

COUNCIL ON ETHICS
THE GOVERNMENT PENSION FUND GLOBAL

To the Ministry of Finance

3 December 2014

**Recommendation to exclude NTPC Limited from the investment universe
of the Government Pension Fund Global**

Unofficial English translation

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1 Summary

The Council on Ethics recommends the exclusion of National Thermal Power Company Ltd. (NTPC) from the Government Pension Fund Global (GPF) due to an unacceptable risk of the company contributing to severe environmental damage through its operation in Khulna, Bangladesh.

In the form of a *joint venture* with Bangladesh Power Development Board, NTPC has established a company to build a large coal-fired power plant in southern Bangladesh. NTPC will be responsible for planning, building and operating the plant.

The power plant is to be constructed near the border of the Sundarbans national conservation area, the world's largest mangrove forest. The area is rich in biodiversity and contains substantial conservation values, including Bengal tigers and river dolphins. The conservation area also encompasses two world heritage sites, as well as a further world heritage site on the Indian side of the border. Three factors mean that the project carries a substantial risk of environmental damage.

Both coal and other materials needed during construction and operation will be shipped to the power plant through the Sundarbans. Waste from the power plant will be removed along the same route. The sailing route to the anchorage and transshipping area is very close to the border of a world heritage site. Anchorage and transshipping operations will raise the risk of mishaps and accidents involving emissions very close to vulnerable areas. This risk is a direct consequence of the power plant's construction and placement.

The power plant will produce more than one million tonnes of ash annually, which will have to be either securely stored or bound, for example in cement. Several of the proposed uses carry a high risk of emissions of unwanted substances like mercury, arsenic and other metals into the environment and drinking water, either through their use and storage or through accidents during transportation. Many of the metals accumulate in organisms, and will be concentrated up the food chain. Some substances, like arsenic, may seriously threaten the health of the local population.

The third risk relates to the extensive dredging of riverbed and seabed areas. When large volumes are removed from the riverbed or dumped, the volume of particles transported by the river increases substantially. There is a high risk that this activity may place further strain on the already endangered mangrove forest and life in the river and appurtenant marine areas, which are also important to the local population.

The Council on Ethics initially contacted NTPC in March 2014, and has had some communications with the company since then. The company takes the view that, in assessing the power plant project, emphasis must be given to Bangladesh's status as a poor country with a great need for electricity, and that the distance to the world heritage site indicates that the project does not present a particular risk of environmental damage.

The Council on Ethics considers it highly unlikely that a coal-fired power plant can be constructed at this location without the construction itself constituting a high risk of severe environmental damage, even if extensive additional measures are implemented. In the present case, the company has also failed to give sufficient consideration to what needs to be done to protect the environment. Further, various factors relating to transportation and waste management have not been addressed and handled satisfactorily. Overall, this suggests a significantly increased risk of unwanted incidents in a unique, highly vulnerable area. The Council has also given considerable weight to the strong concern expressed by UNESCO

regarding the risks associated with the project, and the fact that the IFC recommendations on such situations have not been followed

Based on an overall assessment in which consideration has been given to all of the discussed matters, the Council on Ethics has concluded that there is an unacceptable risk that NTPC will contribute to severe environmental damage through the building and operation of the power plant at Rampal, including related transportation services.

2 Introduction

In March 2014, the Council on Ethics decided to assess the GPFG's investment in NTPC¹ by reference to the guidelines for observation and exclusion from the Fund's investment universe (the ethical guidelines).² The reason for this decision was information on the planning and building of the coal-fired power plant in Rampal, southern Bangladesh, near the Sundarbans mangrove area. NTPC is a partner in the joint venture that owns the power plant, and will be the plant operator³.

As at the end of December 2013, the GPFG owned shares in the company valued at NOK 423 million, corresponding to an ownership interest of 0.38% of the shares in the company.

2.1 What the Council has considered

The Council on Ethics has considered whether there is an unacceptable risk that NTPC may be responsible for or contribute to severe environmental damage contrary to section 2(3)(c) of the ethical guidelines.

In other cases where the Council on Ethics has considered exclusion under this criterion, the Council has given particular emphasis to whether:

- the damage is significant;
- the damage has irreversible or long-term effects; and
- the damage has a considerable negative impact on human life and health,

and then assessed whether:

- the damage is a result of violations of national laws or international norms;
- the company has neglected to act to prevent the damage;
- the company has not implemented adequate measures to rectify the damage; and
- it is probable that the company's unacceptable practice will continue.

The Council on Ethics' guidelines state that material weight shall be given to the risk of future damage. This recommendation concerns future risks associated with both construction and operation. Construction has commenced, while ordinary operation is expected to begin in 2016/2017.

The coal-fired power plant planned for Rampal is being built in a unique and vulnerable natural area. Transport to the plant in the course of construction and operation will occur by boat, through this vulnerable area. The Council on Ethics has therefore also examined the

¹ The company has *Issuer Id*: 196136 and ISIN no.: INE733E01010.

² https://www.regjeringen.no/en/sub/styrer-rad-utvalg/ethics_council/ethical-guidelines/id425277/.

³ http://www.ntpc.co.in/index.php?option=com_content&view=article&id=545&lang=en.

impact of transportation and other activities occurring outside the construction site. Since these activities will be organised by other companies to some degree, the Council has also considered whether NTPC may be held responsible for them.

2.2 Sources

In addition to open sources, this recommendation is largely based on two analyses of the company:

- *“Final Report on Environmental Impact Assessment of 2x(500-660) MW Coal Based Thermal Power Plant to be Constructed at the Location of Khulna”*, prepared by the Center for Environmental and Geographic Information Services (CEGIS), dated January 2013.
- *“Final Report On Consulting Services on Coal Sourcing, Transportation and Handling of (2x660) MW Coal Based Thermal Power Plants at Chittagong and Khulna, and 8320 MW LNG and Coal Based at Maheshkhali”*, prepared by CEGIS, dated November 2012.

