Empowered Committee acknowledged that the red mud and fly ash ponds (see section 3.4) next to the Vamsadhara river could potentially cause serious pollution in case of a leak.[70]

The refinery is close to the Vamsadhara river.
© AI

68 Vimta Labs, 2005a:E-1.

69 Vimta Labs, 2005a:14.

70 CEC, 2005, *Site Inspection Report of the Fact Finding Committee Regarding its Visit to Orissa from 18th-23rd December 2004*, New Delhi.

3.3 **Air pollution**

This section addresses the refinery and mine EIAs separately because of the number of issues specific to each site.

EIA requirements on air pollution

EIA Notification 1994

- Climate and air quality:
  - Windrose at site
  - Max/min/mean annual temperature
  - Frequency of inversion
  - Frequency of cyclones/tornadoes/cloud burst
- Ambient air quality data:
  - Nature and concentration of emission of Suspended Pariculate Matter (SPM), Gas (CO, CO_2, NO_x, CH_n etc) from the project

Terms of Reference, refinery 2004

- The calciner and boiler stacks shall be provided with electrostatic precipitator and continuous monitoring device for SO_2. The particulate emissions shall not exceed 150mg/Nm^3. The height of the stacks shall be as per the CPCB* guidelines. The boiler and calciner stacks should be equipped with continuous monitoring device to check SPM emission levels. Low NO_x burners shall be installed to control the NOx emissions.
- Adequate ambient air quality monitoring stations shall be established in the downward direction as well as where maximum ground level concentration of SPM, SO_2 and NO_x are anticipated in consultation with the State Pollution Control Board.

EIA Notification 2006 in addition to 1994 Notification requirements

- Dust or odours from handling of materials including construction materials, sewage and waste.

Terms of Reference, refinery expansion 2008

- Residential colony should be located in upwind direction.
- Ambient air quality at 8 locations within the study area of 10km, aerial coverage from project site with one AAQMS† in downwind direction should be carried out.
- The suspended particulate matter present in the ambient air must be analyzed for the presence of poly-aromatic hydrocarbons (PAH), ie Benzene soluble fraction. Chemical characterisation of RSPM‡ and incorporating of RSPM data.
- Determination of atmospheric inversion level at the project site and assessment of ground level concentration of pollutants from the stack emission based on site-specific meteorological features should be included.
- Air quality modelling for Alumina Refinery plant for specific pollutants needs to be done. APCS for the control of emissions should also be included.
- One season data for gaseous emissions other than monsoon season is necessary.
- An action plan to control and monitor secondary fugitive emissions from all the sources as per CPCB guidelines should be included.
- A plan for the utilization of gases in the WHRB§ for generating power should be incorporated.

Environmental clearance, mine

- The critical parameters such as SPM, RSPM, NO_x in the ambient air within the impact zone, peak particle velocity at 300m distance or within the nearest habitation, whichever is closer, shall be monitored periodically.

Source: Ministry of Environment and Forests (1994, 2004, 2006, 2008b, 2009b).
** Central Pollution Control Board (of the central government's ministry of environment and forests)*
† AAQMS ‡ Respiratory suspended particulate matter § WHRB

3.3.1 **Refinery air emissions**

Main shortcomings of Vedanta's EIAs

- The choice of air quality sampling locations does not include a number of affected sites and there is no clear justification for the choice of sites for sampling.
- Sources of emission are not all clearly identified.
- Only a limited set of potential pollutants have been considered.
- Dust and odour are not acknowledged as potential sources of pollution.
- No dust mitigation measures are proposed.

As a major industrial plant, the refinery has a number of potential sources of air pollution. Apart from the type of plant and technology choices, local conditions including wind speeds and topography will affect the concentration and spread of any pollutants. The assessments do not address the possible effect of air pollution on affected populations, nor do they propose measures to mitigate some of the sources of air pollution.

For the 2005 Refinery EIA, a range of air pollutants were measured at nine sites within an 11km radius from the refinery site.[71] For the 2008 refinery EIA, measurements were made at eight regional locations plus two locations within the refinery.[72] The sampling sites provide data for locations at increasing distances from the refinery and in various directions. It is not clear how these sites were chosen, because none of them are close to the refinery where the highest concentrations of pollution would be expected. In 2005 the closest sampling site was Niyamgiri at a distance of 2.5km (with an elevation difference of 900m) and in 2008 Rengopalli, 1.5km away. The latter was selected because it is close to the red mud pond.

Topographic maps and satellite imagery indicate that there are several villages closer to the refinery than Rengopalli (see Figure 3). Bundel, Kenduguda and Chananima villages are all closer than Kasibadi in the north-western direction. To the north Chhattarpur, Bhataguda, Kudajhuli, Raghunathapur and other villages are closer than Harekrishnapur. To the south-east the closest sample village is a full 11km away. The villages closest to the site should be of obvious interest with regard to plant emissions.

Table 1: Sampling locations of ambient air quality

Location	Distance (km)	EIA
Refinery office	0	2008
Refinery power block	0	2008
Rengopalli	1.5 south-west	2008
Niyamgiri	2.5 south	2005/2008
Kasibarhi	3.5 north-west	2005/2008
Harekrishnapur	3.8 north	2005/2008
Lanjigarh	4 west	2005/2008
Mine site	5 south	2005/2008
Bijabandali	5.4 east	2005/2008
Trilochanapur	10.5 south-west	2005
Bhaliapadar	11 south-east	2005/2008

Source: Vimta Labs, 2005a and Global Experts, 2008.

71 Vimta Labs, 2005a.
72 Global Experts, 2008.

Mathematical modelling of ground level concentrations from the refinery in the 2005 EIA indicates that the main direction of atmospheric emissions in winter is to the north-east and south-east, with the main predicted concentrations to the north-east within 3km of the refinery. The highest predicted concentration is at 1.4km in this direction.[73] The pattern is equivalent for SO_2 and NO_x emissions in winter. This data raises questions about the failure to include villages and dwellings close to the refinery in the ambient air quality samples and the atmospheric emissions modelling. Further concerns about the data arise from the fact that the sampling sites do not include any locations to the north-east of the refinery and the only site to the south-east is Bhaliapadar, 11km away.

Plots of ground-level concentrations of air emissions are also included in the 2008 EIA. These indicate peak predicted values to the north, north-west and south for suspended particulate matter (SPM), south-east for SO_2 and north-west and south for NO_x.[74] Again, the highest predicted concentrations predominantly occur within a few kilometres of the refinery. Sampling sites in these directions are close to or beyond the outer limits of the higher incremental value contours. These are Harekrishnapur (3.8km north); Kasibadi (3.5km north-west); Niyamgiri (2.5km south); and Bhaliapadar (11km south-east).

The refinery EIAs have failed to take into account the effects of air pollution in the villages most likely to be affected by pollution. The MoEF's 2005 Terms of Reference require one sampling location in the downwind area but this has not been provided. The location of all villages in the area covered by the modelling of air pollution should have been included in the figures to illustrate the potential impacts. The implications for future monitoring are that the conditions of those most likely to be affected by pollution will not be known.

Sources of emissions

Modelling results for SPM, sulphur dioxide (SO_2) and nitrogen oxides (NOx) are provided in both EIAs. Respirable particulate matter (RPM) is referred to but not modelled and the data on ambient pollutants is incomplete. The information therefore is restricted to a limited list of potential pollutants. Air quality studies of alumina refineries in other contexts have included a wider range.[75] This is the case in Australia, for example, where air quality assessments for refining operations are generally much broader in scope.[76]

Sources of pollutants

Only three sources of emissions are identified in the 2005 refinery EIA: two stacks at the calcination plant and one at the power plant. The 2008 expanded refinery EIA identifies seven sources: five stacks at the calcination plant and two at the power plant. According to environmental experts, this data on potential emission sources is not comprehensive.[77]

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73 Vimta Labs, 2005a:C4-7.

74 The reason for different wind directions in the EIA reports may reflect differences in the input data used for modelling purposes in the different EIAs.

75 Examples of EIAs that provide additional data are: • Pinjarra refinery in Western Australia – total suspended particulates (TSP), volatile organic compounds (VOC), carbon monoxide (CO), mercury and arsenic (Alcoa World Alumina Australia, 2007a); • Gladstone refinery in Queensland – a total of 70 pollutants (Pacific Air and Environment, 2009); • Kwinana refinery in Western Australia – aldehydes and ketones, VOC, SVOC, trace metals, organosulphides, mercaptans, hydrogen sulphide, ammonia, amines, CO (Alcoa World Alumina Australia, 2006). • Worsley refinery in Western Australia – VOC, SVOC, TSP, metals, odour (Johnston et al., 2006); • Wagerup Refinery in Western Australia – aldehydes and ketones, ammonia, amines, carboxylic acids, dioxins and furans, chloride and chlorine, fluorine, fluoride, methane, CO, mercaptans, hydrogen sulphide, VOC, SVOC, trace metals, TSP and RPM (Alcoa World Alumina Australia, 2002).

76 The scope of air quality studies at the Australian refineries has been influenced by public concern over emissions and occupational health issues, as well as regulatory requirements. Air quality assessment and monitoring studies may also be combined with Health Risk Assessments based on guidelines of the US Environmental Protection Agency or other regulatory agencies.

77 Additional sources identified at other refineries include: • Pinjarra – oxalate kiln stack, digestion regenerative thermal oxidation (RTO) stack, cooling tower; • Kwinana – digestion vapour containment stack, digestion heater vents, oxalate belt filter vacuum pump stack, seven minor point sources, and 29 potential fugitive and open air sources that generate dust, caustic mist, liquor vapour, odour and other pollutants; • Wagerup – calcinar vacuum pump vent, calcinar tank vent, liquor burner, clarification tanks, evaporation vacuum pumps, digestion stack and pumps, mills vent, slurry storage, residue storage areas, and cooling lake.

Although the sources may vary between refineries depending on process components, there will be a variety of sources at the Lanjigarh refinery in addition to those identified in the EIAs. The issue of dust coming from the red mud pond is a notable omission in the list of pollutants. Odour is also a major public issue at some refineries and requires specific analysis and management.[78] This is especially true in an area like Lanjigarh where wind speeds are not expected to be high. Odour is not considered in the 2008 EIA despite being a requirement of the 2006 EIA Notification. This is an inexplicable omission.

Dust management

Dust emissions from alumina refineries vary with the ore but consist of alumina, silica, iron oxides and a range of trace metals which in this case may include vanadium. This dust can be a major cause of concern to communities living close to the waste ponds. For this reason a detailed dust management strategy is considered part of international leading practice, such as was developed for the Alcoa Pinjarra red mud pond and surrounding areas in Western Australia.[79] In this plan, the characteristics of the dust, the effect of wind speed and terrain on dust dispersion, dust management techniques and monitoring are discussed.[80]

In India it is also part of standard practice to equip red mud ponds with sprinkler systems to prevent dust particles from spreading.[81] It is unclear why the Lanjigarh refinery red mud ponds (existing and proposed for expansion) do not have sprinkler systems. The use of a dry slurry system would increase rather than decrease the need for dust mitigation since particles are likely to move more easily with the wind when in a completely dry state.

Dust from the lakes, however, may not be a significant issue at Lanjigarh owing to the low wind speeds in the area. According to the Alcoa dust management plan, dust emissions from red mud ponds begin at a wind speed of 6.5m/sec, and become the largest source of dust from the refinery at speeds above 14.5m/sec. The wind speed data in the 2008 refinery expansion EIA indicates speeds above 6.5m/sec are very rare (about eight events recorded in the year from March 2007 to February 2008). Monitoring is needed to determine the actual levels of dust emissions. This should have commenced when the refinery started operations. This data could then have been used to determine the need for dust suppression.

The absence of data on dust emissions from the red mud ponds in the analysis of air pollution in both the 2005 and 2008 EIAs raises questions about compliance with the EIA requirements. Under the 1994 EIA Notification it is mandatory to list all sources of suspended particulate matter as part of an air pollution assessment. In the 2006 Notification this requirement became even more pronounced with the clause adding dust from waste disposal as an explicit requirement.

Reliability of results

The predictive value of the mathematical air emission model depends upon a number of inputs. Meteorological data has been measured on site for one year in the case of the 2005 refinery, which might be considered a minimum for reliable results, especially in view of the varying pattern of monsoon rains. The model chosen by the EIAs does not take into account the elevated terrain of the area, a weakness that the EIAs fail to recognise. In view of these limitations to the air emissions model, combined with a restricted number of pollutants considered in the model and the low number of emission sources tested, the capacity to reliably predict air emissions appears rather weak.

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78 Brown, G J and D F Fletcher, 2003, *CFD Prediction of Odour Dispersion and Plume Visibility for Alumina Refinery Calciner Stacks*.

79 Alcoa World Alumina Australia, 2007b, *Dust Management Plan for the Alcoa Pinjarra Bauxite Residue Disposal Area*.

80 The proposed techniques to mitigate the dust include turning over the top 0.5 to 1m of the mud, wetting the surface of the residues using sprinklers when adverse wind speeds are expected, applying bitumen emulsion to inner dyke walls to reduce dust, applying rock aggregate and wood mulch to residue sand areas (dyke walls etc), applying emulsified waste oil to road surfaces, and stabilising dyke walls with grasses and appropriate native vegetation.

81 See for example BS Envitech, 2008; Vimta Labs, 2006 and 2007. The Vimta Labs EIAs for other alumina refineries in India are particularly interesting because they were undertaken by the same EIA consultants and include sprinklers for the red mud ponds (although in other ways they are not very comprehensive in managing dust).

3.3.2 **Mining air emissions**

Main shortcomings of Vedanta's EIAs

- The choice of air quality sampling locations does not include a number of potentially affected sites and there is no clear justification for the choice of sites for sampling.
- No baseline samples have been taken and no subsequent monitoring is proposed in the Niyamgiri Hill range.
- The failure to identify any villages on Niyamgiri Hill as potentially affected precludes measures to mitigate and prevent pollution.

Potential sources of air pollution are more limited for the mine than for the refinery. Emission of NOx and SO_2 is limited to the operating of various machines for digging, transport and crushing of ore. More consequential is the potential for dust emissions in the form of SPM and respirable particulate matter (RPM) during blasting, drilling, transport, crushing and re-filling of mined-out areas. The 2005 mine EIA identifies these sources of pollution but does not discuss dust mitigation measures or dispersion.[82]

For unexplained reasons both the mining EIA and the mining plan[83] take a different approach to air pollution mitigation from that of the refinery EIAs. Whereas the refinery EIAs failed to identify the villages most likely to be affected, they at least acknowledged the existence of villages where air pollution needed to be monitored. The 2005 mine EIA and the 2004 mining plan both take the position that no villages fall within the mining lease boundary, and they fail to identify villages nearby. They seem to assume that unless villages are within the lease area, they will not be affected by the operation of the mine or the associated transport systems.

From topographic maps and satellite imagery, it is clear that many villages are within only a few kilometres of the site (see Figure 2). The reason presented for the absence from the EIA of any acknowledgement of the potential air pollution impact on hillside villages is a curious reference to a 'Russian study'[84] stating that the forest surrounding the mining area is dense enough to accumulate all sorts of air pollution. In fact the potential role of vegetation in mitigating atmospheric emissions is a complex matter that requires site specific analysis rather than an unsupported assumption such as this.

This may explain why there is no suggestion in the EIA to take samples at the villages on Niyamgiri Hill or to continuously monitor whether SPM remains within prescribed limits during mining operations. However, the EIA has determined that it is worthwhile to study villages further away from the site on the plains (see Table 2). The chosen locations are all in the refinery area around Lanjigarh town, in the valley 700-900 metres below the hill villages, except for one location at the centre of the mining lease, and one 7km east of the proposed mining area. The closest station is Balabadrapur village, 2km north-west of the proposed mine site but far below in the valley. The decision to exclude villages that are relatively nearby, and include locations much further afield, is not explained in the EIA.