Both reports were commissioned by the “Government of the Peoples Republic of Bangladesh, Ministry of Power, Energy & Mineral Resources, Bangladesh Power Development Board”. As described below, the Bangladesh Power Development Board is one of the two joint venture partners.

The first report is an environmental impact assessment (EIA), which has been approved by the Bangladeshi environmental authorities and forms the basis for the issued permits.

The company has provided some general information, but has made limited replies to questions from the Council on Ethics relating to issues not covered by the reports. The company has also commented on a draft of this recommendation.

3 Background

NTPC is a partly state-owned Indian energy company established in 1975 to develop India’s energy sector. The company is involved in the entire energy-sector value chain. As at 31 March 2013,⁴ the Indian state owned 75% of the shares in the company.

NTPC has entered into a 50:50 joint venture agreement with the Bangladesh Power Development Board for the construction of a coal-fired power plant at Rampal in the Khulna district of Bangladesh. A joint venture company was established for this purpose: Bangladesh-India Friendship Power Company Pvt. Ltd. Under the joint venture agreement, NTPC is responsible for planning, building and operating the power plant.

The planned power plant is large, featuring two units totalling 1,320 MW, and is substantially bigger than any existing power plant in Bangladesh, irrespective of energy source. The power plant will be fired with sub-bituminous coal, and be fitted with ordinary equipment for flue gas purification, including desulphurisation. The power plant will be situated on the site in such a way that further units can be added at a later date.

The power plant is to be built near the Sundarbans conservation area. There are different estimates of the distance between the power plant and the conservation area. The company has stated that the site lies 14 km from the edge of the forest, while other sources state that it

⁴ http://www.ntpc.co.in/index.php?option=com_content&view=article&id=42&Itemid=75&lang=en.

is located between five and nine kilometres from where the forest edge was when the Sundarbans national conservation area was established. The difference between the estimates is probably due to the subsequent construction of settlements in the border zone and a resulting increase in the real distance between the site and the edge of the forest.

Under Bangladeshi law, no such plants may be built within 10 km of a forest area.

Bangladesh has a considerable electricity deficit. Nevertheless, the project agreement provides that some of the electricity produced will be fed into the Indian grid.

3.1 Mangrove forest

Mangrove forests are a topographical feature of the intertidal zone which connects land and marine environments. Mangrove forests are declining markedly, and are thought to be shrinking more quickly than rainforests. They are characterised by numerous species of mangrove tree and bushes with a high salt tolerance, and have complex interdependencies with many other species. Mangrove forests are ordinarily highly productive.

Mangrove forest vegetation is highly specialised. It is not only required to tolerate very high salinity, but its roots normally grow in mud containing almost no oxygen. As a result, mangrove trees often have special aerial roots that reach up into the air at low tide. Alternatively, air is absorbed by special pores in the tree's bark.

Mangrove forests bind mud carried by rivers to vegetation, creating new land. Accordingly, mangrove forests are not as old and stable as, for example, rainforests. Rather, they are dynamic and vulnerable to external influences.

Mangrove forests offer good hiding places and an excellent growth substrate for numerous species, and transport easily accessible nutrients from land to marine environments. A very large number of specialised microorganisms ensure the conversion of nutrient-rich and frequently oxygen-poor mud into a more accessible form for organisms higher up the food chain. This makes mangrove forests a vitally important spawning and development environment, with a high density of marine species. Such forests are also home to many plants and animals with specialised modes of living.

The EIA for the project shows that there is great biodiversity in the immediate proximity of the plant (the "study area", with a radius of approximately 10 km), with a large number of plants and animals. More than 150 bird species were registered during the impact assessment. The study area as defined in the EIA lies largely outside the Sundarbans. The biodiversity figures for the Sundarbans are far higher. A number of species in the study area are listed as endangered or critically endangered, including tigers, Ganges river dolphins, fishing cats and several types of turtle.⁵

Bangladesh has a population of approximately 160 million people, living on an area one-third the size of Norway. It faces one of the world's highest flood risks, and primarily comprises mud deposits made by three large rivers on their way from the Himalayas to the sea. Bangladesh suffers flooding and cyclones, which at times flood more than half the country. The mangrove belt between land areas and the sea plays a critical role in limiting erosion by the sea, in slowing storm surges, and in bonding mud from rivers to expand the land area.

⁵ EIA, app. page XI.

3.2 The Sundarbans

According to the IUCN (The International Union for the Conservation of Nature), the Sundarbans are the world's largest mangrove area and largest Bengal tiger habitat, as well as the only mangrove area in which tigers are found.⁶ The Sundarbans region as a whole constitutes a national conservation area in Bangladesh, and contains two world heritage sites.⁷ Further, the entire forest has been designated a Ramsar⁸ and Biosphere⁹ area. Approximately one-third of the Sundarbans lies in India, and contains a third world heritage site. The entire Indian part of the mangrove forest is a Biosphere area.

The area is species-rich and ecologically highly special. It also constitutes a habitat for the only two remaining river dolphins in Asia – the Ganges dolphin and the Irrawaddy dolphin. Both species are classified as globally endangered. The Bengal authorities have established several conservation areas for these whales, including in the part of the Pashur River along which transportation to the power plant is to occur.¹⁰

In its 2014 review of world heritage sites, UNESCO evaluated the overall situation in the Sundarbans.¹¹ The review was highly critical of the power plant project, stating that its construction was of direct relevance to the world heritage site. The review identified transportation and dredging as problematic, expressed strong concern about the establishment of new settlements in the area as a consequence of the power plant's construction, and criticised the weaknesses in or lack of impact assessments.

The UNESCO World Heritage Committee described the situation relating to the world heritage site as follows in its review:

“4. Notes with concern that the indirect impacts on the property of the construction of a coal fired power plant at Khulna do not appear to have been assessed, considers that increased navigation on the Pashur River and the required dredging are likely to have a significant adverse impact on the property's Outstanding Universal Value (OUV)...”¹²

“The Committee is recommended to regret that the State Party did not submit a report on the state of conservation of the property as per Decision 35 COM 7B.11 and to express its concern about the construction of the coal-fired power plant in Khulna (Rampal). IUCN considers that the EIA of the power plant, published in January 2013, did not adequately consider potential impacts of the plant on the property's OUV. While the State Party has responded that the Sundarbans as a whole including the property were considered in the EIA, an assessment of the specific impact on the property's OUV should nonetheless have been carried out, in conformity with IUCN's World Heritage Advice Note on Environmental Assessment.

Furthermore, while the power plant will be located about 65km away from the property and local air and water pollution can potentially be mitigated sufficiently, the dredging of the

⁶ <http://whc.unesco.org/en/list/798>.

⁷ “World heritage area” is the term used to describe the most unique and valuable conservation areas of significance for humanity, which are recognised and listed by UNESCO.

⁸ A Ramsar area is an area of wetlands protected under the Ramsar Convention because it contains unique natural values.

⁹ “Man and the Biosphere” is a UNESCO protection programme for areas containing unique natural conservation values. Some human activity is permitted in these areas, provided that is adapted to the area's character and conservation needs.

¹⁰ EIA, page 259.

¹¹ <http://whc.unesco.org/archive/2014/whc14-38com-7B-Add-en.pdf>.

¹² <http://whc.unesco.org/en/decisions/6050/>.

*Pashur River to facilitate the transport of coal to the plant, as well as the coal dust released into the environment during transport and transfer, are likely to adversely impact the property. The EIA for the plant does not consider the impact of dredging in the rivers adjacent to the property. Only limited consideration has been given to the transport and transfer of coal in close distance to the property and no mitigation efforts beyond already existing regulations are known. The dredging necessary to keep the channels of the Pashur River open for navigation is likely to alter the morphology of the river channels, which, in combination with erosion and sedimentation caused by the wakes of large vessels, would be likely to affect priority habitat for freshwater dolphins and other aquatic species, such as the critically endangered Batagur turtle (*Batagur baska*) and vulnerable small clawed otter (*Aonyx cinerea*). Coal dust released into the environment during transport and transfer is likely to have a significant direct adverse impact on mangroves, fish, and probably freshwater dolphins, amongst other endangered species.*

While the State Party notes that an EIA for the dredging activities will be carried out before these will start and that experts from the World Heritage Centre and IUCN will be able to contribute to this process, the impacts of dredging should have been included in the EIA for the power plant, given that dredging to keep the rivers open for navigation is directly linked to the feasibility of the power plant. There is concern that indirect and cumulative impacts from the power plant, related activities to facilitate navigation, and other infrastructure and industrial developments do not appear to have been assessed. Therefore, the Committee is recommended to request the State Party to undertake a comprehensive Strategic Environmental Assessment (SEA) of development in the Sundarbans and its immediate vicinity, including a specific assessment of potential impacts on the OUV of the property, in conformity with IUCN's World Heritage Advice Note on Environmental Assessment."

The area is not only associated with substantial conservation values, but is also highly important to the local population, which meets two-thirds of its animal protein needs by fishing in the river system.

As a result of human activity, the Sundarbans mangrove area has shrunk by approximately two-thirds in the past 150–200 years. This has particularly impacted animal species that require large habitats, such as tigers and river dolphins, and undermined the area's flood protection function.

The population in fringe areas is growing, and large volumes of timber and fuel, as well as food resources, are being taken from the forest. Increased construction of roads and other infrastructure will further increase the pressure on the natural resources in the Sundarbans.

It is estimated that around 200,000 people regularly harvest different resources in the Sundarbans. Around 70 percent of these harvest food resources from the rivers.

Inland and coastal fish stocks are declining. The World Bank has stated that the primary threat to stocks is human activity which disrupts and destroys fish habitats.¹³

4 Environmental risk resulting from the company's activities

Three factors in the project present a considerable risk of environment damage: dredging, transportation and handling of ash from the power plant.

¹³ World Bank: Bangladesh Environmental Analysis, 2006.

The development and the transportation of coal have been examined in two impact assessments providing large amounts of factual information. The project has also been widely criticised on various websites. We have primarily taken our figures from the company's two impact assessments, and based our risk specifications on those documents to some degree. We have also used information from UNESCO on the status of the conservation areas, as well as information from IFC (*International Finance Corporation*) concerning expectations of the company with regard to biodiversity.

4.1 Placement

The plant is situated on the eastern bank of the Pashur River, north of the city of Mongla, which has a port. There is reason to believe that the choice of location is linked to its proximity to the Indian electricity grid.

The EIA estimates that approximately 150 families lived and pursued their livelihoods – primarily rice cultivation and shrimp farming – on what has now become the power plant site. The surrounding area comprises relatively densely populated agricultural land.

The construction site lies in what is described as the “*wind risk zone of Bangladesh*”,¹⁴ and is vulnerable to cyclones and storm surge. General figures on high water incidents during cyclones show that the water level along the coast has risen by more than eight metres on at least three occasions since 1960.¹⁵ Not least due to the reducing effect of the mangrove forest, the flood level is lower in inland areas. Although the power plant site is located approximately 70 km from the coast, it is to be built up using dredged material because it lies just 1.5–2 metres above sea level. The water level on the site is estimated to have risen by 4.47 metres during the last major cyclone – Aila – in May 2009.

The EIA refers to research documenting an increase in sea temperatures off Bangladesh. Sea temperatures have a direct impact on the occurrence of tropical hurricanes. At the same time, the number of the most powerful cyclones has increased, although the total number of cyclones has not. The height of storm surges is therefore expected to rise materially in the years ahead, even if sea levels do not rise.

¹⁴ EIA, chapter 6.10, map 6.15.

¹⁵ EIA, tab. 6.13.