No baseline samples have been taken and no subsequent monitoring is proposed anywhere in the Niyamgiri hill range. This deficiency is all the more questionable given that other sections of the report acknowledge that the EIA consultants are aware of the existence of at least some of the villages close to the proposed mine.[85]

82 Vimta Labs, 2005b.
83 Engineers India Ltd, 2004.
84 Vimta Labs, 2005b:C2-38.
85 Land use details have been taken from government statistics for Palberi, Phuldumer in Vimta Labs 2005b, Annexure II, demographic details for Palberi, Phuldumer in Vimta Labs, 2005b, Annexure III.

Table 2: Air monitoring locations for mine

Name of the Station	Distance from mine site (km)	Direction w.r.t. mine site	Environmental setting
Lanjigarh	3.8	NNW	Rural, residential environmental setting representing crosswind conditions
Kasibadi	5.3	N	Rural, residential environmental setting representing crosswind conditions
Niyamgiri Vedanta nagar (near Rengopalli)	2.9	N	Rural, residential environmental setting representing downwind conditions
Balabadrapur	2.0	NW	Rural, residential environmental setting representing crosswind conditions
Harikrishnapur	7.1	NNE	Rural, residential environmental setting representing downwind conditions
Bijamendeli	7.0	NE	Rural, residential environmental setting representing downwind conditions
Bhaliapadar	9.3	SE	Rural, residential environmental setting representing crosswind condition
Trilochanapur	3.7	SW	Rural, residential environmental setting representing upwind conditions
Hill top (mine area)	Mine lease area		Core zone

Source: Vimta Labs, 2005b, Table 3.4.1

3.4 **Disposal of waste**

EIA requirements on waste disposal

EIA Notification 1994

- Solid wastes:
  - Nature and quantity of solid wastes generated including municipal solid wastes, biomedical wastes, hazardous wastes and industrial wastes.
  - Solid waste disposal method.

Terms of Reference, refinery 2004

- The company shall adopt dry disposal (High concentration slurry disposal) system for red mud and ash disposal.

EIA Notification 2006 in addition to 1994 Notification requirements

- Production of solid wastes during construction or operation or decommissioning
- Spoil, overburden or mine wastes, hazardous wastes (as per Hazardous Waste Management Rules), other industrial process wastes
- Facilities for treatment or disposal of solid waste or liquid effluents
- Risks of contamination of land or water from releases of pollutants into the ground or into sewers, surface waters, groundwater, coastal waters or the sea
  - From handling, storage, use or spillage of hazardous materials
  - From discharge of sewage or other effluents to water or the land (expected mode and place of discharge)

Terms of Reference, refinery expansion 2008

- Identification and details of land to be used for ash and red mud disposal should be included.
- Design details of the red mud pond as per the CPCB guidelines with garland drains should be included.
- Red mud pond for at least for 10 years capacity, land availability, structure of pond should be included.
- Action plan for solid/hazardous waste generation, storage, utilisation and disposal should be incorporated.

Source: Ministry of Environment and Forests (1994, 2004, 2006, 2009b)

Main shortcomings of Vedanta's EIAs

- Insufficient discussion and justification of design criteria with regard to giving proper attention to minimising risks to surrounding populations.
- Lack of specificity of exact location of expanded red mud and fly ash ponds.

Refinery waste

Red mud

Red mud is the main form of waste from alumina refineries. It consists of alkaline caustic soda along with a range of heavy metals and other trace elements that vary with the composition of the bauxite ore. Approximately two-thirds of bauxite ore becomes red mud waste. Some of this can be processed and made usable.[86] Storing the mud is difficult owing to the large quantities generated and the very fine particles that result from grinding, which is necessary to dissolve the aluminium oxide in the refining process. These particles may be carried by water or wind if exposed to the elements. The storage structure must thus prevent seepage through the ground and into groundwater sources. The walls must be high enough to contain the mud even in cases of the area being hit by a flood. The design of the pond must have a runoff system to allow rain water to run off and be contained because this water may also be polluted. Finally, it is important to mitigate the effects of dust.

Fly ash

Fly ash, sometimes referred to as 'coal ash' or 'coal fly ash', is what is left of coal after it has been combusted. The coal waste is referred to as 'fly ash' because it flies through the air until it subsequently lands (on the ground, on people, on agricultural land or in water resources). Fly ash contains the toxic components of the original coal that are left behind after it has been burnt. It contains a cocktail of potentially hazardous and health-threatening metals – including arsenic, beryllium, boron, cadmium, chromium, cobalt, lead, manganese, selenium, mercury, molybdenum, strontium, thallium, vanadium – as well as dioxins. Although the proportions of these depend on the composition of the coal fed into the plant, virtually all varieties of coal contain at lease some of each of these pollutants. Scientific studies have established the risk that fly ash poses to human health and to the environment.[87]

The 2005 EIA for the refinery estimated it would produce 2 million tonnes of red mud a year.[88] For the 2008 expanded refinery EIA this increases to 7.5mtpa. This appears to indicate a much lower rate of increase in red mud waste compared to the increase in alumina production, presumably through anticipated process improvements. A high concentration slurry disposal (HCSD) system was installed as part of the Terms of Reference requirements for the 2005 refinery EIA[89] to remove moisture[90] from the red mud waste and thereby reduce the weight of the stored waste (this does not significantly reduce the volume however). 1.28 mtpa of red mud was reported as the actual rate of production of red mud from the refinery with an expectation this would increase to 3.75 mtpa with the expansion when using the HCSD system.[91]

86 The 2002 refinery EIA (Tata AIG Risk Management Services, 2002a) mentions how a special process would recover vanadium from the red mud, since it has commercial value. The refinery EIA 2005 (Vimta Labs, 2005a) claims the concentration of vanadium in the ore is less than 10ppm and therefore negligible, making the recovery unnecessary. But 18,000 tonnes of Vanadium was estimated in the red mud for the 1.0 mtpa refinery (REIA 2002:3-8) (indicating 0.006 tonnes of Vanadium per tonne of ore).

87 See Epstein et al, *The True Cost of Coal*, New York Academy of Sciences, February 2011 http://solar.gwu.edu/index-files/Resources-files/epstein-full cost of coal.pdf ; US EPA, *Human and Ecological Risk Assessment of Coal Combustion Wastes*, 6 August 2007 http:www.earthjustice.org/library/reports/epa-coal-combustion-waste-risk-assessment.pdf.

88 Vimta Labs, 2005a.

89 Ministry of Environment and Forests, 2004.

90 The removal of moisture promises the additional benefit of improved possibilities to reuse water and recycle caustic soda for activities in the plant.

91 Global Experts, 2008.

The red mud pond at Lanjigarh, May 2011 © AI

Ash from the refinery at the foot of the Niyamgiri Hills
© Gethin Charmberlain

A 183-hectare area next to the refinery is required to store the red mud from the existing refinery and 95 hectares for the ash pond (see Table 3). The expanded refinery will require an additional 890 hectares for the expansion of the red mud pond and 219 hectares for the new fly ash pond.[92] According to the EIA, the two red mud ponds would take up more than half of the entire refinery area if the expansion is completed (1,073 of 2,008 hectares).

Table 3: Land use for original and expanded refineries (in hectares)

	Existing land (1 mtpa)	Additional land (6 mtpa)	Total land usage
Main plant	279.87	140.84	420.71
Red mud	182.94	890.34	1073.28
Ash pond	95.42	218.94	314.36
Township	52.45	28.33	80.78
Railway	53.81	64.75	118.56
Total	664.49	1343.2	2007.69

Source: Global Experts, 2008.

The initial fly ash and red mud ponds were stacked much higher and thus contained a much larger volume of waste per area than what is proposed for the expanded refinery. The expanded red mud pond can hold only a roughly 1m thick layer of red mud, despite using the same technologies as the original refinery. The expanded ash pond is only 1.8m deep, while the original pond is 5m deep. The EIA provides no explanation for the size of the waste containment areas but merely asserts: 'The total land required has been optimized and what is being acquired is the bare minimum that is required for setting up of the plant.'[93]

92 Vimta Labs, 2005a.
93 Global Experts, 2008:19.

Using the same stacking height as the existing red mud pond would have meant a reduction from 890 hectares of land acquired to 91 hectares. Similarly, the ash pond could have been reduced to 72 hectares instead of 204 by using the same stacking as for the original pond. The failure to explain why the red mud and fly ash ponds are not stacked in a similar way for the proposed refinery expansion as for the original refinery raises questions: how far did the design criteria take into account the significance to affected people of the additional land that was acquired?[94]

Table 4: Proposed solid waste disposal facilities

Particular	Area	Volume	Life	Stacking height
Ash pond A1	357,000 m^2	1,800,000 m^3	12-13 years	5.0 m
Ash pond B	2,040,000 m^2	3,600,000 m^3	12-13 years	1.8 m
Red mud west cell pond	280,000 m^2	3,200,000 m^3	3-4 years	11.4 m
Red mud east cell pond	8,900,000 m^2	10,400,000 m^3	9-10 years	1.2 m

Source: Global Experts, 2008.
Note: Stacking height calculated based on volume and area.

In the 2005 EIA the lining proposed for the red mud pond comprises a compacted layer of clay 500mm thick covered by low density polyethylene (LDPE), covered by a further compacted layer of clay 1,000mm thick. This falls short of best practice, which would require three such layers of clay with a lining three metres deep.[95] For the proposed expansion, different specifications are presented, but no explanation for the difference is given. A number of consultancy firms were called in to design the waste pond for the expanded refinery.[96] Their design recommendations are reported in the EIA but the reasons for several changes to the original design are not discussed.[97] The choice was made initially to line the entire pond with a LDPE liner as had been done for the 2005 refinery, to prevent seepage. But ultimately it was decided to compact the ground and use clay bentonite. Only the smaller settling pond was to be lined with LDPE. The only explanation given in the EIA for the final design of the waste pond for the expanded refinery is 'to optimize the cost of construction'.

In addition to waste treatment and liners, the site selected for the red mud pond and for the refinery as a whole should provide natural features that further reduce the risk of significant pollution events. Important environmental features include groundwater at a substantial depth from the surface, soils with low permeability, and separation from surface drainage channels. The area around the Lanjigarh refinery is sub-optimal in all these respects. The groundwater is at a depth of 3-4m in the dry season but rises to 2m during the monsoon,[98] and the permeability of the soil is high according to tests carried out for the EIA.[99] Finally, part of the drainage of water from the hillside to the Vamsadhara river appears, from the maps provided in the EIA, to be located precisely where the refinery was built. This carries the risk of the refinery interfering with natural drainage patterns in the areas, potentially leading to flooding as no alternative arrangements for drainage are referred to in the EIAs.

Need to address issues not predicted in original EIAs

Actual use of the waste ponds has revealed problems that were not predicted in the EIAs. First, the proposed compacted slurry system has not been used at all times. According to a Senior Environmental Scientist at the Orissa State Pollution Control Board (OSPCB), 'the high concentration red mud

94 See Chapter 4.2 which addresses issues of land, livelihoods and displacement.
95 According to independent experts advising Amnesty International on this issue.
96 The first consultant was Australian company Worley. Institute of Science, Bangalore, and Tailings Management System of Canada were also used.
97 Vedanta has told Amnesty International that these design changes were on the recommendation of the Indian Institute of Science.
98 *Global Experts, 2008, pp*70-71.
99 *Ibid*, 102.

slurry disposal system is not being scrupulously followed. The desired consistency of the red mud slurry is not being maintained.'[100] This means a lot more water is in the pond, creating the risk of overflow. Second, the OSPCB report mentions the poorly aligned slope which has caused water to stagnate in places where it was meant to flow towards settling ponds. This poor construction indicates that certain sections of the compound walls may face undue pressure.

Moreover, OSPCB reports note that the ground was never compacted as it should have been and is thus failing to prevent seepage to groundwater, and that where lining exists it has torn in places:[101] '[The] red mud pond has not been constructed as per the design specification and there is clear indication of ground water contamination in the area.'[102]

Similar failures were reported by the OSPCB in relation to the containment of fly ash wastes including ash slurry with less than the desired consistency:

> It was observed during the visit that ash slurry from power plant area was flowing in the drain and discharged to river Vamsadhara through clear water pond, which is damaged and there is no retention. Embankment of clear water pond has been damaged in August, 2007 and is yet to be repaired.[103]

Seepage from the ash pond was also detected. The failures documented by the OSPCB in relation to the existing waste management and containment systems raise serious questions about the proposed expansion, despite the company's claims to have rectified these. These failures illustrate the limitations of Vedanta's EIAs in predicting actual impacts, and the need for actual impacts to be carefully monitored.

More than three years after the refinery commenced production late in 2007, the 28 hectare red mud pond at Lanjigarh has become almost full. In early 2011, efforts were made to increase the existing red mud pond's capacity, by raising the 30 metre height of the dyke wall by three metres, a move not envisaged in the EIAs for the refinery or its proposed expansion.

Construction of a second red mud pond within an area of 60 hectares is almost complete as of July 2011, but it is yet to be used as the villagers of Rengopalli have filed a law suit contending that this would disrupt their access to the main road in Lanjigarh.

In the meantime, following heavy downpours on 5 April and 11 May 2011, local residents reported breaches from the 28-hectare red mud pond and raised serious concern about pollution of local water bodies.[104] After reports of a second breach, the Ministry, on 3 June 2011, issued a statement reporting that, on inspection, no breaches in the red mud pond had been found but there could have been overflows from the red mud pond's central collection pit. However, an official inspection report dated 25 April 2011 also stated that 'there is reportedly a tectonic fault under the red mud pond, which could be responsible for some seepage to the toe train. The unit has now taken steps to trap the leachate that might escape through the fault.' The EIAs for the refinery and its proposed expansion do not contain any information on this geological fault.

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100 Orissa State Pollution Control Board, 2007, *Inspection Report on M/S Vedanta Aluminium Limited, Lanjigarh, Kalahandi*, Orissa, p 15.

101 Orissa State Pollution Control Board, 2007, *Inspection Report on M/S Vedanta Aluminium Limited, Lanjigarh, Kalahandi*, Orissa; Orissa State Pollution Control Board, 2008, *Inspection Report on M/S Vedanta Aluminium Limited, Lanjigarh, Kalahandi*, Orissa.

102 Orissa State Pollution Control Board, 2008, *Inspection Report on M/S Vedanta Aluminium Limited, Lanjigarh, Kalahandi*, Orissa, p10

103 *Ibid*, p5.

104 Latha Jishnu, 'Vedanta's red mud pond leaks into Vamsadhara river', *Down to Earth*, 11 April 2011, www.downtoearth.org/in/node/33296

Mining waste

The mining plan and the EIAs acknowledge the importance of managing overburden, the waste material from the mine, in order to reduce soil erosion and prevent siltation of streams.[105] It is also an important first step for successful forest growth in mined out areas. The overburden is described as quite thin, ranging from 0 to 5m with an average of 2.7m.[106] But given the size of the proposed mining operations, the overburden becomes a significant amount of waste material, anticipated to be around 700,000 tonnes a year, which needs to be managed. The overburden consists of laterite, a mineral with high iron content, although not so high as to make it worthwhile to use as iron ore.

In the first two years there will be no mined out area in which to dump the overburden. The sloping hilltop and strong seasonal monsoon rain will make it difficult to contain the overburden. Instead, Vedanta proposes to create a special dump for this waste, estimated at two million tonnes. A gorge which falls within the mining lease area has been identified where this initial waste can be left permanently closed by ridges and a wall. An embankment will be constructed to restrict the outflow of overburden. Garland drains will direct water around the dump site and forest will be planted on top of the dump to stabilise it.[107] This solution is proposed with very little detail about the special environmental features and characteristics of the gorge.

3.5 **Water use and pollution**

EIA requirements on water use and pollution

EIA Notification 1994

- Water balance:
  - Water balance at site
  - Lean season water availability
- Water requirement:
  - Source to be tapped with competing users (river, lake, ground, public supply)
- Water quality
  - Changes observed in quality and quantity of groundwater in the last years and present charging and extraction details
  - The quantum of existing industrial effluents and domestic sewage with incremental load to be released in the receiving water body due to the proposed activities along with treatment details
  - The quantum and quality of water in the receiving water body before and after disposal of solid wastes including municipal solid wastes, industrial effluents and domestic sewage
  - The quantum of industrial effluents and domestic sewage to be released on land and type of land

Details of reservoir water quality with necessary Catchment Treatment Plan
Command Area Development Plan.