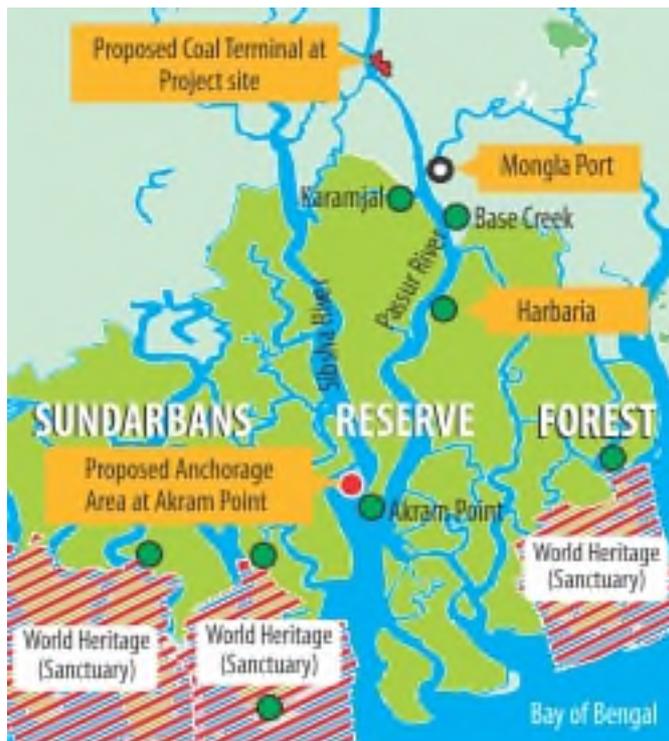


Figure 1 Map showing the Sundarbans and world heritage sites, anchorage area and power plant. <http://archive.thedaylystar.net/beta2/news/coal-dust-a-big-concern/>

In India, corresponding projects (in terms of size and proximity to conservation areas), are in principle not generally approved. In their *“Technical EIA Guidance manual for Thermal Power Plants”*, the Indian environmental authorities have specified a minimum distance of 25 km from valuable natural areas.¹⁶

The river courses in a mangrove forest change, and are vulnerable to erosion. A large increase in shipping traffic and extensive dredging will necessarily alter the erosion pattern.

On 29 January 2012, parts of the Pashur River along which transportation is to occur were officially declared a *“dolphin sanctuary”*. The environmental impact assessment specified four *“Important Dolphin area along the coal transportation route”*, one of which is the anchorage area at Akram Point. The three others are located higher up the river system.¹⁷

The EIA also stated that the globally endangered freshwater dolphins and other endangered species live in the Pashur river system, *“...and hence it is important that utmost care and stringent conditions be laid down for the safety and sustenance of this unique ecosystem...”*.¹⁸

¹⁶ Technical EIA Guidance Manual for Thermal Power Plants, Ministry of Environment and Forests, India, August 2010. p 4-8: *“Locations of thermal power stations are avoided within 25 km of the outer periphery of the following:*

- Metropolitan cities
- National park and wildlife sanctuaries
- Ecologically sensitive areas like tropical forest, biosphere reserve, important lake and coastal areas rich in coral formation”

¹⁷ EIA, map 6.18, page 208.

¹⁸ EIA, page 207.

4.2 Transport and dredging

Coal is to be transported up the Pashur River, and will have to be reloaded onto smaller vessels along the way. Some of this transportation has to occur along the border of the world heritage site, and the planned anchorage and reloading area lies just a few kilometres upstream of the world heritage site. External companies are to be used for the transport operation, and will run five vessels along the river almost continuously.

An anchorage area is planned at Akram Point, where coal is to be transferred to somewhat smaller boats. These boats, with a capacity of around 10,000 tonnes, will operate a shuttle service between Akram Point and the power plant, making a total of 400–500 trips a year.

It is likely that large volumes of ash from the power plant, potentially totalling up to one million tonnes annually, will be transported by boat. It is also probable that extensive boat transport will be required in connection with the operation and maintenance of the plant and the construction of electricity infrastructure like pylons, transformers, etc. in the area.

These transport operations will necessitate extensive dredging of the river and in the anchorage area, and will mean substantial traffic involving large vessels. The development of an anchorage area at Akram Point involves the planned dredging of 30 million cubic metres of fill. This corresponds approximately to an volume measuring 200 football fields, 30 metres deep. In addition, the EIA pointed out the need to dredge parts of the river course leading up to the power plant¹⁹, i.e. the dredging of approximately 2.1 million cubic metres in the upper part (approximately 16 km) of the river.

When a river is dredged, the volume of mud carried by the river increases greatly, due to the agitation of light riverbed sediments. It is known that dredging can cause acidification and altered water chemistry due to the very low oxygen content of these sediments.²⁰ The conditions on the riverbed already impose such a strain on plants that most mangrove species compensate by absorbing oxygen directly through pores in the bark and aerial roots. These trees are adapted to the normal level of mud transportation, and are vulnerable to mud build-up in the intertidal zone in the event of increased mud transportation.

4.3 Acute pollution contingency plans

Accidents occur in all shipping operations, particularly in coastal waters subject to rapid changes in weather conditions and narrow waterways presenting challenging navigational conditions. The shipping lane leading to the power plant is narrow and features shifting sandbanks and currents, which vary in accordance with the rate of flow and tides. Even minor navigational errors, poor communication with other vessels or brief technical problems may cause an accident.

Commercial shipping currently docks at the port of Mongla near the power plant. This is the only port of notable size in the area. Based on information on the website of the local port authority, less than one ship per day passed through the area on randomly selected days in the spring of 2014.

The environmental impact assessment pointed out that 153 vessels docked in the port in the period 2010–2011, and that currently 1.6 million tonnes pass through the port every year. The transportation of coal through more than 400 trips upriver every year will thus greatly multiply the number of journeys, and the shipped tonnage will also increase many times over.

¹⁹ EIA, page ix.

²⁰ See, for example, <http://www.ajol.info/index.php/ijonas/article/view/49863>.

The risk and consequences of accidents will also increase because the vessels shipping the coal will be far larger than those normally navigating the river system.

There is reason to believe that large volumes of ash may be transported along the river. In the event of an accident, the ash will be spread and partly dissolved in the water, and will be impossible to gather in again.

Although the environmental impact assessment contains a brief chapter on measures to control the impact at ecosystem level in the “*Environmental Management Plan*”, the chapter does not mention unexpected accidents such as shipwrecks. Accordingly, no measures are proposed beyond the enforcement of existing rules. The analysis splits responsibility for following up on these points between various official bodies and companies, but does not refer to the company’s responsibility specifically, or state whether anyone has coordination responsibility.²¹

Based on the information available to us, it appears that no resources are available for dealing with mishaps and accidents during transportation in the mangrove belt. The environmental impact assessment and coal transport analysis describe no existing or planned resources for preventing the spread of pollution in the event of an accident.

Bangladesh has ratified the relevant IMO (International Maritime Organisation) and MARPOL (International Convention for the Prevention of Pollution From Ships) conventions. Under these, shipping companies bear legal liability for the consequences of accidents at sea. This is most relevant in terms of compensation. Shipping companies also have a responsibility to prevent situations presenting a risk of an accident.

Ships that sink are not expected to take effective steps to prevent environment damage. It is therefore normal for coastal states to establish a contingency function to deal with acute pollution at sea. This normally comprises a warning system, equipment, crews and other resources that are tested, maintained and given regular, focused training. For example, the IMO convention imposes clear requirements on coastal states that have ratified the relevant agreements:

*“States which are party to the OPRC Convention and OPRC-HNS Protocol are required to establish a national system for responding to oil and HNS pollution incidents, including a designated national authority, a national operational contact point and a national contingency plan. This needs to be backstopped by a minimum level of response equipment, communications plans, regular training and exercises.”*²²

The entire system is normally based on a thorough risk analysis in which incidents with an impact on the design are identified. The system is then designed accordingly. The most important factor is the required response time, i.e. the design must enable crews and resources to be on site to prevent the most serious consequences of an accident. In unpopulated coastal and upriver areas, it is unrealistic to have such resources in place on time under all conditions. Moreover, it is difficult to establish contingency systems featuring depots, crews, vessels and exercises without negatively impacting surrounding areas.

The power plant and transportation to it will alter the risk profile materially, all the way from the open sea to the port. Any risk analysis and contingency system based on the current risk profile will have to be reviewed if the risk profile changes. Nothing has been said about either state or in-house contingency plans or related risk assessments in the documents describing

²¹ EIA, page 326, tab. 10.1.

²² International Maritime Organisation, International Convention on Oil Pollution Preparedness, Response and Cooperation.

environmental risk and transport solutions. However, the company's letter did mention that a consultant with logistics expertise had been hired to examine the contingency planning situation.

4.4 Waste: fly ash

When coal is burned, a non-combustible residue remains, primarily comprising fine silicate particles and metal compounds. These are largely captured by a purification device, normally an electrofilter. Some ash also remains in the combustion chamber, and is referred to as bottom ash. The ash content of coal varies, from 12–15 percent for some coal types to more than 40 percent for some Indian coal types, for example. In other words, a large power plant produces very substantial amounts of waste.

In total, the power plant will produce about 940,000 tonnes of ash per year. No final decision has been made on disposal of the ash, but the EIA proposed several alternatives, including use as an additive in cement production, use as fertiliser, use as an additive in brick production, etc. At present, ash from the other, far smaller coal-fired power plants in Bangladesh is not fully re-used, and only a limited proportion of the ash produced by coal-fired power plants in India is re-used. In the USA, around 45 percent of fly ash is used in cement, bricks, etc., while the remainder is generally stored.²³

The metal content of the ash will normally comprise a concentration of the metals originally present in the coal. Depending on the purification technology used, some mercury, and a smaller amount of cadmium, may pass through the purification devices and accompany the emitted gases. The concentration of metals in the ash varies in line with coal quality. Typically, the mercury content is slightly less than 1 ppm (part per million), hypothetically equating to as much as 940 kilogrammes per year in the case of this particular power plant. The concentration of arsenic in different types of coal in general ranges from 10 to 80 times the mercury concentration, corresponding to 10 to 50 tonnes or more per year. The corresponding figure for cadmium is approximately 10 tonnes per year.

Under certain conditions, the metal compounds in the ash will be mobilised and carried in rainwater or groundwater. Some of these are damaging to the environment, even in low concentrations. For example, there may be relatively large volumes of arsenic compounds, barium, hexavalent chromium, lead, mercury, cadmium, thallium, etc. Some of these, like arsenic, are carcinogens. Several of the most environmentally harmful metals can accumulate in organisms. This means that they remain in the ecosystem and are concentrated up the food chain with the result that top predators – in this case normally tigers, birds of prey and dolphins – may develop very high blood and tissue concentrations.

Metals that are soluble in water will be carried by the water out of the disposal site, into the ground, groundwater or river system. Very effective barrier and drainage systems will be required to prevent mobile metals in stored ash from ending up in the river system and groundwater.

The company has proposed the temporary storage of ash until final disposal is decided. There are also plans to build up the low-lying area around the plant, which measures 1,414 acres or 5.72 km² and is vulnerable to flooding, with the ash as part of “land development”.²⁴ The aim is to build up height for a potential second stage of development at the power plant. The use

²³ <http://www.washingtonpost.com/blogs/wonkblog/wp/2014/02/06/coal-ash-is-spilling-into-north-carolinas-river-heres-why-its-so-hard-to-regulate/>.

²⁴ EIA, page 106.

of ash for this purpose will carry a high risk of the ash coming into contact with water, and the resulting leaking of metals.

The US Environmental Protection Agency (EPA) has found that emissions from leaky ash storage sites into drinking water increase the risk of illness.²⁵

Bangladesh has suffered widespread problems as a result of arsenic poisoning following the establishment of a large number of groundwater wells from around 1970 onwards. These wells extracted water from shallow deposits that also contained mobile arsenic. It is estimated that several tens of millions of people have been exposed to arsenic concentrations in drinking water that have affected their health. Several sources have described the situation as the largest mass poisoning of all time,²⁶ and it is estimated that the number of resulting annual mortalities may number several tens of thousands.