EIA Notification 2006

- Risks of contamination of land or water from releases of pollutants into the ground or into sewers, surface waters, groundwater, coastal waters or the sea
  - From handling, storage, use or spillage of hazardous materials
  - From discharge of sewage or other effluents to water or the land (expected mode and place of discharge)
  - By deposition of pollutants emitted to air into the land or into water
  - Is there a risk of long term build up of pollutants in the environment from these sources?
  - Water (expected source and competing users)

105 Engineers India Ltd, 2004, *Mining Plan Lanjigarh Bauxite Mine*, New Delhi.
106 *Ibid*, 7-1.
107 *Ibid*.

Terms of Reference, refinery 2004

- There shall be no discharge of process effluent. As reflected in the EIA/EMP report, the proposed refinery shall be designed for zero process discharge.
- Monitoring of groundwater quality around the red mud and ash ponds shall be undertaken by providing piezometeric holes. A leachate study shall be undertaken and report submitted within six months of commissioning of the project. A plan shall be worked out for rehabilitation of red mud pond and ash pond as and when they are filled up. Efforts shall also be made to find our productive uses of red mud.

Terms of Reference, refinery 2008

Ground water monitoring minimum at 8 locations and near solid waste dump zone, Geological features and geo-hydrological status of the study area are essential also. Ecological status (terrestrial and aquatic) is vital.

- Permission for the draw of 26,000 m3/day water for the expansion project from River Tel at Kesinga and water balance data including quantity of effluent generated, recycled and reused and discharged is to be provided. Methods adopted/to be adopted for the water conservation should be included.

Environmental clearance, mine

- Garland drains, settling tanks and check dams of appropriate size, gradient and length shall be constructed around the mine pit, topsoil dump, temporary over burden dumps and mineral dumps to prevent run off of water and flow of sediments directly into the Vamsadhara River, the Sakota River and other water bodies and sump capacity shall be designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) and maximum discharge in the area adjoining the mine site. Sump capacity shall also provide adequate retention period to allow proper settling of silt material. Sedimentation pits shall be constructed at the corners of the garland drains and desilted at regular intervals.
- Regular monitoring of ground water level and quality shall be carried out by establishing a network of existing wells and constructing new piezometers in and around the project area during the beneficiation [sic] process. The periodic monitoring [(at least four times in a year – pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January); once in each season)] shall be carried out in consultation with the State Ground Water Board/Central Ground Water Authority and the data thus collected may be sent regularly to the Ministry of Environment and Forests and its Regional Office Bhubneswar, the Central Ground Water Authority and the Regional Director, Central Ground Water Board.

Source: Ministry of Environment and Forests, 1994, 2004, 2006, 2008b, 2009b.

Main shortcomings of Vedanta's EIAs

- No detailed hydrological maps are provided to show information about surface water.
- The refinery EIAs do not address vital characteristics of the Vamsadhara River, such as seasonal water flow.
- The refinery has been designed as a zero-emissions plant, but no effort is made to monitor potential spills.
- While spot samples may detect leakages, continuous and incremental pollution is unlikely to be detected under the proposed set-up.
- Water pollution is not measured in habitations closest to mine site.
- Information on existing water usage by affected populations is inadequate.
- There are no details of water availability in the Tel River, and whether it will be possible to supply water to the entire refining and mining complex, including the expanded refinery.

The refinery

To assess the risk of pollution spread and the suitability of the chosen location, detailed maps of the local hydrology would have been necessary. These are not provided in the EIAs, which instead focus on larger-scale maps of the designated 10km radius study area. Similarly, there is a lack of information on groundwater contours with seasonal flows including depths and direction. When such basic information is not provided,it is difficult to assess the plans presented in the EIAs.

No data is presented in the 2005 and the 2008 EIAs on risks of water pollution, even though the 2008 EIA claims that monitoring bores were installed at 10 locations around the red mud and fly ash ponds.[108] Instead, the EIAs claim to make use of secondary sources and satellite imagery for the plans. However, a review of freely available maps shows that there is an extensive open water system nearby which is not mentioned in the assessment (see Figure 3). The 2005 EIA acknowledges elsewhere that the groundwater is relatively shallow at 3-4m below ground, rising to 1-2m in the monsoon period.

The omission of natural features is justified in the EIA on the assumption that the risks are low, owing to engineering features such as the 'zero water discharge' design of the refinery and the construction of the waste disposal ponds. The environmental risk potential does not refer to water pollution[109] despite the fact that 10 monitoring stations have been installed around the waste ponds.[110]

In the absence of detailed contingency and mitigation plans, the over-reliance on technology is unlikely to be effective in preventing pollution. The management of environmental risk should include engineering best practice together with an assumption that systems may fail. The potential consequences of various failure scenarios should be examined. This is the approach recommended by the Australian Ministerial Council on Mineral and Petroleum Resources[111] and the Minerals Council of Australia.[112] This type of analysis requires detailed information on the plant site and the immediate surroundings.[113]

The mine

The 2005 mining EIA acknowledges that 'Understanding the water quality is essential in preparation of Environmental Impact Assessment and to identify critical issues with a view to suggest appropriate mitigation measures for implementation'.[114] The 2005 EIA attempts to evaluate water quality, project outcomes and the impacts on agricultural productivity, habitat conditions, recreational resources and aesthetics in the vicinity.[115]

Although the air sampling did not include any villages in Niyamgiri hills, one water sampling station was located in a Dongria Kondh village close to the mine site, namely in Lakhapadar just south-east of the proposed mining area. But apart from this one monitoring station, there is a lack of monitoring of water on the entire eastern side of the proposed mining area in the 2005 mining EIA.

Detailed topographical maps indicate that several streams of water come from the top of the mountain where the mine is planned and run past Lakhapadar village, making it seem a well-chosen site for the water sampling. But many other streams can also be seen on the map. The Wildlife Institute of India states that as many as 36 streams originate all around the Niyamgiri Hill.[116] Maps indicate that streams originating in the proposed mining area flow past villages such

108 Global Experts, 2008:211.
109 *Ibid*, 193.
110 *Ibid*, 211.
111 http://www.ret.gov.au/resources/mcmpr/Pages/mcmpr.aspx
112 http://www.minerals.org.au/
113 A. Tingay, 2010, *Comments on the environmental impact assessments for proposed Lanjigarh bauxite mine, alumina refinery and the refinery expansion*:16.
114 Vimta Labs, 2005b:C3-36.
115 *Ibid*.
116 Wildlife Institute of India, 2006a, *Studies on impact of proposed Lanjigarh bauxite mining on biodiversity including wildlife and its habitat*, Dehradun, India:13.

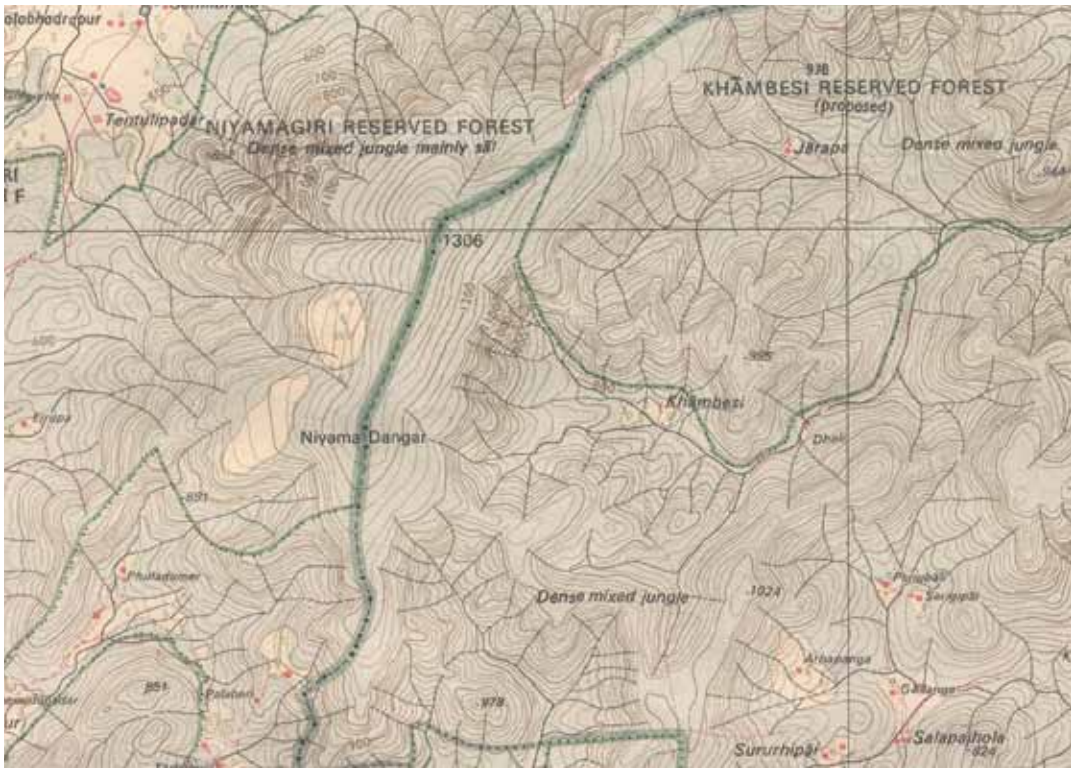

Figure 5: Detailed map of proposed mining area

Source: Indian toposheet map scale 1:50,000

as Batula, Jarapa and Khambesi. Given this, the lack of more extensive sampling of surface water is questionable. The approach taken, using just five sampling sites, appears inadequate as a baseline survey (see Table 5 below for sampling locations).[117]

Having ascertained from these samples that the water quality is within prescribed standards, there is a discussion on how to prevent surface run-off which is likely to be the main source of water pollution in an area with expected rainfall of 1,600-1,800mm a year and a vulnerable hilltop location.

Proposed measures to contain the run-off are discussed in the mining plan and the 2005 EIA. These include:[118]

- Sumps at the lowermost mine front to collect run-off from the active mine area. This will then be pumped to settling ponds and the clear water outflow allowed to seep into the ground.
- Diversion of rainwater run-off from the site into garland drains that divert the flow to adjacent valleys.
- Collection of rainwater that falls into the mine in sumps with recharge to the ground.
- Small check dams along the lower contours to intercept silt.
- Garland drains to divert flows around the gorge waste dump.

The main aim of the drainage management system is to direct water into the ground. The EIA claims that groundwater is located 300m below the mine site and thus not at risk of becoming polluted. This is difficult to validate in the absence of a detailed contour plan of the hill. On a commonly available detailed map it is possible to see a number of streams (see Figure 5), which appears to support the findings of the Wildlife Institute of India that there are many streams coming down the hill.[119] But without a description of the physical, hydrological and biological features of those streams it is impossible to determine the potential impacts of the flows that may be diverted to adjacent valleys via the introduced drains, or the potential run-off that could occur if the drainage does not operate as expected.

117 Vimta Labs, 2005b.
118 Engineers India Ltd, 2004; Vimta Labs, 2005b.
119 Wildlife Institute of India, 2006.

Table 5: Water sampling locations

Location	Distance from mine boundary	Bearing w.r.t. mine boundary
Surface water		
Lanjigarh (near Vamsadhara)	3.8	NNW
Niyamgiri Vedanta nagar (near Rengopalli)	2.9	N
Harikrishnapur	7.1	NNE
Tentulipadar	2.0	NW
Lakhapadar	1.5	SSE
Groundwater		
Lanjiqarh	3.8	NNW
Niyamgiri Vedanta nagar	2.9	N
Balabadrapur	2.0	NW
Chhatrapur	5.0	NNE
Kansari	3.9	NE
Plant site	3.8	N

Source: Vimta Labs, (2005b

In common with the refinery EIA, the mine EIA assumes that the drainage plans will work, and therefore does not attempt to anticipate the risks attached to different kinds of failure, whether to local populations or to the environment.

Water use for refining

Figure 7: The Tel river at Kesinga
Photo by Patrik Oskarsson, taken 16 March 2007

Water use is expected to go up dramatically from 14,895m^3 to 56,250m^3 with the refinery expansion.[120] But the refinery expansion EIA in common with earlier EIAs does not inform us about the availability and other uses of the water from the Tel river. Where the 2006 EIA Notification specifically demands clear data on availability of water, the refinery expansion EIA refers only to a contract having been signed with the State of Orissa for the company to draw water. The terms of this contract are not referred to despite their potential relevance.

120 Global Experts, 2008.

Little information is available elsewhere about the water situation of the Tel River and its various users. One of the submissions to the Supreme Court in the Niyamgiri forest case stated:

> Tel is a seasonal river, which used to be dry for almost eight months in a year. Its current summer flow is simply the surplus water of [the] Indrawati [dam] project, which is let off to Tel River through its tributary Hati River, mainly because the canal system of Indrawati project hasn't been completed. Once the command area irrigation works are completed, there would be no flow to Tel River in summer. This implies that in order to provide 7.5 mgd water to Vedanta factory, either the command area work of Indrawati will not be completed or the groundwater/subsurface flow of Tel will be tapped. The fact is that no proper assessment has been done of the ecological and economic impact of lifting water from Tel and the clearance has been provided in a highly irregular manner.[121]

Such gaps in analysis of water use and potential for pollution, and in the provision of relevant information, make it difficult to conduct a proper risk assessment and to meet the MoEF's Terms of Reference.

3.6 **Transport**

EIA requirements on transport

EIA Notification 1994
Not covered

EIA Notification 2006
- New road, rail, air waterborne or other transport infrastructure including new or altered routes and stations, ports, airports etc?
- Use, storage, transport, handling or production of substances or materials, which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health.
- Use of substances or materials, which are hazardous (as per MSIHC rules) to human health or the environment (flora, fauna, and water supplies).
- Affect the welfare of people eg by changing living conditions?
- Emissions from materials handling including storage or transport.

Terms of Reference, refinery expansion 2008
- Impact of the transport of the raw materials and end products on the surrounding environment should be assessed and provided.

Environmental clearance, mine 2009
- Vehicular emissions shall be kept under control and regularly monitored. Measures shall be taken for maintenance of vehicles used in mining operations and in transportation of mineral within the mine lease. The mineral transportation within the mine lease shall be carried out through the covered trucks only and the vehicles carrying the mineral shall not be overloaded.

Source: Ministry of Environment and Forests, 1994, 2008b, 2009b.
**Manufacture, Storage and Import of Hazardous Chemical Rules 1989*

121 Samantra, P, 2005, Submission to the Supreme Court in the Niyamgiri forest case.

Main shortcomings of Vedanta's EIAs

- There is no acknowledgement of impacts caused by the transport of bauxite despite this having been an ongoing feature ever since the 1mtpa refinery opened. With the expansion of the refinery, transport is bound to increase at least until the railway opens.
- Caustic soda transport is ignored even though it is an additional hazard since it is a strongly alkaline liquid.
- The conveyor belt to be used for transportation of ore from Niyamgiri to the refinery is mentioned but its impacts are not analysed.

A considerable quantity of ore is currently being transported by truck to the refinery as the nearby mine is not operational and therefore not providing ore to the refinery.

In 2009-2010 coal and bauxite were being brought by rail to be unloaded at Dahikal, 13km from Lanjigarh, and transported by truck to the refinery along narrow, bumpy roads close to villages. An estimated 200 trucks arrived by road at the refinery daily (arriving throughout the day and night); an estimated 70-90 container trucks carrying alumina powder in containers also leave the refinery daily. Amnesty International researchers witnessed the volume of traffic associated with the refinery. Large trucks carrying bauxite arrived at Lanjigarh along narrow, battered roads. Although the OSPCB has stipulated that all bauxite-laden trucks should remain covered, many are left uncovered, leading to air pollution from the exposed piles of bauxite.[122] Since mid-2010 a railway line to Lanjigarh has been carrying some of this bauxite.