Nevertheless, the available materials do not describe how a large volume of fly ash containing relatively high concentrations of arsenic should be treated to avoid further contributing to the arsenic load in the area. On the contrary, one proposed use for the ash is as a fertiliser. This would make many of the components in the ash, including arsenic, available for absorption into plants. Rice in particular absorbs large amounts of arsenic,²⁷ and is a very important dietary element in Bangladesh. There is a widespread view that arsenic in the food chain may in future become as serious a problem as arsenic in drinking water.²⁸

Arsenic arises in different forms. Several of these are acutely poisonous or cause cancer even in very low concentrations.

The mercury in the fly ash will constitute a particular risk in this area, since the chemical conditions in the river will, to a greater extent than elsewhere, transform mercury into a form (methylmercury) that is very easily absorbed and concentrated up the food chain. The population eats large amounts of fish from the river, and is thus vulnerable.

4.5 The impact assessments

The true status of the reports is unclear in certain respects. In most countries, companies intending to establish an operation are responsible for commissioning environmental impact reports that provide thorough descriptions of measures to reduce risks. Such environmental impact reports are generally not prepared by the companies themselves, but by consultants. However, the companies are responsible for ensuring that those who draft the reports are experts, and that the reports cover all relevant environmental risks. Further, the companies own the reports and are responsible for implementing proposed measures. The authorities may impose requirements on the companies based on, among other things, such reports, and may subsequently take steps vis-à-vis the company if a report is inadequate.

CEGIS, which drafted the reports, is stated to be “*a public trust under the Ministry of Water Resources*”, and thus also represents the authorities. It is unclear whether NTPC or the joint venture company can in fact be responsible for a report prepared by the authorities, or whether a party representing the authorities has prepared and is in practice responsible for an environmental impact assessment that in turn forms the basis for the authorities’ own operational requirements specification.

²⁵ USEPA, “Human and ecological risk assessment of coal combustion wastes”, aug. 6, 2007.

²⁶ <http://www.who.int/docstore/bulletin/pdf/2000/issue9/bu0751.pdf?ua=1>.

²⁷ <http://www.plantphysiology.org/content/152/1/309.abstract>.

²⁸ <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2647345/>.

The Ministry of Energy's subordinate agency has commissioned a report prepared by a subordinate agency of the Ministry of Water Resources that constitutes the expert basis for the Ministry of Environment and Forest's imposition of requirements on a joint venture company in which the governments of both India and Bangladesh are involved as owners.

The Ministry of Environment has also been responsible for approving the report.

This makes it difficult to understand who is, and who is regarded as, responsible for the EIA's content, assessments and potential deficiencies. This undermines confidence that the EIA provides an objective, comprehensive analysis.

The structure and content of the environmental impact assessment is not entirely consistent with, for example, the World Bank's customary EIA design, as regards both the balanced presentation of pros and cons and the specification of technical measures.

Repeated use is made of expressions like "*little amount of leacheate might be leaching to the ground*" and "*Dredging activities may have impacts on the river water quality*", and there are few descriptions of the evidence in support of these statements and what is needed to limit such effects.

Inadequate information is available on environmental monitoring plans, and on what baseline is to be adopted in these plans. Moreover, the cost-benefit analysis appears to be very brief.

Both the "Environmental Monitoring Plan" and the "Cost and Benefit Assessment" are listed in the table of contents, but there is no text in the document. We nevertheless assume that they have been described but that, based on the specified page numbers, they are very brief.

5 Information from the company

The company was initially contacted by letter of 20 March 2014. It has replied to all enquiries, but The Council of Ethics have received limited replies to specific questions going beyond the content of the EIA. The company has also received a draft of the recommendation for comment.

The company's primary concerns have been Bangladesh's substantial need for stable electricity supplies and that any disadvantages of the project must be weighed against the situation in the country, which suffers from extensive poverty and a lack of energy. Barely 60 percent of the population has access to electricity. In its letter of 1 September 2014, the company wrote:

"Each country is blessed with certain characteristics such as physiography, natural resources, ecology, human population and needs etc. and we have to strike the balance between the environment and development based on our local conditions. With that perspective in mind, we feel that Govt. of Bangladesh has taken a conscious decision to go ahead with the project, and their decision, as a sovereign country needs to be respected."

The company disagrees with the Council on Ethics' assessment of the environmental impacts, and that it is unfortunate that an official body has prepared the environment impact assessments on which the permits granted for the project are based. The company wrote:

"In our opinion, an EIA undertaken by a Govt. Entity adds to the credibility over an EIA undertaken by a private consultant, which is again accused to be biased, as the same is funded by project proponent. Further, the responsibility for further studies and mitigation always lies with the Joint Venture Company setting up the project, according to the environmental clearance granted."

In its comments on the draft recommendation, the company pointed out that ship transport is the most common form of transport in a country like Bangladesh, both due to natural conditions and because poor countries often have poorly developed infrastructure. The company pointed out that Mongla is Bangladesh's second-largest port, and stated that the river system will be dredged in any event, because it is a "declared waterway". The company also gave notice of future measures relating to transport:

"...BIFPLC has engaged another consulting firm of international repute through global tendering process for a detailed coal sourcing and logistics study. The Emergency situations and requisite response systems associated to this coal transportation shall be studied by the Consultant and based on the recommendations of the consultant, an elaborate emergency response system for coal transportation will be developed."

The company has also emphasised that the distance between the world heritage site and the power plant will be approximately 70 km.

Overall, the company is of the opinion that the expected environmental impact and accident risk are acceptable, given the measures the company plans to implement.

6 The Council on Ethics' assessment

The Council on Ethics has concluded that there is no doubt that the entire Sundarbans have unique environmental qualities, and that there is a special need to protect the mangrove forest in the Sundarbans generally and the world heritage sites and globally endangered animal species in particular. The Council has concluded that it is correct to regard the national conservation area as a necessary buffer zone around the world heritage site, and that the large numbers of animals such as river dolphins and tigers in the buffer zone document the special conservation values in the entire area. The Council considers there to be an unacceptable risk of severe environmental damage to both the world heritage sites and the conservation areas surrounding them as a result of the power plant and transport to it. The Sundarbans are a dynamic mangrove area that is under severe pressure, and the effects of the intervention in and damage to such systems is often irreversible. Further, a significant risk of serious negative environmental and health effects is presented by the dissemination of metals, particularly arsenic, in ash produced by the power plant.

The Council on Ethics has assessed the present case as a project that has been launched but not yet begun operating. The Council has therefore been unable to refer to operational experience, and has relied more on risk assessments as the foundation for its conclusion. The Council sees reason to emphasise that its mandate is precisely to evaluate future risk. In its recommendation, the Council has given weight, for example, to the risks associated with preparations and construction, and it would therefore be pointless to conduct the assessment once the project period is over and the plant is in operation. Emphasis has also been given to the risk of unforeseen situations and accidents.

The Council on Ethics considers it unlikely that the disruption and accident risk connected to transportation will be reduced without extensive analysis and measures. Moreover, even if further measures were to be implemented, it is unlikely that risk can be reduced to an acceptable level. Given the large volumes of mud transported by the river, there will be a recurring need for dredging. The leakage of metals will be a constant risk if the proposals in the environmental impact assessment are adopted. Each of the factors – transportation, dredging and ash disposal – constitutes a significant environmental risk.

NTPC bears operator responsibility in the joint venture company, and is thus also responsible for design, construction and operation. It is also the company partner with the most practical experience of such projects. In most countries, it is customary for the operating company to be responsible for commissioning an analysis of risk factors and measures to avert project risk (an EIA). In the present project, an official body has drafted the EIA. The EIA clearly states that very many considerations have to be taken into account to prevent environmental damage, that the conservation values are substantial, and that many authorities are involved. The EIA describes measures that, in principle, appear relevant. However, it contains no, or few, descriptions of what is required to avoid damaging the environment, and does not assess whether the proposed measures will be adequate. Nor does it draw on international experience relating to leakages from storage sites, measures to prevent sludge loss, comparable contingency systems or the risk of shipwreck. It is therefore impossible to assess whether the environment will be sufficiently protected if the company's proposals are adopted. The Council has concluded that this constitutes a clear additional risk which the company has not taken adequate steps to investigate.

Further, the EIA does not deal with the consequences of failing to comply with the regulations. This renders the identification of relevant, adequate measures difficult. If adequate environmental protection requires full compliance with all regulations, an analysis will be required of whether this is achievable, or whether additional systems have to be introduced to discover or reduce the effects of deviations. For example, although it is in principle impermissible to pollute in connection with a shipwreck, realistically this will occasionally happen in difficult waters and under difficult weather conditions.

NTPC is a large company with previous experience indicating that stricter requirements are sometimes also imposed in cases where no world heritage sites are among the likely injured parties. Even though the authorities in Bangladesh have been more involved in analysing risks and specifying suitable risk-alleviation measures (since an official body has actually prepared the EIA), the generally accepted principle nevertheless applies that the company itself is responsible for identifying risk factors and implementing adequate measures.

This has been emphasised by, for example, the World Bank/IFC (International Finance Corporation), which in its Performance Standard 6 on biodiversity²⁹ has imposed very strict requirements regarding the potential consequences of interventions, and regarding biodiversity monitoring and evaluation programmes in areas classified as critical habitats, i.e. world heritage sites, most Ramsar and Biosphere areas, and areas home to endangered or critically endangered species. The power plant's impact zone is covered by all of these criteria, even though the power plant site is located outside and upstream. UNESCO also gives emphasis to activities outside world heritage sites that may impact conservation values.

The Council on Ethics has concluded that, in the present case, it is correct to examine the environmental values where environmental damage may arise, and that the conservation values correspond to those listed in the "critical habitats" category in IFC Performance Standard 6. There, the IFC stated:

"17. In areas of critical habitat, the client will not implement any project activities unless all of the following are demonstrated:

²⁹ IFC Performance Standard 6, Biodiversity Conservation and Sustainable Management of Living Natural Resources, 1 January 2012.

- *No other viable alternatives within the region exist for development of the project on modified or natural habitats that are not critical;*
- *The project does not lead to measurable adverse impacts on those biodiversity values for which the critical habitat was designated, and on the ecological processes supporting those biodiversity values;*
- *The project does not lead to a net reduction in the global and/or national/regional population of any Critically Endangered or Endangered species over a reasonable period of time;*
- *A robust, appropriately designed, and long-term biodiversity monitoring and evaluation program is integrated into the client's management program;*³⁰

This implies that the standard applied to the company by the Council on Ethics in the present case largely corresponds to the expectations the IFC has of companies establishing operations that will impact critical habitats.

Sea and river transportation, contingency planning and dredging

The transport route passes along the border of the world heritage site, and through the Sundarbans. The entire transport route until just south of Mongla lies within the Ramsar area.

The company intends to purchase boat-based transportation services. The vessels will be constructed specifically for this assignment, and will have few or no other customers. The transportation of coal and construction materials must be regarded as part of the project, and a matter to which the company must give consideration in its overall plan for dealing with the environmental challenges. There is therefore no doubt that the company shares responsibility for, and is a participant in the creation of, all risks arising in connection with transportation.

The EIA states, by way of summary, that this highly valuable area will suffer in the absence of the strictest attention and requirements. At the same time, it is unclear whether the requirements that will be imposed will be adequate, whether it will be possible to comply with the requirements at all times, and how compliance will be monitored.

The Council on Ethics has concluded that the activities associated with thousands of trips to and through this area constitute a material risk to the protected areas and the values they contain.

In a country with limited national shipping legislation, the legal responsibility of vessels will be defined by the International Maritime Organisation (IMO). The IMO requires those responsible on a vessel to liaise with any national contingency organisation.