This transport by truck has led to noise, dust and exhaust emissions along its route which can cause significant problems for people. Dust is not only being emitted from the bauxite ore but also from the movement of many trucks on already dusty roads. The exact routes are not known but any road taken will lead directly through a number of villages where houses line the roads and the dust levels are already high especially during the dry pre-monsoon months. In some areas this has led to trucks being banned from travelling during the day with the effect of reducing day-time dust but increasing noise during the night.[123]

The environmental impacts of large-scale trucking operations are well-known, and will be compounded by the proposed refinery expansion when even more trucks will be needed. Yet transport is not covered in either the 2005 or the 2008 EIAs. An approximation of the number of trucks used could have been made by assuming standard Tata[124] trucks each carrying 30 tonnes of bauxite ore and dividing these by the amount of bauxite ore produced each year. A figure for the number of trucks per day could be derived from this.

The omission of transport-related issues from the first refinery EIA[125] could be partly explained if it was assumed that the mine would be opened by the time the refinery was constructed. However, during the preparation of the expansion EIA it was known that refinery operations were reliant on ore sourced from other domestic and international locations. The proposed refinery expansion may cause a permanent need for transportation in view of the likely shortfall in ore from Niyamgiri. A possible explanation for a lack of discussion of the impacts of transport could be the reference to the railway line which is under construction, but this is mentioned only briefly in the EIAs.

The alumina produced at the refinery is destined mainly for export markets via Visakhapatnam port in the state of Andhra Pradesh, but also for the Vedanta aluminium smelter in Jharsuguda, northern Orissa. These locations are significant distances away from the Lanjigarh refinery along roads in poor condition.[126] There is a risk of spillage of dangerous substances such as caustic soda,

122 As reported by numerous villagers and witnessed by Amnesty International researchers during visits to the area. See Amnesty International, *Don't Mine us out of Existence: Bauxite Mine and Refinery Devastate Lives in India*, February 2010, pp. 69-70

123 Amnesty International, 2010, *Don't Mine us out of Existence: Bauxite Mine and Refinery Devastate Lives in India*: 69-70.

124 Common brand of lorries in India.

125 Tata AIG Risk Management, 2002a.

126 The distance from Lanjigarh to Vedanta's mines in Chhattisgarh is about 420-440km, to Visakhapatnam the distance is about 270km, to Jharsuguda it is 350km, as measured on Google maps.

which will continue to be supplied mainly from the port in Visakhapatnam as it is imported. This is a highly corrosive chemical which can harm humans and animals in the event of a spill.[127] The EIAs do not explain how caustic soda can be safeguarded from spillage.

The lack of rigorous analysis of the impacts of refinery expansion in the EIA can be highlighted by the following citation from the refinery expansion EIA:

> […] process units like raw material crushing and other supporting services like storage and transportation will emit lot of dust in the form of RPM & SPM. Needless to say that adequate air pollution control measures will be taken up both at design and operational stage to conform to the emission parameters within the standard limit. The project proponent will take necessary action by providing closed containers for transportation of raw materials, by products and end products to avoid fugitive emission during transportation.[128]

Contrary to the EIA's assertion that it is 'needless to say', pollution control measures relating to the transportation of raw materials and finished products ought to be explicitly addressed. It is insufficient merely to refer to closed containers as if they are an adequate control measure.

To transport ore from the mine to the refinery, Vedanta plans to build a conveyor belt system. There is no discussion of the potential impacts that will arise from operating the belt, especially with regard to noise, dust and further forest clearance.

In the light of these omissions, the entire treatment of transportation for the refinery expansion falls far short of the prescribed standard as set out in the 2006 EIA Notification and the 2008 MoEF Terms of Reference.

3.7 **Environmental management**

EIA requirements on environmental management

EIA Notification 1994

- An Environmental Management Plan (EMP) has to be made but there are no demands on what this has to contain in the EIA Notifications.
- Subject to the public interest, the Impact Assessment Agency shall make compliance reports publicly available.

EIA Notification 2006

- The Environment Management Plan would consist of all mitigation measures for each item wise activity to be undertaken during the construction, operation and the entire life cycle to minimize adverse environmental impacts as a result of the activities of the project. It would also delineate the environmental monitoring plan for compliance of various environmental regulations. It will state the steps to be taken in case of emergency such as accidents at the site including fire.
- An EMP should consist of 'Description of the administrative aspects of ensuring that mitigative measures are implemented and their effectiveness monitored, after approval of the EIA'.

Terms of Reference, refinery 2004

- Data on ambient air quality, fugitive emission and stack emissions shall be regularly submitted to this Ministry including its Regional Office at Bhubaneswar and the State Pollution Control Board/Central Pollution Control Board once in six months.

Continued over »

127 It can severely irritate and burn the skin with possible eye damage: http://nj.gov/health/eoh/rtkweb/documents/fs/1706.pdf
128 Global Experts, 2008:141.

- General conditions: The Regional Office of this Ministry at Bhubaneswar/Central Pollution Control Board/State Pollution Control Board will monitor the stipulated conditions. A six monthly compliance report and the monitored data along with statistical interpretation shall be submitted to them regularly.

Terms of Reference, refinery expansion 2008

- Risk assessment and damage control need to be addressed.

EIA clearance, mine 2009

- Regular monitoring of ground water level and quality shall be carried out by establishing a network of existing wells and constructing new piezometers in and around the project area during the beneficiation process. The periodic monitoring [at least four times in a year – pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January); once in each season] shall be carried out in consultation with the State Ground Water Board/Central Ground Water Authority and the data thus collected may be sent regularly to the Ministry of Environment and Forests and its Regional Office Bhubaneswar, the Central Ground Water Authority and the Regional Director, Central Ground Water Board. If at any stage, it is observed that the groundwater table is getting depleted due to the mining activity, necessary corrective measures shall be carried out.
- A separate environmental management cell with suitable qualified personnel should be set-up under the control of a Senior Executive, who will report directly to the Head of the Organisation.
- The funds earmarked for environmental protection measures should be kept in a separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry of Environment and Forests and its Regional Office located at Bhubaneswar.

Source: Ministry of Environment and Forests (1994 & 2004, 2008b)

Main shortcomings of Vedanta's EIAs

- There are no clearly specified monitoring of operations including emissions.
- There is no clarity on who has the responsibility to monitor conditions and validate the data that the company submits.
- There is no risk analysis that identifies the consequences of potential system failures and therefore no management strategies for such events.

An EMP has been mandatory for Indian EIAs since 1994, but the Notifications contain little detail on what this plan should contain. Ongoing attempts to make the regulations stronger can be seen in the above summary of EMP requirements: the mine environmental clearance is the most detailed, although it still comes under the EIA 1994 Notification.

The EMP of the 2005 Niyamgiri mining EIA is more like an environmental mitigation plan, discussing the design of different types of check dams to contain water run-off and measures for air pollution control.[129] The EMP should have assigned responsibilities across the organisation for environmental control, including monitoring activities, and what to do in case of failure. Instead, it restricted itself to the implementation of environmental technology.

There is, however, an element of monitoring as part of the EMP: 'The regular online and background monitoring of environmental parameters is essential for the successful implementation of EMP' states the refinery expansion EIA.[130] But the rest of the EMP in this EIA provides little other than general principles of environmental management, with few details of how this will actually be accomplished. No continuous monitoring of various sources of pollution is proposed and instead

129 Vimta Labs, 2005b.
130 Global Experts, 2008:205.

it is up to the authorities to take spot samples as part of monitoring exercises. Also, scant detail is provided of the actual organisational set-up, including skills and responsibilities.

3.8 **De-commissioning and the future of the area**

EIA requirements on mine and plant closure, including rehabilitation of land

Mine closure requirements as part of mining plan

- Rehabilitation plan for quarries/borrow areas
- Green belt plan
- Compensatory afforestation plan.

Environmental clearance, mine

- A Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment and Forests five years in advance of final mine closure for approval.
- Plantation shall be raised in an area of 352.3ha including a 7.5m wide green belt in the safety zone around the mining lease, backfilled and reclaimed area, around void, roads etc. by planting the native species in consultation with the local DFO/Agriculture Department. The density of the trees should be around 2,500 plants per ha.
- Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment and Forests and its Regional Office located at Bhubaneswar on six monthly basis.
- The void left unfilled in an area of 5ha shall be converted into the water body. The higher benches of the excavated void/mine pit shall be terraced and plantation done to stabilise the slopes. The slopes of higher benches shall be made gentler for easy accessibility by the local people to use the water body. Peripheral fencing shall be carried out all along the excavated area.

Source: Ministry of Environment and Forests (2009b), Engineers India Ltd. (2004)

Main shortcomings of Vedanta's EIAs

- The 2005 mining EIA does not address concerns about changes to the hydrology of Niyamgiri hill due to mining.
- The process of restoration of the mined out area is not set out in detail. Moreover, it takes no account of existing land uses, nor does it acknowledge a role in the process for the Dongria Kondh.
- Since no plan has been presented for the refinery, its legacy once closed is uncertain.

The EIAs deal only in a very cursory way with long-term effects and the possibilities of rehabilitating the mine and refinery sites for a return to former land uses after closure. Potential changes to local water streams have been highlighted in various reports but are not mentioned in the mining EIAs. Reforestation is presented as a goal without taking into account current environmental attributes or the interests and wishes of the local population who are now in a position to stake a claim to the area via India's Forest Rights Act. There is no account of how all the waste products from the mine and refinery will be stored and treated following closure of the facilities.

How the mining area is rehabilitated and what happens to the waste from the refinery are crucial to the future of people and to their livelihoods in the Lanjigarh area. While some details exist for the rehabilitation of the mine, very little is presented on what will happen to the refinery in around 30 years time when both close.[131]

131 The technical lifetime of the mine is expected to be about 30 years if mined at a rate of 3mtpa. This is similar to the economic agreement to mine bauxite between Sterlite India and the Orissa Mining Corporation, which is for 25 years (Amnesty International, 2010). The lifetime of the refinery is not mentioned in the EIAs but it is anticipated that it will operate for a similar period of time as the mine.

There are two main issues arising from the long-term effects of mining. One is the potential changes to the hydrology of the hill as overburden and ore are removed. The other is how the mine area can be returned to its previous land use(s), for example through the planting of trees. Water is a serious concern, especially in the dry summer period before the start of the annual monsoon rains. This is why the many hill streams coming off Niyamgiri take on special significance, particularly when other bodies of water in the area have dried up. In the vicinity of the mountain the small springs provide essential water supply in areas with no storage infrastructure and only modest pumps or other means to access water. The phenomenon is described as follows by the Wildlife Institute of India:

> Nearly 36 streams originate all around the Niyamgiri hill. The majority of the streams are originating from lowermost control of the Bauxite layer. It is believed that the Bauxite layer which is formed through leaching also acts as a layer for imbibing water and releasing it slowly throughout the year. It is anticipated that the removal of this layer of bauxite will impact ground waters in the region, and consequently the quality of forested habitats.[132]

Despite the significance of this issue for the health and livelihoods of the Dongria Kondh and other affected communities, the mining EIAs and the mining plan do not address concerns relating to hydrological changes due to mining. The report commissioned by India's Supreme Court from the Central Mine Planning and Development Institute (CMPDI),[133] claims, contrary to the findings of the Wildlife Institute of India, that the bauxite has low ability to retain water (as measured in a low porosity) and also a poor ability to transmit water (a low permeability).

Given the discrepancies in the findings of existing studies an integrated analysis of water and forest changes is warranted. However, neither the mining EIA nor the mining plan contains such an analysis.

Mine closure

Theoretically, the land could be returned to its previous use once the mined ore has been exhausted. A mine closure plan has been mandatory since 2003 as part of a mining lease application. The 1994 EIA Notification does not mention a plan to rehabilitate mined out land but some paragraphs on mine closure are nevertheless included in the 2009 environmental clearance.[134] The brief mine closure plan gives very few details about responsibilities, aims of the rehabilitation work or who will monitor it. The mined out area will be handed over to the Orissa government forest department after it has been mined out and the area reclaimed.[135] At the same time the mining plan states that 'horticulture services' will be contracted 'to promote entrepreneurship among local people'.[136] No details are provided about how this will happen. Table 6 shows the mining and reclamation schedule.[137]

Owing to the lack of baseline data on site-specific environmental conditions (as presented in Vimta Labs, 2005b), there is minimal information to establish the significance of the area in environmental or cultural terms before mining commences. What is known is that the bauxite area is relatively open, with grasslands and stunted trees. This area is frequented for grazing by a number of species of mammals.[138] This information is not presented in any of the mining EIAs, reducing their usefulness to predict environmental impact.

132 Wildlife Institute of India, 2006a, *Studies on impact of proposed Lanjigarh bauxite mining on biodiversity including wildlife and its habitat*, Dehradun, India:13.

133 CMPDI, 2006, *Interim report on hydrological Investigations Lanjigarh bauxite mines M/S Orissa Mining Corporation*, Ranchi, India. CMPDI is a mining consultancy.

134 Ministry of Environment and Forests, 2009b; Vimta Labs, 2005b:C5-30.

135 Engineers India Ltd, 2004:Ch4:12.

136 *Ibid.* Ch9:15.

137 Engineers India, Ltd 2004.

138 Wildlife Institute of India, 2006a, *Studies on impact of proposed Lanjigarh bauxite mining on biodiversity including wildlife and its habitat*, Dehradun, India.

Table 6: Excavation and reclamation schedule for Niyamgiri mine

Year	Overburden (000 T)	Bauxite (000 T)	External dump (000 T)	Backfilling quantity (000 T)	Area mined (ha)	Area reclaimed* (ha)	Saplings planted (number)
1	1,000	758.5	1,000		20	-	-
2	700	2,947.6	700		15	-	-
3	700	3,022.1		700	15	5	5,000
4	700	3,041.2		700	15	10	10,000
5	700	3,102.2		700	15	10	10,000
6-10	3,500	15,007.5		3,500	50	65	65,000
11-15	3,500	15,066.5		3,500	62.3	65	65,000
16-20	3,500	15,077.7		3,000	85.0	70	70,000
21-Ult	4,126	19,143.2		4,126	78.0	120.3	120,000
Total		77,168.4	1,700	12,800	355.3	345+	345,000

Source: Engineers India Ltd. (2004) Table 4.3
** The area reclaimed is smaller than the mined area because roads and built-up area will not be reclaimed.*

Mine reclamation must go beyond limited environmental factors such as the number of trees planted. It needs to include the social uses of the land. It might be possible to grow forest in the mined out area, but it is not known if this is culturally or environmentally desirable. This is a serious concern as the government acknowledges that the forest plays a 'critical role in the livelihoods of the tribal poor in Orissa'.[139] Even if trees are to be planted, it should be under the control of the traditional inhabitants of the area. The right to harvest whatever grows in this new forest is not clarified. Under the Forest Rights Act this land should be settled as a community forest reserve belonging to the Dongria Kondh, to be used however they see fit.[140] While this act had not been adopted at the time of the EIA, a recent circular of the MoEF requires the act to be implemented before any future mines are opened.[141]

Refinery closure

No specific closure plan or long-term pollution control requirements have been set for the refinery other than the need to design a red mud pond with enough storage for at least 10 years.[142] No explanation is given for the lack of detail on what will happen to all the wastes generated by the refinery in future. With waste ponds already leaking, and a proposed expansion that will significantly increase the amount of waste, future pollution risks are considerable.

Vedanta vehicles drive through a village at the foot of the Niyamgiri Hills.
© Gethin Chamberlain

139 Government of Orissa, 2004:29.
140 Ramanathan, U, 2010 *Site Inspection Report for diversion of forest land*, New Delhi: Ministry of Environment and Forests.
141 Ministry of Environment and Forests, 2009c.
142 Ministry of Environment and Forests, 2008b.

A villager stands on land he once owned, beneath an unfinished conveyor belt designed to carry bauxite ore from the Niyamgiri hills to the Vedanta Alumina plant in Lanjigarh.

4 Socio-economic analysis

4.1 Overview of socio-economic analysis

Although EIAs are by definition focused on the environmental impacts of proposed projects, some of the information sought as a part of the assessment process also relates to the socio-economic impacts. The purpose of this section is to examine India's requirements to assess the socio-economic impacts of the proposed projects; the degree to which the EIA's for Vedanta's Orissa operation complied with these requirements; and the implications for the affected communities in Lanjigarh and Niyamgiri of Vedanta's failure to comply.

India's EIA Notifications of 1994 (amended in 2002) and 2006 require project proponents to provide information and carry out impact assessments in relation to a limited number of socio-economic issues (see box on page 73). These include land use, land clearance, displacement of villages and population, rehabilitation and re-settlement packages, health impacts, facilities for workers, and some limited information on sites of cultural, historical or religious importance.

Vedanta's EIAs fall short of India's limited requirements for impact assessments. Assertions about improvements in basic infrastructure and facilities in the area as a consequence of the project are not backed by any details; nor is it clear how such improvements will be designed to benefit local communities. Studies documenting the deterioration in socio-economic conditions caused by mining and refining activities are ignored.

Main shortcomings of Vedanta's EIAs

- Failure to differentiate between the various communities affected by the refinery, refinery expansion and mine.
- Failure to assess the differential impacts of the projects on the more vulnerable groups within the affected communities.
- Significant omissions in the data collected and presented.
- Lack of comparative information from similar projects elsewhere in India.

Throughout, the assessments rest on the unsubstantiated assumption that the 'trickledown' benefits of the projects will lead to significant improvement in socio-economic conditions in the area. For instance, in the EIA documents the mine is proposed as a means of improving the region through investment and employment.[143] The 2002 mine EIA anticipates improvement of basic infrastructure, including roads, water supply, communication facilities, medical facilities, and schools as a result of mining activity.[144] However, no details are provided to support these assertions.

In relation to the refinery and its proposed expansion, the narrative assumes that a large project will generate employment that will have a beneficial impact on the socio-economic conditions of the region. The 2002 EIA for the refinery states that a 'large project with large investment and large employment potential in Kalahandi district is expected to have major beneficial impact on the socio-economy of the region'.[145] The refinery expansion EIA states further that 'the local people will be benefited through trickledown effect'.[146] Referring to a survey by the Institute of Rural Management Anand (IRMA) as evidence, the consultants conclude that the overall economic condition of the area

143 Separately from the EIA process, the Supreme Court mandated a special local area development fund. This was decided at an amount of 10 crore (100 million rupees) or 5 per cent of profits.

144 Tata AIG Risk Management Services Ltd, 2002b:2.7-4.

145 Tata AIG Risk Management Services Ltd, 2002a:1.

146 Global Experts, 2008:118.

has improved since the existing plant was built.[147] They fail to mention any migration into the area and related social impacts of the existing plant. They state that the potential environmental costs of the refinery are outweighed by the socio-economic benefits to the local community:

> Although the air quality will have some impact on the environment, but considering the socio-economic importance of the project and for a better interest of the state and locals, the project has sustainable environmental impact attaining the projected growth in economy and social welfare.[148]

These assumptions ignore studies by research bodies and NGOs documenting the deterioration in socio-economic conditions of several affected populations caused by mining and related activities. The Centre for Science and Environment (CSE) has documented the unyielding poverty that prevails in mining districts throughout India. CSE research indicates that 'mineral-bearing districts continue to be among the most backward districts in the country, in spite of the immense wealth they generate'.[149] The Centre concludes: 'India's mineral-rich districts are marked by grinding poverty, low literacy and poor human development indicators.'[150]

4.2 **Land, livelihoods and displacement**

As with most agrarian communities, change in land-use caused by major development projects can have a deep socio-economic impact. Even in the context of India's limited requirements for social impact assessment, Vedanta's EIAs are inadequate. The failure on the part of all Vedanta's EIAs to provide detailed, specific and accurate information on land use in the project areas undermines the possibility of proper analysis of the project's impacts on the lives and livelihoods of affected persons. Inconsistencies in the data provided in the EIAs are not explained; for example the EIAs present different figures for the numbers of people that would be displaced by Vedanta's mining operations.

Vedanta's EIAs rely on the compensation package offered by the state of Orissa. The state of Orissa's resettlement and rehabilitation arrangements have significant flaws: they are based on land titles, ignoring the reality that many Indigenous People do not have legal ownership of the land that they cultivate. The view that only those who lose their homes to the project will be treated as displaced demonstrates a highly problematic and narrow understanding of displacement. It ignores how issues such as pollution and loss of livelihood can compel people to leave their homes even if these lie outside the mining area.

A paddy field in the Niyamgiri Hills. © AI

147 Global Experts, 2008:123.
148 Global Experts, 2008:209-10.
149 Bhushan, C, and M Zeya Hazra, 2008, *Rich lands poor people: Is 'sustainable' mining possible?* p16, New Delhi, Centre for Science and Environment.
150 *Ibid*, p17.

EIA requirements on socio-economic impacts

EIA Notification 1994 (as amended up to 2002)

- Information on the agricultural land required, forestland and density of vegetation and land use in the catchment within 10km radius of the proposed site.
  - Number of villages and population to be displaced.
  - Information on the Rehabilitation Master Plan.

EIA Notification 2006

- Clearance of existing land, vegetation and buildings.
- Areas containing important, high quality or scarce resources (ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals).

Terms of reference, refinery expansion 2008

Vedanta is required to:

- Elaborate on its proposed socio-economic development activities.
- Consider the possibility of reducing requirement of private land.
- Provide details of the land required.
- Include a detailed action plan on rehabilitation and resettlement with regard to the policy of the government of Orissa.

EIA Manual 2001

The manual suggests that the following baseline information should be provided:

- Information on existing employment/training, housing, education, utilities, amenities (water, sanitation, electricity, transportation).
- Likely stress on public utilities and services in the region.
- Potential impacts on existing occupations and economic activities
- Potential losses of livelihood for local and vulnerable sections of the population.
- Potential benefits/disbenefits to the local habitants resulting through project and ancillary activities.
- Assessment of economic benefits arising out of the project.
- Extent of resettlement and rehabilitation, including vulnerability of the affected populations.
- Assessment of rehabilitation requirements with special emphasis on scheduled areas if any.

Main shortcomings of Vedanta's EIAs

- The information on land use is incomplete and inaccurate.
- The information on displacement is inadequate.

Incomplete and inaccurate information on land use

Accurate and detailed information on land required for the project and on land use is essential to assess impacts on the lives and livelihoods of local communities. Information on these issues in Vedanta's EIAs is very general.

Land use in the Tata AIG EIAs of 2002 is described as identical for both the mining and the refinery area. Given that the mine and the refinery are only 7km apart, there is bound to be some overlap in the areas under study. However, it is implausible that land use in the area within a 10km radius for both the mine and the refinery is exactly the same, given the differences in composition of the population of the two areas.

Information on land use in the later EIAs is scant and often haphazardly presented. For instance, the 2005 mine EIA fails to explain why land use data is drawn from the 1991 census, whereas demographic data is based on the 2001 census. In the refinery EIA of 2005 there is hardly any discussion on land use except where the assessing agency explains that 'land requirement for the

project has increased from 720 hectares to 922.12 due to minor changes in the layout of Ash Pond, Red Mud and Railway Route'. In addition 'certain quantity of revenue land, which became uneconomical holding for the displaced families of villages Kinari and Bhorbhata, were also acquired, even if it was not required for the plant'.[151]

The obvious failure on the part of all the EIAs to provide detailed, specific and accurate information on land use in the project areas undermines proper analysis of the impacts of the project on the lives and livelihoods of project affected persons.

Illegal clearing of ground near the conveyor belt from the proposed mine site to the refinery. © AI

Inadequate information on displacement

A significant impact of large projects can be displacement of people from homes and land. Accurate information on the scale of displacement is therefore key to any project impact assessment. The EIAs on the mine and refinery do not privide this.

Despite the requirements of the 1994 Notification, the 2002 mine EIA does not specify the number of people likely to face displacement. The EIA concludes that if the companies follow the resettlement and rehabilitation (R&R) plan and compensation package outlined by the land acquisition authority, the Industrial Development Corporation of Orissa, then there will be 'minor negative impact on the displaced population'.[152] However, the 2005 mine EIA states that there will be no impact on human settlement as 'there is no habitation in the lease area on plateau top hence no displacement is envisaged'.[153] There is no explanation of why the two EIAs for the mine present differing views on potential displacement.

With regard to the refinery, the 2002 EIA indicates that the project requires 720 hectares of land to be acquired, and that the land should be chosen to minimise population displacement and transition of agricultural land.[154] The assessment estimates that a total of 300 people would lose land fully or partially to the project.[155] In the 2005 EIA for the refinery, the number of people who would be partially or fully affected is increased to 700.[156] Although this could be attributed to the increase in land requirement from 720 hectares to 922.12 hectares owing to changes in the layout of the ash pond, red mud and railway route, the EIA does not explain it as such.

151 Vimta Labs Ltd 2005a:E-4e.
152 Tata AIG Risk Management Services Ltd, 2002b:2.7-3.
153 Vimta Labs, 2005b:C4-23.
154 Tata AIG Risk Management Services Ltd, 2002a:3.
155 In this case 300 people should be taken to mean 300 families as every landholder would be supporting at least one family.
156 Vimta Labs Ltd, 2005:C4-3.

There are some signicant deficiencies in the R&R policy of the Orissa government. For instance, only those who have formal land titles are entitled to compensation as displaced or affected persons. The majority of dalits and *adivasis*, as well as women inside and outside these communities in the affected areas, do not have legal ownership over the land they cultivate or need access to for their livelihoods. This is a problem not specific to Lanjigarh and Niyamgiri. The wide gap between the number of people in Orissa who are dependent on land they do not 'own' for their livelihoods and the much more limited number who are actually protected by Orissa's R&R policies has been documented in the past.[157]

The 2010 report of a three-person team set up by the MoEF to investigate allegations of violations under the Forest Conservation Act also critiques the definitions of displaced and affected persons in Orissa's R&R policy. It comments that while there may be no villages in the proposed mining area in Niyamgiri (which means no displaced or affected persons as defined by the Orissa R&R policy) the Dongria Kondh informed the team that 'there are over 200 villages on the sides of the mountain. They will all get affected by the road, the vehicles, the mining, and the drying up of the streams'.[158] Information on these factors should have been presented in the EIAs for the mine.

4.3 Inadequate information on affected populations

The EIAs provide scant information on the communities that will be affected by the mine and refinery projects. They refer to broad classifications of people in a way that ignores the different modes of subsistence of these communities that may be differentially affected by mining and refining activities. Some of the groups most at risk are not even identified. Vedanta's failure to disaggregate data by class, caste, tribe and gender makes it impossible to assess how far affected individuals and communities can adapt to a loss of livelihood by learning new skills or taking up job opportunities offered by the proposed projects, and thus avoid even greater poverty.

EIA requirements for data on affected populations

Neither of the EIA Notifications specify the level of detail for the data that needs to be collected.

The EIA Manual 2001

The following baseline information should be provided:
Information on the dependent/resident population.
Vulnerability of the affected population.

Section 3.1.7 of the EIA manual states:

> Much of the socio-economic data required for EIA does not exist, except to a limited extent in the Census records (conducted every 10 years, with the next due in 2001), and Revenue records. In many cases, these data will need to be validated and suitability verified by the project proponent/consultant through sample surveys. It is the responsibility of the reviewer to check the adequacy of data and suitability of sampling methods adopted in social surveys.

Despite the guidance provided in the EIA Manual (see box above), Vedanta's EIAs give scant information on the communities that will be affected by the mine and refinery projects. Although the EIAs (2002, 2005 and 2008) mention that the areas for the proposed project are rural and the bulk of the affected people belong to the Scheduled Castes and Scheduled Tribes, there is no recognition of the specific communities within these broader groups. This omission makes it impossible for Vedanta or the government to ascertain the vulnerability of the communities in question.

157 See Indian People's Tribunal Report, October 2006, *Environment and Human Rights, Kashipur: An Enquiry into Mining and Human Rights Violations in Kashipur, Orissa*.

158 Ramanathan, U, *Site Inspection Report for diversion of forest land*, New Delhi: Ministry of Environment and Forests, p.3.

There is no meaningful recognition in any of the EIAs of who the affected people are beyond designations of Scheduled Tribes[159] and Scheduled Castes. In only referring to these broad classifications, the documents miss the cultural, social, gender and livelihood specificities of the affected communities. They completely fail to differentiate between the various tribes in the area, including the Dongria Kondh, Majhi Kondh and Desai Kondh. The majority of the Dongria Kondh rural population depend on a subsistence economy, but subsist in different ways that may be differentially affected by mining and refining activities. There are also members of the Dom and Namasudras castes of dalits in the district. It is vital to understand the geographical distribution of populations, as the communities affected by the mine differ in their culture and practices from those affected by the refinery. Baseline information and details about the diversities and vulnerabilities of the local populations, as suggested in the EIA manual, would have enabled a more effective identification of potential impacts.

A village near the refinery. © Sanjit Das

It is also critical to understand the differences among people: distinct communities may have diverse needs and different relationships with their natural environment, and may use land differently. In specific communities, gender roles – particularly in relation to division of labour – may also be interpreted differently, and as a result individuals within those communities – whether men or women – have different capacities to adapt to industrialisation or displacement. For example, class and caste or tribe continue to be the main determinants of how people make a living in rural India. More than 10 per cent of India's *adivasi* population lives in the state of Orissa, and there is great variation among groups within the state.[160] The majority depend on subsistence economies.[161] However, while some communities rely on hunting and gathering for their livelihood, others are entirely dependent on agriculture or may be landless.

The failure to analyse and understand the way in which different communities – and individuals within those communities – subsist means that the EIAs are unable to properly assess the impact of loss of access to land and natural resources or assess how this can be compensated or addressed. In her site inspection report to the MoEF, Usha Ramanathan (one of the three-member committee established by the MoEF to examine allegations of diversion of forest land and abuse of the rights of Indigenous Peoples, and concerns about wildlife) comments on the difference between how

159 Scheduled Tribes in Orissa may be divided into the following categories: hunters and food gatherers; shifting cultivators, including cattle rearers; artisans; horticulturists; settled cultivators; and a small number of industrial and mining workers; see Mahapatra, K, 1997, Tribal language and culture of Orissa, Bhubaneswar: Academy of Tribal Dialects and Culture, Welfare Dept.

160 *Ibid*, p166.

161 *Ibid*, p167.

the Dongria Kondh from Niyamgiri perceive the impacts of the proposed mine and how Vedanta views those same impacts. She concludes: 'disruption of the habitat and the way of life … cannot be remediated or compensated, and may lead to the destruction of the Dongria Konds as a PTG [Primitive Tribal Group]. This is too serious a consequence to ignore.'[162]

The failure of the EIAs to properly assess the actual impact of the proposed projects means that any conclusions they reach about the potential negative or positive socio-economic impacts are based on incomplete information and therefore cannot be relied upon.

Misleading assumptions about opportunities offered by industrialisation

Class, caste or tribe, and gender determine individuals' and communities' vulnerability to significant changes to their lives, such as displacement, and also influence their ability to adapt to them. There are clear links between gender, identity, poverty, and education levels which determine how far affected individuals and communities can adapt to a loss of livelihood by learning new skills or taking up job opportunities offered by the proposed projects. Those who cannot adapt in this way will be plunged into greater poverty. For example it is estimated that

> A person belonging to the ST [Scheduled Tribe] category living in the southern region [of Orissa] has a more than 90 per cent probability of being in poverty – and women probably even more – compared to about 25 per cent of non-deprived groups in coastal Orissa, or less than 10 per cent in better-off parts of India.[163]

Literacy levels among women are low in Orissa and particularly in adivasi districts including Kalahandi and Rayagada, where the project is located.[164]

Vedanta's EIAs do not reflect any of these and other socio-economic issues. Nor do they indicate how affected communities in Niyamgiri and Lanjigarh will be assisted in coping with industrialisation and loss of traditional livelihoods.