No such national contingency resource is mentioned in the EIA. We therefore have to assume that no adequate resource of this kind exists. The company must be aware of this deficiency, and has an independent responsibility to ensure that its activities and those of its suppliers do not constitute an unacceptable risk.

The proximity to the Sundarbans in general and the world heritage site in particular mean that accidents involving vessels may have unacceptable consequences.

Over a ten-year period, ships will make approximately 1,000 trips passing close by the world heritage site, and there will be around 10,000 trips up or down the upstream river system in an area which is vulnerable to monsoons, storm surge and flooding and highly challenging in

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http://www.ifc.org/wps/wcm/connect/bff0a28049a790d6b835faa8c6a8312a/PS6_English_2012.pdf?MOD=AJPERES.

navigational terms. A single accident that is not handled quickly and correctly may be sufficient to cause great damage to the Sundarbans and the world heritage sites. Statistically, there is a greater risk of such accidents occurring in poor weather and difficult sailing conditions. This underlines that contingency plans and measures cannot be based on what is possible under normal circumstances.

The company has noted that transportation in itself constitutes an additional burden, as it has stated that noise, light at night, erosion due to increased shipping traffic, general pollution from boats (such as oil-polluted water, sewage and other waste), represent a challenge, and that these matters must be regulated. Several measures have been proposed to reduce the extensive disruption to animal life caused by the transport operations, such as limited use of lighting in connection with night sailing, etc., but no analyses have been undertaken of whether the measures are adequate or of how the company considers that compliance with any requirements should be monitored.

The transport operations constitute a significant risk to the mangrove forest and its ecosystem, and mean extensive disruption to animal life, changes to mud transportation with an effect on plant life and animals in the river, and erosional changes affecting both vegetation and animal life. The overall result may be lasting changes to the ecosystem.

The EIA summarised this issue as follows: *“If navigational, spillages, noise, speed, lighting, waste disposal rules regulations are not properly maintained, it may impact the Sundarbans ecosystem especially Royal Bengal Tiger, deer, crocodile, dolphins, mangroves, etc.”*³¹. However, there is no statement on the basis on which it has been concluded that these rules are adequate, or on how compliance with the rules is to be ensured.

As stated, the joint venture company has engaged a consultant to assess the logistics of the coal-transport operation. The consultant is also to propose contingency measures. This is positive, and may reduce the risk somewhat.

Even if a light contingency system were to be established, for example based on alarm notification systems between the boats and with equipment installed on them, such a short time would pass between the occurrence of an accident and the time pollution in the form of oil, ash or other materials reaches land or other marine areas that it is unrealistic to expect such a system to alleviate the situation significantly. Accordingly, the Council on Ethics has concluded that the scope of transportation and the circumstances under which it is to occur indicate that the risk of severe environmental damage is unacceptably high.

The Council on Ethics is not aware of any thorough evaluation examining whether increased mud transportation will affect the protected areas. Rivers naturally carry large numbers of particles, and local species are therefore adapted to this, but there is great uncertainty about what a potentially large increase would mean. Locally, and in the short term, there will obviously be a major impact on fishing, a nutritional and financial lifeline in the area. However, fish can migrate, and may return once conditions have improved. Local plant life, and particularly mangrove species, lack this ability to relocate quickly.

The company has stated that the river will be dredged in any event, since it is an important transport route in the area. This is probably correct, but the need for dredging will nevertheless increase significantly as a result of the power plant. The lack of an analysis of the problem of increased mud transportation in connection with dredging, and particularly the lack of a plan for environmentally sound implementation of the extensive dredging work at Akram Point and in the riverbed leading up to the power plant, creates great uncertainty about

³¹ EIA, page 268.

the company’s plans for necessary environmental measures and their effect. The Council on Ethics is of the opinion that it is particularly important not to risk unwanted environmental consequences in such a vulnerable area.

Ash disposal

Flue gas contains large numbers of particles with environmentally hazardous properties. To avoid dissemination in the environment, large volumes of these are removed from the air stream in highly efficient air treatment plants. However, several of the proposed uses will constitute a real risk of dissemination through incorrect handling of the ash. This applies to use as fertiliser, storage without the adoption of adequate measures in an area vulnerable to flooding, and use as a fill material in area in which the groundwater table is likely to be close to the surface for parts of the year. The Council on Ethics has found no information indicating that the company has concrete plans for proper on-site disposal, and is of the opinion that consideration is being given to disposal methods carrying an unacceptably high risk that pollution removed from the air stream will be reintroduced to a vulnerable environment. This also applies to the risks associated with potential transportation of ash by boat.

The EIA proposed different disposal methods, but did not evaluate the potential health effects of arsenic dissemination in an environment that is already overloaded. This will expose the local population and the environment to an unacceptable risk which will continue to apply after any improper disposal ends.

Conclusion

It seems unlikely that a coal-fired power plant can be constructed at this location without construction itself constituting a high risk of severe environmental damage, even if extensive new measures are implemented. In the present case, the company has also failed to give sufficient consideration to what needs to be done to protect the environment. Further, various factors relating to transportation and waste management have not been addressed and handled satisfactorily. Overall, this suggests a significantly increased risk of unwanted incidents in a unique, highly vulnerable area. The Council on Ethics has also given considerable weight to the strong concern expressed by UNESCO regarding the risks associated with the project, and the fact that the IFC recommendations on such situations have not been followed.

Based on an overall assessment in which consideration has been given to all of the discussed matters, the Council on Ethics has concluded that there is an unacceptable risk that NTPC will contribute to severe environmental damage through the building and operation of the power plant at Rampal, including related transportation services.

7 Recommendation

The Council on Ethics recommends the exclusion of the company NTPC Ltd. from the investment universe of the Government Pension Fund Global due to an unacceptable risk of the company contributing to severe environmental damage.

Ola Mestad Chair	Dag Olav Hessen	Ylva Lindberg	Marianne Olssøn	Bente Rathe
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