Dongria Kondh people from Salpojola village in the Niyamgiri Hills. © Sanjit Das

162 Ramanathan U., 2010, *Site Inspection Report for diversion of forest land*, New Delhi: Ministry of Environment and Forests, p3.

163 de Haan, A. & Dubey, A., Poverty, Disparities, or the Development of Underdevelopment in Orissa. *Economic and Political Weekly*, 40(22/23), 2321-2329, 2005, p2328

164 See Orissa Development Report 2001 pp xi http://planningcommission.nic.in/plans/stateplan/sdr_orissa/sdr_oriexe.doc

4.4 **Ignoring cultural significance**

EIA requirements on cultural significance

EIA Notification 1994 (as amended up to 2002)

- Distance of the nearest National Park/Sanctuary/Biosphere Reserve/Monuments/heritage site/Reserve Forest.
- Potential impacts to archaeological monuments and culturally/religiously important locations

EIA Notification 2006

- Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, community facilities).

The EIA Manual

The manual suggests:

- Baseline data on tranquillity, sense of community, community structure, religious places and structure

A member of the Kutia Kondh tribe in the village of Dangadahal in the foothills of Niyamgiri mountain.

Neither of the two mine EIAs meets the requirement to assess the potential impact on locations of cultural or religious importance, and neither mentions the cultural significance of the Niyamgiri Hills to the Dongria Kondh. None of the EIAs provide any baseline data on, or analysis of, culture, community and religion as suggested in the EIA Manual. This is contrary to the human rights framework of the mining industry body, ICMM, which states that mining company members of the ICMM are expected to: 'Respect the culture and heritage of local communities, including indigenous peoples'.[165] Although Vedanta is not a member of ICMM, the complete failure to recognise the cultural value of the Niyamgiri Hills seems to be antithetical to leading practice for mining corporations.

Cultural rights, Indigenous Peoples' rights and land rights are inextricably linked. This is recognised to a limited extent under India's laws. The Scheduled Areas in which the Lanjigarh refinery and the proposed mine at Niyamgiri lie, are constitutionally protected for the benefit of tribal peoples.

Adivasis, extractive industries and national law

India's constitution contains several measures aimed at protecting the rights of *adivasis*:

- Article 46 sets out the state's responsibilities in guaranteeing *adivasis* protection from social injustice and all forms of exploitation.
- Schedule V lists a range of adivasi lands and habitats as protected areas where these communities have special customary rights over land.
- Section 5(1) of Schedule V empowers India's president and state governors to withhold any law considered detrimental to the interests of adivasi communities in these territories.

However, *adivasis* have no legal rights to minerals found on protected land. Both national and local authorities have routinely acquired land in such territories without the consent of local communities, to set up extractive industries.

Amendments made to India's constitution in 1993-94 conferred powers in relation to local development to bodies – known as *panchayats* or village councils – elected by local adivasi communities. A federal statute enacted in 1996, the Panchayats Extension to Scheduled Areas Act (PESA), requires the authorities to consult the *panchayat* or the *gram sabha*[166] before acquisition of land for any development projects located in adivasi territories listed under Schedule V. The authorities must also consult the *gram sabha* or *panchayat*, as appropriate, before resettling and rehabilitating people affected by such projects.

However, PESA does not specify the kind of information that should be provided to the gram *sabha* or *panchayat* on the proposed projects. Nor does this law have adequate provisions to ensure that consultation undertaken with the local communities is genuine. Moreover, the legislation fails to specify what should happen in cases where the village councils or local communities reject a project proposal. In the decade since PESA was enacted, the authorities have repeatedly overruled dissenting decisions of the village councils and gone ahead with land acquisition for mining projects.

165 International Council on Mining & Metals, *Human Rights in the Mining & Metals Industry: Overview, Management Approach and Issues* 2009, p22

166 All adult members of the village: people whose names are included in the electoral roll for the *panchayat* at village level.

Kondh villagers stand next to a makeshift gate they set up to bar the way to the proposed mining area. They were never properly consulted about the mine.
© Sanjit Das

5. Human rights considerations

Chapters 3 and 4 of this report outline shortcomings in the five EIAs, based on the requirements in India's EIA Notifications of 1994 (amended in 2002) and 2006, India's EIA manual of 2001 and the specific Terms of Reference laid down by the MoEF. The present chapter examines the EIAs from a human rights perspective.

EIAs are not intended to be a mechanism to assess the potential human rights impacts of a project. At present, few governments require any assessment of the human rights impacts of projects such as mining and refining, despite substantial evidence that human rights are frequently adversely affected by such projects. UN human rights experts have noted that this can undermine states' ability to discharge their legal obligation to protect human rights.

The state duty to protect human rights

Under international law, states have a clear duty to protect people within their jurisdiction from having their human rights breached by non-state actors, including companies. Apart from being bound by international customary law, India has ratified, and is therefore a state party to, several international treaties that guarantee human rights. These include the International Covenant on Civil and Political Rights (ICCPR), the International Covenant on Economic, Social and Cultural Rights (ICESCR), the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), the Convention on the Elimination of All Forms of Racial Discrimination (CERD) and the Indigenous and Tribal Populations Convention (Convention No. 107) of the International Labour Organisation (ILO). India has also supported the UN Declaration on the Rights of Indigenous Peoples (2007).

The corporate responsibility to respect human rights, and the role of impact assessment

When a government fails to protect people's human rights against harm by non-state actors such as companies, this amounts to a violation of international law. However, government failure to protect rights does not absolve non-state actors from responsibility for their actions and their impact on human rights.

There is an emerging consensus on corporate responsibility for human rights that companies – as a minimum – must respect all human rights. This is the position articulated by Professor John Ruggie, the UN Special Representative of the Secretary-General (UN SRSG) on the issue of human rights and transnational corporations and other business enterprises, in his 2011 report to the Human Rights Council.[167] According to the UN SRSG:

> In order to identify, prevent, mitigate and account for how they address their adverse human rights impacts, business enterprises should carry out human rights due diligence. The process should include assessing actual and potential human rights impacts, integrating and acting upon the findings, tracking responses, and communicating how impacts are addressed.[168]

167 Ruggie, J, 21 March 2011, *Guiding Principles on Business and Human Rights: Implementing the United Nations "Protect, Respect and Remedy" Framework*, A/HRC/17/31.

168 *Ibid*, para 17.

Assessment of human rights impact is increasingly seen as vital for businesses, particularly in sectors that are highly physically invasive, such as the extractive industries. According to the UN SRSG, 'While these assessments can be linked with other processes like risk assessments or environmental and social impact assessments, they should include explicit references to internationally recognized human rights.'

In the EIAs reviewed for this report, two issues related to the human rights impacts of Vedanta's mine and refinery operations emerge: first, the EIAs identify a number of issues and environmental impacts that clearly pose a risk to human rights. However, the EIAs rarely consider or assess the repercussions of the environmental impacts in human terms. This is a common shortcoming of EIAs. Second, there are potential negative human rights impacts that the EIAs do not touch upon at all. Companies are not required, under Indian law, to consider human rights impacts or to carry out any other impact assessment processes. As a consequence, some issues are effectively invisible in the impact assessment process. They do, however, become very visible once the projects are implemented.

5.1 **Human rights issues raised by EIAs**

Many of the social and environmental issues that EIAs cover have direct human rights implications. The risk of pollution of land, water and air and displacement of people from land on which they live or work are clearly human rights issues – given that they would potentially affect human health, livelihoods, access to clean water and food.

Despite this, throughout the EIAs there is a lack of attention to obvious risks to human well-being. As a consequence, although EIAs could enable the company to identify some risks to human rights, this has not been done. Nor has the government of India acted on the information in the EIAs to protect human health and well-being. This raises questions, not only about the EIA process, but also about the manner in which the authorities in India scrutinise EIAs.

This chapter considers the human rights issues which were implicit but not addressed in the EIAs. It looks specifically at how the gaps and deficiencies highlighted in the preceding chapters have contributed to the failure to properly identify or assess the human impacts of the mine and refinery project. It also looks at those human rights impacts that an environmental assessment would not capture.

In the context of Vedanta's operations in Orissa, many of the risks to human rights could have been identified had the EIAs been properly conducted, and had Vedanta used existing guidance,

A communal building in Pengsur village near Niyamgiri mountain. Vedanta has started to cut down trees to build roads up the hillsides. © Gethin Chamberlain

developed for companies, by the UN and forums on extractive industries. However, this was not done. On the contrary, at several points Vedanta seems to have taken a minimalist approach to the whole issue of impact assessment. This suggests that far from being seen as a means to ensure the highest standards in respect of social and environmental impacts, the assessment was conducted in a way that fell short of even the bare minimum of regulatory compliance.

The analysis presented here is indicative of the human rights risks that the refinery and mine pose, and should not be considered an exhaustive examination of the issues. The overarching concern is that many of the human rights impacts could and should have been identified, and then addressed by Vedanta and the Indian authorities. This should have been done within the EIA processes or through additional processes that specifically focus on human rights impacts.

5.2 The rights of Indigenous Peoples

As a party to the ICCPR, the ICESCR, the CERD and ILO Convention 107, India is under an obligation to protect the rights of Indigenous Peoples over the lands and territories they traditionally occupy.

The importance of effective impact assessment processes in the context of activities on Indigenous lands has been recognised as a key component of discharging the legal obligation to protect Indigenous Peoples' rights. For example, Article 7 (3) of the ILO Convention 169 on Indigenous and Tribal People states:

> Governments shall ensure that, whenever appropriate, studies are carried out, in co-operation with the peoples concerned, to assess the social, spiritual, cultural and environmental impact on them of planned development activities. The results of these studies shall be considered as fundamental criteria for the implementation of these activities.

The UN Committee on Economic, Social and Cultural Rights (CESCR) has, in its concluding observations, highlighted the need for states parties to

> carry out environmental and social impact assessments and consultations with affected communities with regard to economic activities including mining and oil explorations, with a view to ensuring that these activities do not deprive the indigenous peoples of the full enjoyment of their rights to their ancestral lands and natural resources.[169]

The 2007 UN Declaration on the Rights of Indigenous Peoples affirms the right of Indigenous Peoples to the lands, territories and resources, which they have traditionally owned, occupied or otherwise used or acquired and requires that states give legal recognition and protection to these lands, territories and resources. The Declaration requires states to

> consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free and informed consent prior to the approval of any project affecting their lands or territories and other resources, particularly in connection with the development, utilization or exploitation of mineral, water or other resources.[170]

The obligation of states to seek the free and informed consent of Indigenous Peoples has also been reinforced by various human rights bodies, while clarifying governmental obligations under the ICCPR, ICESCR and CERD, all treaties that India is a party to. Free, prior and informed consent (FPIC) is a core right enshrined in this Declaration. It is applicable to a number of contexts of

169 CESCR, 12 June 2009, *Concluding Observations of the Committee on Economic, Social and Cultural Rights: Cambodia*, UN. Doc. E/C.12/KHM/CO/1, para 16.

170 Article 32, UN Declaration on the Rights of Indigenous Peoples.

particular relevance to the Niyamgiri mine, including the approval of the mining lease and project, location of the mine site on the traditional land of the Dongria Kondh, use and exploitation of natural resources, and the storage of hazardous waste on their land.

Over the past decade international guidance on extractive industries and Indigenous Peoples has evolved and bodies such as the ICMM increasingly recognise the importance of respecting the rights of Indigenous Peoples to their traditional lands, and of ensuring meaningful and respectful consultation processes. Although some of the industry guidance fails to fully meet international standards, for example on FPIC, it does reflect other elements of international law and standards.[171]

Vedanta's bauxite mining project will cover 700 hectares of land on top of the north-western part of the Niyamgiri Hills and involve excavation of a large section of the hill to a depth of about 30 metres. The hills and surrounding area are home to the Dongria Kondh, an 8,000-strong adivasi (Indigenous) community spread over 90 villages. The Dongria Kondh consider the hills as sacred and do not cut trees or practise cultivation on the hilltop, as they worship Niyam Raja Penu who they believe lives there. Their identity is closely tied to the Niyamgiri Hills, which they believe are essential to their culture, traditions, and physical and economic survival.[172]

The hills form a biologically rich and diverse habitat, which the Dongria Kondh rely on for food and forest products including firewood, timber and medicinal plants. The Dongria Kondh practise shifting cultivation on the Niyamgiri Hill slopes: they grow ginger, millet, turmeric, beans and other vegetables. They eat the food that they grow but also sell crops and forest products.[173]

The Dongria Kondh's close ties with the Niyamgiri Hills form the basis of their culture, their spiritual life, their integrity, and their economic survival. During 2008/9 Amnesty International conducted focus group discussions with men and women from the Dongria Kondh in 19 hamlets in the Niyamgiri Hills close to the proposed mining site. All the people interviewed by Amnesty International emphasised that the Niyamgiri Hills are essential for their survival as a distinct people, for their culture and traditions and for their economic and physical survival.

In the light of international law and standards, as well as guidance produced by extractive industry bodies, the state authorities and the companies involved in the mining project should have carried out an adequate assessment of the potential impact of the mining project on the Dongria Kondh as an Indigenous People. Such an assessment would go further than the EIA process, and should use international standards and guidance as the basis for assessment. Any adequate assessment would involve the participation of the Dongria Kondh in the assessment process. It would also consider the impacts holistically – examining the cumulative impacts of mining on the way of life of the Dongria Kondh.

The inadequacies of the EIA process have been compounded by Vedanta's failure to meet the EIA requirements.

The failure to identify the villages on Niyamgiri Hill as potentially affected by the mining operations or any pollution resulting from mining is a serious omission. As noted in Chapter 3, the EIAs operate on the presumption that as no villages are within the actual area to be mined, there is no impact on the people living in the Niyamgiri Hills. The EIAs appear to take an extremely narrow view of 'impact' in relation to the Niyamgiri Hills.

The EIAs do not consider existing land uses in the Niyamgiri Hills or assess the potential for land use to be affected by mining and associated processes such as transportation and an influx of workers into the area. Nor do the EIAs consider that air pollution from the mine, including

171 International Council on Mining and Metals, 2010, *Indigenous Peoples and Mining: Good Practice Guide*. www.icmm.com/page/208/indigenous-peoples

172 Amnesty International, February 2010, *Don't Mine Us Out of Existence: Bauxite Mine and Refinery Devastate Lives in India*, p17.

173 *Ibid*, pp21-22.

dust, overburden and possible pollution of water, may affect the lives or livelihoods of Indigenous communities. In respect of air quality, no baseline sampling was done in potentially affected villages in the Niyamgiri Hill range and no subsequent monitoring of air pollution is proposed.

The streams which originate from the top of the Niyamgiri Hills are the only source of water for communities who live there, in a region that receives limited rainfall for many months of the year and is often subject to drought. Any negative impacts on the streams, through pollution, or disruption of water re-charging capacity or drainage patterns, or any other effects on the quantity and quality of water, could have disastrous consequences for the communities. Despite the requirements of the EIA Notifications, the two mine EIAs contain only scant information on local water resources and almost no information on human dependence on these resources. As a consequence, the potential implications of water pollution or a reduction in access to water are not considered.

At no point while undertaking assessments have the companies involved in the proposed mine consulted with, or made any attempt to seek the consent of, the Dongria Kondh to the lease of the lands or any other aspect of the Niyamgiri mining project. Nor have the communities been provided with adequate and timely information on the proposed mining project on their traditional lands.

5.3 **Effects of land acquisition and evictions in relation to the refinery**

The EIAs for the refinery acknowledge that a number of people would be evicted from their homes and the land that they use. The EIAs also indicate the size and scope of the industrial complex to be constructed in Lanjigarh, a remote rural area. The construction of the refinery and the displacement of people from homes and land raise a number of human rights concerns. While the EIAs provide some data on the potential displacement, this data is largely technical and does not consider the impact of land acquisition and eviction on the people affected.

International standards in relation to displacement and evictions clearly require proper impact assessment. For example, the UN Basic Principles and Guidelines on Development-based Displacement and Evictions state:

> Comprehensive and holistic impact assessments should be carried out prior to the initiation of any project that could result in development-based eviction and displacement, with a view to securing fully the human rights of all potentially affected persons, groups and communities, including their protection against forced evictions. … Impact assessments must take into account the differential impacts of forced evictions on women, children, the elderly, and marginalized sectors of society. All such assessments should be based on the collection of disaggregated data, such that all differential impacts can be appropriately identified and addressed.

In order to properly assess the impacts of land acquisition and eviction, the company and the government should have engaged in a process of consultation with those potentially affected and identified possible impacts on all potentially affected persons. The impacts of loss of access to or eviction from privately owned or common public lands can be wide-ranging. For example, loss of land can negatively affect people's livelihoods and food security, even where people are compensated for the land itself; rural communities may struggle with the challenges of moving from an agricultural-based subsistence way of life to a monetised or wage-based one. These issues are not considered in the EIAs.

Additionally, as noted in Chapter 4, the EIAs assume that displacement affects only individuals and households who are moved off lands or out of their homes. The EIAs failed to assess impacts on landless people who worked on other people's farmlands, which were going to be acquired for the project. The EIAs fail to consider the loss of access to public lands, or the impacts this may have on the ability of people to secure their livelihood and access to food. The loss of access to public land can have a particularly negative impact on people who have no land, and who rely on other people's farmland as a source of labour, and on using communal land to graze their cattle and

gather food. The human right to an adequate standard of living, including adequate food, may be seriously compromised when people lose access to land. Had the EIAs more clearly mapped out land use, some of these issues could have been identified.

5.4 Impacts on the right to health and a healthy environment

The ICESCR guarantees the right to health. In elaborating the content of this human right the CESCR has clarified that:

> the right to health embraces a wide range of socio-economic factors that promote conditions in which people can lead a healthy life, and extends to the underlying determinants of health, such as access to safe and potable water …and a healthy environment.

States are obliged to take all necessary measures to prevent companies from infringing the right to health, including enacting or enforcing laws to prevent the pollution of water, air and soil by extractive and manufacturing industries.

Between 4,000 and 5,000 people, including adivasi and dalit communities, live in the 12 villages that surround the refinery, some of them barely 150-300 metres from its boundary walls. The manner in which the EIAs address potential pollution of air and water falls far short of any adequate consideration of the potential implications for the health of these communities.

While some limitations are inherent in the EIA process, these are exacerbated by Vedanta's omissions, identified in Chapters 3 and 4. The result has been a failure to consider the human impacts of the refinery on nearby villages. For example:

- The EIAs note that a buffer zone will be put in place between the boundary of the refinery and the local villages. However the EIAs are silent on the implications for the communities in the period before the buffer zone is in place.
- The EIAs include some information on air quality and water use. However, the working assumption of zero emissions has proved to be unsound in reality. As a result, the EIAs fail to consider the risks of air pollution, including from dust and transport, on the local villages, thereby ignoring the potential human impacts. As noted in Chapter 3, the air quality sampling locations chosen omit a number of affected sites and there is no clear justification for the choice of sites for sampling.
- There is no assessment of the cumulative impact of exposure to a range of emissions on the nearby villages. Only a limited number of potential air pollutants were identified and only a limited number of pollution sources. The EIAs contribute to a failure to predict and address long-term cumulative exposure to pollution. For the affected villages this is exacerbated by the failure to consider water pollution.
- The refinery EIAs fail to take into account the fundamental risk of locating an alumina refinery next to the Vamsadhara River, which is in close proximity to several villages. Nor do the EIAs identify how the river is used by local people. Within the refinery complex there are a number of waste containment systems which pose clear risks to human health and to people's ability to use the local water system, should any leakages occur. Before the refinery was constructed, people used the river for drinking and other domestic purposes, and many continue to use the river for bathing and for their livestock. The EIAs do not identify any need to have plans in place for failures to meet the zero emissions scenario or to ensure local people are properly informed of any risks to their health in the event of leakage. While the absence of data on the risks related to air pollution in the EIAs for the original refinery is a matter of concern, the failure to include concerns about pollution and impacts in the 2008 EIA for the refinery expansion is inexplicable. At the time when this EIA was being prepared the researchers would have been aware of the number of concerns raised publicly, and the concerns highlighted by the Orissa State Pollution Control Board.

A fuller discussion of this issue can be found in Amnesty International's 2010 report.[174]

The mine EIAs also fail to consider adequately issues of air and water pollution and the risks these pose to human health, including access to potable water. The 2005 mining EIA acknowledges dust pollution but does not propose to measure baseline data, does not discuss potentially affected locations on Niyamgiri Hill and does not propose to monitor the dust. For both the mine and refinery sites, the information provided lacks the detail essential for the analysis and prevention of water pollution. Neither the health risks posed by water pollution, nor the ability of people to access water for drinking and other domestic purposes, receive adequate attention in the EIAs.

5.5 **Failure of EIAs to consider gender issues**

Both international human rights law and well-accepted standards on business and human rights clearly recognise that gender frequently has a significant influence on people's lives across a wide range of issues. In the context of mining and industrial activity, women and men may experience many different impacts which are related to gender and prevailing gender norms. India's EIA requirements and the five Vedanta EIAs considered in this report are effectively gender blind. The focus in the EIA process on villages and communities precludes any assessment of impacts on individuals and marginalised groups within those communities. This means that the rights and needs of women are more likely to be overlooked.

EIAs are not a human rights tool. Nevertheless, all EIAs should include a gendered analysis of environmental impacts, as it is very likely that many impacts on the environment and any mitigation measures proposed in environmental management plans will affect women and men differently.

The failure of states such as India to require the consideration of gender in EIA processes is likely to undermine the state's ability to meet its legal obligations in respect of the rights of women, equality and non-discrimination.

A family of the Kutia Kondh tribe, in Dangadahal village in the foothills of Niyamgiri mountain. Community members have had to dig for stones for roadbuilding to earn money for food © Gethin Chamberlain

174 Amnesty International, February 2010, *Don't Mine us out of Existence: Bauxite Mine and Refinery Devastate Lives in India*, pp45-64.

India's duty under international law to eliminate discrimination against women

The Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) imposes a legal obligation on state parties to respect, protect and fulfill the rights of women to equality and non-discrimination. The Convention obliges state parties to ensure that:

- There is no direct or indirect discrimination against women in their laws.
- Women are protected against discrimination – whether committed by public authorities, the judiciary, organisations, enterprises or private individuals, in public or in private – by competent tribunals, sanctions and other remedies.

States must improve the de facto position of women through concrete and effective policies and programmes. They must address prevailing gender relations and the persistence of gender-based stereotypes that affect women not only through acts by individuals but also in law, and legal and societal structures and institutions.[175]

Article 14 of CEDAW, which focuses on rural women, lays down that:

> States/parties shall take into account the particular problems faced by rural women and the significant roles which rural women play in the economic survival of their families, including their work in the non-monetised sectors of the economy, and shall take all appropriate measures to ensure the application of the provisions of the present convention to women in rural areas.
>
> States/parties shall take all appropriate measures to eliminate discrimination against women in rural areas in order to ensure, on a basis of equality of men and women, that they participate in and benefit from rural development and, in particular, shall ensure to such women the right.

Responding to India's third and fourth periodic reports on compliance with CEDAW, the Committee on the Elimination of Discrimination Against Women expressed grave concern about the displacement of tribal women owing to the implementation of major projects and the influence of global economic trends. The committee therefore urged the Indian government to 'Study the impact of mega projects on tribal and rural women and to institute safeguards against their displacement and violation of their human rights.'[176]

Assumptions and omissions on gender in the EIAs

A significant omission in the EIAs is the absence of any qualitative information and analysis of how men and women are affected differently as a result of their gender-specific social and economic roles and status within their communities. In its place the EIAs rely on a cursory recognition of the impoverishment and low literacy rates of the affected women. The EIAs lack the baseline information to capture how displacement, reduced access to communal property, the inward migration of workers, and environmental pollution and degradation are likely to impact upon women's lives in different ways from men's.

The assumption underpinning the EIAs that the projects will benefit all the affected communities, combined with the lack of gender analysis, leads to the assumption that women will automatically benefit from the proposed projects. The reality is different: the proposed project may well expose women and girls to greater poverty and dependence. These assumptions and omissions are particularly critical when assessing the impact of the proposed project on *adivasi* women. While

175 Committee on the Elimination of Discrimination Against Women, General Recommendation 25, para 7, on Article 4, para 1, of CEDAW, on temporary special measures,

176 See Concluding comments of the Committee on Elimination of Discrimination Against Women, 2007 paras 46 and 47.

both *dalit* and *adivasi* women across the affected communities experience discrimination compared to men, the EIAs fail to assess on any level how the proposed projects may undermine the status and rights tribal women currently enjoy.

As a result of these assumptions and omissions, the EIAs fail to identify a number of predictable human rights impacts including:
- Loss of access to resources, livelihood and compensation
- Increased insecurity and vulnerability to violence.

Loss of access to resources, livelihood and compensation

Although women in the affected communities are responsible for a wide range of agricultural work, the vast majority do not own land in their own right. They are dependent on men in their families for access to land, reliant on access to common property resources for their livelihoods, or work as agricultural labourers. Vedanta's acquisition of common and privately owned land, and environmental degradation caused by pollution, are likely to reduce women's access to land and common property resources.

As Orissa's R&R policy mainly targets land owners, women can be largely invisible in the process of rehabilitation and resettlement. Testimonies of women from coal mining areas of Orissa (Talcher district) show that displacement and loss of land were the most serious problems affecting their lives. Their link to livelihood, economic and social status, health and security all depended on their continued access to, and usage of, land and forests.[177]

The payment of compensation and royalties to men as landowners or heads of households 'on behalf of' families and communities can exacerbate women's economic dependence. One study found that only 1.4 per cent of women displaced in Orissa had any power to decide how compensation money should be spent.[178]

Increased vulnerability to violence

Extractive industry projects have frequently been linked to a general increase in crime and a particular increase in different forms of violence against women.[179] The shift in power dynamics within families makes women increasingly vulnerable to discrimination and domestic violence within the home. Many of the women in the affected communities, particularly the adivasi women, enjoy comparative freedom of movement and safety owing to the remote location of the communities. The influx of migrant workers has often been linked to a rise in prostitution and trafficking,[180] and an increase in sexual harassment against local women. This in turn has curtailed their freedom of movement. Examples of such incidents have already been documented in Lanjigarh.[181]

5.6 **Right to information and participation**

The principles of transparency, consultation and participation are embedded in international human rights law and standards. Expert bodies of the UN and regional human rights institutions have made clear the importance to human rights of ensuring that people have access to information and can participate meaningfully in decisions that affect their rights. In the case of major commercial projects both the government and the companies involved should ensure that affected people have

177 Bhanumathi, K, 2002, 'The status of women affected by mining in India', in Macdonald, I and C Rowland, (eds) *Tunnel vision: Women, mining and communities*, p2.

178 Action Aid, 2008, *Tribal Poor, Resource Rich: Displacing people destroying identity in India's indigenous heartland*, p66.

179 Bhanumathi, K, 2002, 'The status of women affected by mining in India',.in Macdonald, I and C. Rowland (eds) *Tunnel vision: Women, mining and communities*; Padel, F and S Das, 'Cultural genocide: The real impact of development-induced displacement', in Mathur, H M (ed) 2008, *India Social development report 2008: Development and displacement*.

180 Action Aid, 2008, *Tribal Poor, Resource Rich: Displacing people destroying identity in India's indigenous heartland*, p73.

181 Report of Indian People's Tribunal on Environment and Human Rights, October 2006, *Kashipur: An Enquiry into Mining and Human Rights Violations in Kashipur, Orissa*, p51. (The Tribunal was headed by Justice S.N. Bhargava, former Chief Justice, Sikhim High Court.

adequate access to information and that they are consulted and their views taken into account before the project goes ahead.

The right to information, the right to be consulted on issues affecting one's human rights and the right to participate in decision-making in relation to human rights issues are recognised components of many substantive rights – including all those referred to above. These rights are also well-accepted in relation to environmental matters and should be central to EIA processes.

However, the requirement for public consultations or public hearings under India's EIA process is minimal, and does not conform with international human rights standards. The EIA process includes public participation in the form of the dissemination of the EIA report and a public hearing. While this is an important aspect of the EIA process, it also has significant shortcomings. Very limited information is provided to communities, and much of what is provided is not accessible. The information is usually in writing, in technical language, and often not in local languages. Those who are not literate or who do not have the capacity to understand technical reports cannot access the written information. Public meetings are limited, and the available evidence suggests that major issues are not explained, nor are possible risks discussed with those who attend. No effort is made to ensure that marginalised groups can access information or attend the meetings, and little attention appears to have been paid to views that members of the community expressed. A fuller assessment is presented in Amnesty International's 2010 report.[182]

5.7 Right to liberty and security of the person, and freedom of expression and assembly

Amongst those human rights issues that an EIA process would be very unlikely to touch upon are the rights to freedom of expression, association and assembly and the rights to liberty and security of the person. However, these human rights are frequently relevant in the context of extractive industries such as oil, gas and mining. This is because extractive industries are often very physically invasive and when they operate in areas of poverty and marginalisation, without adequate measures to protect human rights, local people protest. In India, as in several other countries, such protests by local communities often meet with a repressive response from the state, and in some instances from private security companies, leading to violations of human rights.

Companies in the extractive sector are well aware of this phenomenon and more than a decade ago the frequency of human rights abuses related to security around extractive projects led to the establishment of the Voluntary Principles on Security and Human Rights.[183] The Voluntary Principles explicitly state that risk assessments should consider the available human rights records of public security forces, including local and national law enforcement, as well as the reputation of private security providers. Companies' risk assessments should also seek to identify the capability of security providers, whether public or private, to respond to situations of violence in a lawful manner, ie one consistent with applicable international standards.

The Voluntary Principles also state that although governments have the primary role of maintaining law and order, security, and respect for human rights, companies have an interest in ensuring that actions taken by governments (and particularly by public security providers) are consistent with the protection and promotion of human rights. Vedanta is not a signatory to this code of conduct, but the Principles are well known, and many companies in the extractive sector adhere to them.

These rights are particularly relevant in the context of Vedanta's Orissa operations because of accusations that the police, cooperating with security guards employed by Vedanta, were used to intimidate villagers in Lanjigarh and Niyamgiri in order to suppress dissent. During 2002-2004, activists campaigning against compulsory land acquisition for the refinery faced intimidation.

182 Amnesty International, February 2010, *Don't Mine Us Out of Existence: Bauxite Mine and Refinery Devastate Lives in India*, pp25-40.

183 www.voluntaryprinciples.org/files/voluntary_principles_english.pdf

Amnesty International received reports alleging that the police beat up seven villagers following protests at Basantpada against land surveys in March 2003. On 1 April 2003, Lingaraj Azad of the Niyamgiri Suraksha Samiti, an organisation opposing the refinery-mining project, was arrested on charges of disrupting public order. The next day, 18 people were injured in an attack on a protest march demanding his immediate release; the attack was allegedly organised by members of a youth club which had supported the refinery project. A team of activists from the People's Union of Civil Liberties (PUCL), which visited the area after the attacks, confirmed that the police had failed to take action against the attackers even 10 days after the victims filed a complaint.[184]

5.8 **Summary: Human rights at risk**

This brief analysis of some of the human rights risks that Vedanta and the government of India should have identified illustrates the need for companies and states to clarify the processes they rely upon to ensure human rights are not violated in the course of corporate activity. In the case of the mine and refinery, almost all of the risks identified here have either become reality or remain serious risks, as documented by Amnesty International in its 2010 report.[185] Most of them could have been identified in the course of the environmental impact assessment process, particularly if available standards relating to these issues had been considered.

The risks, the failure to address them, and above all Vedanta's ongoing failure to respond to situations where human rights are being infringed, despite mounting evidence of problems, raise serious questions about Vedanta's interest and willingness to ensure its operations do not result in human rights abuses.

Police try to control a protest against the proposed mine. © Gethin Chamberlain

184 Amnesty International, February 2010, *Don't Mine Us Out of Existence: Bauxite Mine and Refinery Devastate Lives in India*, p40.

185 *Ibid.*

Dongria Kondh woman and her child in Patalamba village.

6 Conclusions and recommendations

CONCLUSIONS

Amnesty International's analysis of Vedanta's EIAs for the Lanjigarh refinery and proposed Niyamgiri mine demonstrates that they fail to do what they are supposed to do – which is to assess the potential environmental and social impacts of the company's mining and refining operations. The EIAs are also inadequate to ensure that the company is fulfilling its responsibility to respect human rights. While EIAs are not intended as tools to assess human rights impact, Vedanta carried out no other impact assessment process in relation to human rights, even after serious human rights problems were brought to the company's attention.

In allowing the company to construct and operate the refinery on the basis of these EIAs, the Indian government failed to fulfil its duty to protect the human rights of people who are and who will be affected by the refinery. The same consideration would apply to the expanded refinery and the mine, although currently clearance for each of these developments to proceed has been withheld by India's Minister of the Environment.

The EIAs contain insufficient detail of the populations that will be affected by Vedanta's mining operations. They fail to disaggregate data to enable an understanding of the differential impacts on women and on the social and cultural groups that will be disproportionately affected. The EIAs for the mine and refinery provide identical information on population, land use and cropping patterns, despite the demographic differences between the two areas. This raises serious concerns about the quality of the research underpinning the EIAs.

The availability of accurate information and the recognition of communities beyond broad categories are critical for shaping understanding of how these communities relate to and depend on their environment, including their use of land and forests. It is also key to anticipating risks and taking adequate mitigation measures. A human rights perspective would insist that impact assessment processes include detailed information on the needs and capacities of particular communities affected, the disparities within and between communities in access to resources, their levels of education and the skills that they possess. A human rights perspective would also address risks posed to particular groups within these communities as a result of pre-existing factors such as discrimination and lack of decision-making power. These groups include women, children and the elderly. Finally, a human rights approach would embody meaningful consultation and participation to ensure that the process of impact assessment, the conclusions drawn and the mitigation measures undertaken are effective in enabling respect for human rights.

Where full EIAs were not completed, as was the case with most of those submitted by Vedanta, the MoEF should not have accepted the 'rapid EIAs' as adequate for projects of this scale. But even the rapid EIAs submitted by Vedanta should have alerted the MoEF to systematic deficiencies in the company's approach. These are characterised by sweeping generalisations, glaring omissions and unwarranted assumptions.

Generalisations on affected communities: The assessments do not accurately portray who will be affected by the projects. Through reliance on out-dated government data, the assessments homogenise and mask the affected populations. In reality, communities affected by the projects have distinct characteristics in relation to labour, livelihoods, culture, and gender divisions. The assessments also fail to acknowledge the existence of some affected communities, particularly the

Dongria Kondh, whose villages or hamlets may not be listed in official governmental records.

Generalisations on the usefulness of technology for environmental control: Any technology is liable to fail if it is not sensitive to the local context, or if not used according to a well-specified environmental management plan. The EIA reports appear to be underpinned by an unchallenged assumption that technology will overcome natural conditions. They do not discuss inherent pollution risks associated with locating a mine or a refinery next to a river. The refinery EIAs fail to discuss risks of water pollution during construction, nor is there any concern for the de-commissioning of large waste ponds. The reliance on technology is also reflected in the failure to provide for continuous monitoring, which would have enabled early detection of spills. This has already proved to be a problem, as revealed in Orissa State Pollution Control Board reports of pollution from the refinery.[186]

Omission of any consideration of risks to human rights: The assessments fail to identify or address serious risks to human rights. There are no baseline studies to accurately represent who will be affected by the projects, and how the exploitation of natural resources and associated environmental pollution may impact upon the health, livelihoods and culture of the women, men and children of these communities. The cultural and spiritual value of the land to some affected communities is not addressed.

Omissions on displacement and migration: The assessments do not accurately portray who will be affected by displacement, land loss and migration. Where they acknowledge the broad need for 'resettlement', they give minimal details on how this will be in done in a just manner or how people who are landless but who rely on common land for their livelihoods, or on labouring on the land of others, will be compensated for their loss.

Omission of gender: The assessments are devoid of any gendered analysis of the impacts of the projects or the proposed mitigation measures. Specific impacts on women are not identified, for example:

- Displacement without adequate compensation because of lack of formal land ownership
- Loss of access to common grazing land and livelihood
- Lack of personal safety and increased insecurity associated with an influx of migrant population, greater vulnerability to harassment and prostitution, and decreased space for women to congregate safely.

Omission of information and detail: The assessments lack detail and information regarding the overall environmental impact of both the refinery and mine. The mining EIAs largely ignore the environmental consequences of the mine, and how the environmental impact of mining could be minimised. There is no detailed investigation of the actual vegetation of the proposed mining area, nor of those locations affected by road and conveyor belt transport, or affected by the dumping of overburden waste. Local streams and water bodies have not been investigated despite being clearly visible on detailed topographical maps.

Assumptions on livelihoods: A broad assumption is made that people who have historically been involved with a set of activities for their livelihood and sustenance can alter their practices in response to the encroachment of major industrial projects. While some individuals may be able to make this change, the disturbance could lead to poverty, marginalisation and alienation of some communities. Indigenous and dalit communities are among those most likely to lack the necessary qualifications for any new jobs that are provided. The assessments do not reflect the importance of forest resources for local livelihoods, nor do they reflect how a loss or change in access to forest goods will affect the capacity of people to meet their subsistence requirements.

Assumptions on location: The choice of location for the refinery just next to the Vamsadhara river is highly questionable, because it increases the potential consequences of any spill or other

186 Orissa State Pollution Control Board, 2008, *Inspection Report on M/S Vedanta Aluminium Limited Lanjigarh, Dist: Kalahandi*; Orissa State Pollution Control Board, 2007, *Inspection Report on M/S Vedanta Aluminium Limited Lanjigarh, Dist: Kalahandi*, Orissa.

polluting event. This problem is compounded by the proposed six-fold expansion in production, the consequent increase in red mud storage area, and the failure to measure the quality of river water, deemed unnecessary because it was assumed there would be zero emissions. Since the EIAs were produced, inspection reports have revealed that spills have occurred.

Assumptions on air pollution: The air pollution monitoring stations are not located in or near to the villages closest to the mine and refinery sites. Moreover, these stations are not in the locations that the EIAs predict will be the most likely to be affected by pollution. Therefore, not only is the information about current pollution incomplete, but the inadequate monitoring structure ensures that the true air pollution levels will not be adequately captured in future. In terms of air emissions from the refinery, only a narrow range of pollutants are being monitored compared to what would be considered leading practice, and the number of sources of pollution examined is limited. This means it will be impossible to detect high levels of many air pollutants. The failure to assess air pollution from dust and odour is an additional weakness.

Vedanta claims that it ensures its projects are carried out in accordance with 'international best practice'.[187] However, Vedanta's impact assessments are well behind their international counterparts, as acknowledged in the Scott Wilson report prepared for Vedanta's bankers.[188] While there are widespread problems in the mining industry as a whole, the ICMM guidelines on *Human Rights in the Mining and Metals Industry* reflect the fact that many other mining companies, including the major international competitors of Vedanta, have taken some measures to assess their human rights impacts.[189] Some mining companies have recognised that it is essential to address the environmental, social, cultural, economic and human rights issues associated with their operations. This approach is identified by these companies as ensuring long-term sustainability for their business. It is also more consistent with the approach urged by the UN Special Representative on business and human rights. An examination of Vedanta's EIAs demonstrates that the company does not subscribe to this approach in the Indian context. It performs well below international best practice, and in so doing exposes affected communities to a range of risks that it could – and should – address.

As an internationally listed corporate entity, Vedanta should hold itself to a higher standard. It should avoid making claims about its impacts on the environment and on sustainable development that misrepresent the full breadth of the possible impacts and it should aim to meet international leading practice. For this to happen, the company would have to acknowledge the true impacts of mining and refining on the local environment and affected communities, and develop robust mitigation responses. A properly conducted impact assessment would be an important step in the right direction.

RECOMMENDATIONS

To the government of India

- Strengthen existing socio-economic requirements and indicators for the EIA process, including those on gender, to ensure that impact assessments can more accurately capture the impacts on specific groups within the affected population.
- Amend the legal framework so as to require companies to carry out environmental, social and human rights impact assessments, particularly for all high-risk projects and activities, including extractive industry projects.
- Require that environmental, social and human rights impact assessments are undertaken by competent and impartial institutions that are suitably qualified.
- Require that impact assessments look at cumulative impacts; this should apply to related

187 See, for example, Vedanta's rebuttal of Amnesty International's claims, February 2010. www.mineweb.com/mineweb/view/mineweb/en/page674?oid=97837&sn=Detail&pid=1

188 Scott Wilson Ltd, November 2010, *Vedanta Resources plc and Lanjigarh Refinery: Independent Review of Sustainability Policies and Practices*. http://csr.vedantaresources.com/scottwilson.html

189 ICMM, 2009, *Human Rights in the Mining & Metals Industry: Overview, management approach and issues*.

projects; for example a related refinery and mine would need to be assessed together for their cumulative impact on a given area.
- Amend the requirements on public participation in the assessment process to ensure that affected communities can participate in the process; provide specific guidance in relation to issues of gender and marginalisation; and require full disclosure of the assessments in a form that is accessible to the affected communities and to particular groups within those communities, including women.
- Bridge the knowledge gap by requiring the production of non-technical impact assessment documents and by appointing an ombudsperson to work on behalf of potentially affected communities.
- Require Vedanta to conduct fresh impact assessments for the Lanjigarh refinery and Niyamgiri mine that conform fully with current regulatory requirements
- Introduce strict penalties and/or disqualify projects where the EIA requirements are not met or where proper and effective environmental management plans are not implemented.
- Suspend all clearances and licences for the Niyamgiri mine and expanded Lanjigarh refinery until Vedanta has cleaned up existing pollution, compensated victims adequately, sought the free, prior and informed consent of the Dongria Kondh in relation to the mine, and addressed the human rights impacts of the project.

To Vedanta and its subsidiaries and joint ventures

- Suspend all plans to mine or expand the refinery until the human rights issues are properly addressed.
- Adopt leading international industry methods for managing the environmental impacts of bauxite mining and alumina refining.
- Ensure that impact assessments address all human rights that could potentially be affected by the project.
- Complete baseline socio-economic surveys to understand who will be affected.
- Ensure that any displacement or land loss is fully compensated, regardless of formal land ownership.
- Make a clear commitment to respect the right to free, prior and informed consent of Indigenous Peoples.
- Put in place policies and process to ensure that all affected individuals have timely access to full information about projects that may affect them.
- Recognise cultural values attached to the proposed mine site.
- Implement proper pollution control measures.
- Ensure that impact assessments have a gender dimension so that the differential impacts on women and men are considered.
- Ensure full disclosure of impact assessments in a format that is accessible to those affected, as well as full disclosure of management and implementation plans to address the findings of the assessment.
- Urgently and fully address the existing negative environmental, health, social and human rights impacts of the Lanjigarh refinery, in open consultation with the affected communities.

To Vedanta's bankers and investors

- Express concern to Vedanta about the actual and potential impacts of its operations in Orissa on human rights and call on the company to implement the above recommendations.
- Ask Vedanta to report regularly on its progress to address the environmental and human rights concerns surrounding its operations in Orissa.
- Call for a suspension of all plans to mine or expand the refinery until the human rights issues are properly addressed.
- Develop an engagement and escalation strategy that will bring about changes in Vedanta's conduct, including effective forms of pressure and sanctions.

Glossary and abbreviations

Adivasis	'The original inhabitants': Indigenous groups sometimes referred to as 'tribals' or 'tribal people'
CEC	Central Empowered Committee: a committee appointed by the Supreme Court of India to examine cases involving approval for use of forest land
CEDAW	UN Convention on the Elimination of all Forms of Discrimination Against Women
CERD	UN Convention on the Elimination of all Forms of Racial Discrimination
CESCR	UN Committee on Economic, Social and Cultural Rights
CMPDI	Central Mine Planning and Design Institute
CPCB	Central Pollution Control Board of India
Crore	10 million
CSE	Centre for Science and Environment
Dalits	'The oppressed': people of the 'lowest' caste
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
FPIC	Free, prior and informed consent
Gram sabha	All adult members of a village: people whose names are included in the electoral roll for the *panchayat* (council) at village level.
HCSD	High concentration slurry disposal
IBM	Indian Bureau of Mines
ICMM	International Council on Mining and Metals
ICCPR	International Covenant on Civil and Political Rights
ICESCR	International Covenant on Economic, Social and Cultural Rights
IFC	International Finance Corporation
ILO	International Labour Organisation
IRMA	Institute of Rural Management, Anand
IUCN	International Union for the Conservation of Nature
Kondh	The largest *adivasi* group in Orissa; it has three sub-divisions – Majhi, Dongria and Kutia Kondh – and most of the Kondh population live in the Lanjigarh/Niyamgiri area
Lakh	100,000
LDPE	Low density polyethylene
MoEF	Ministry of Environment and Forests of the Indian government
MoU	Memorandum of understanding: usually a business agreement relating to an investment
mtpa	Million tonnes per annum (annual production)
NGO	Non-governmental organisation
NO_x	Term applied to a range of nitrogen oxides
OECD	Organisation for Economic Cooperation and Development
OMC	Orissa Mining Corporation
OSPCB	Orissa State Pollution Control Board
Overburden	Used in mining to describe the material that lies above the area of economic interest, mainly soil, rocks, etc
PAP	Project affected persons
PAH	Poly-aromatic hydrocarbons
Panchayat	Village council: local elected body comprising one or several villages
PESA	Panchayats (Extension to Scheduled Areas) Act 1996
PUCL	People's Union of Civil Liberties
PM10	Used to describe particles of 10 micrometres or less
RPM/RSPM	Respirable particulate matter/respirable suspended particulate matter: similar to PM10 but for particles of five micrometres or less
Scheduled Areas	Territories reserved for India's tribal communities in the fifth schedule of the constitution
Scheduled Castes	Official name for *dalits*
Scheduled Tribes	Official name for *adivasis*
SIIL	Sterlite Industries India Ltd
SPM	Suspended particulate matter
SO_2	Sulphur dioxide
SWOBMC	South-West Orissa Bauxite Mining Corporation
Tailings	The materials left over after the process of separating the valuable fraction of an ore
Tribal	Collective name for group of people identified as in need of special protection in the Indian constitution.
UN SRSG	UN Special Representative of the Secretary-General
USEPA	United States Environmental Protection Agency

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Generalisations omissions assumptions

Vedanta Resources plc through its subsidiaries and joint venture partners in India is attempting to gain licences to mine bauxite and expand its existing alumina refinery in the eastern state of Orissa. India's regulations require Environmental Impact Assessments (EIAs) to be undertaken as a pre-condition for such projects to proceed.

This report demonstrates the extent to which Vedanta's EIAs for the Orissa mine and refinery fall short of India's regulatory requirements. They fail to identify all sources of emissions, ignore the cumulative impacts of mining and refining activities in close proximity, are sparse on details relating to waste disposal and pollution of water supplies, and fail to take into account the effects of transportation of ore.

In addition, the EIAs provide scant information on the communities that will be affected by the mine and refinery projects, ignoring their different modes of subsistence and their usage of land. The cultural significance of the Niyamgiri Hills to the Dongria Kondh, an Indigenous community, is disregarded, and there is no gender analysis of the differential effects of the company's activities on women and men.

Such failings have far-reaching human rights consequences that are not being properly addressed including on the rights of Indigenous Peoples, the right to health, the right to information, and effects on livelihood and food security. The government of India should take appropriate action to protect these rights, and Vedanta should take responsibility for its human rights impacts in line with international standards.

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