1. Project Data:

- **Country:** Zambia
- **Project ID:** P070962
- **Project Name:** Zambia Copperbelt Environment Project (cep)
- **Appraisal Cost (US$M):** 39.5
- **Actual Cost (US$M):** 53.1
- **L/C Number:** C3741; CH026
- **Loan/Credit (US$M):** 40.0
- **Actual Loan/Credit (US$M):** 36.5
- **Sector Board:** Environment
- **Cofinancing (US$M):** 0.0
- **Board Approval Date:** 03/20/2003
- **Closing Date:** 03/31/2011
- **Prepared by:** Robert Mark Lacey, George T. K. Pitman, Soniya Carvalho

2. Project Objectives and Components:

a. **Objectives:**

   According to the Project Appraisal Document (PAD, page 3), the project development objective is to assist Zambia:
   
   "to i) address environmental liabilities associated with the mining sector, following the privatization of the mining assets, and ii) improve future compliance of the mining sector with environmental and social regulations."

   According to the Development Finance Agreement the objectives of the project are:
   
   "to assist the Borrower’s efforts in: (a) addressing environmental liabilities and obligations associated with the mining sector, following the privatization of the mining assets of ZCCM [Zambia Consolidated Copper Mines, hereinafter Consolidate Copper]; and (b) strengthening the capacity of its environmental regulatory institutions to improve future compliance of the mining sector with environmental and social regulations."

   This Review uses the statement in the Development Finance Agreement to assess the project since it is more monitorable.

b. **Were the project objectives/key associated outcome targets revised during implementation?**

   No

c. **Components:**

   There were two components:
   
   1. *Environmental Management Plans and Environmental Management Facility* (US$35.3 million at appraisal, US$46.9 million at closure). The Component financed the identification and implementation of priority measures
to remedy environmental and related social problems arising from Consolidated Copper’s pre-privatization mining operations, as well as to enable Investment Holdings to meet its environmental contractual obligations to private mining companies. The delineation of liabilities between investors, Investment Holdings and the Government was to be determined through the preparation of an Environmental Management Plan (EMP) by each investor and of a Counterpart EMP by Investment Holdings. The Component also financed the preparation of a Consolidated Environmental Management Plan (CEMP). While incorporating the concerns of the EMPs, the CEMP would look beyond individual mining sites to address ecosystem-wide issues such as watershed management, air pollution, and contamination of soils and sub-surface water. The CEMP would also identify funding priorities and provide the criteria for selecting priority sub-projects to be funded by the Environmental Management Fund (hereinafter called the Fund) in the Copperbelt and in Kabwe, such as the cleanup of defunct mine plant sites, removal and disposal of hazardous materials, rehabilitation of tailings (mining residue) dams (because of the possibility of dam failure due to mining residue in preparation for closing, the resettlement of people living in mine caving areas, and (in Kabwe) the treatment of lead-exposed children and remediation of lead contamination in their living, play and learning environments.

2. Strengthening the Environmental Regulatory Framework

   (US$4.2 million at appraisal, US$6.2 million at closure). To help the Government to ensure that both historical and future environmental liabilities were adequately met, this Component aimed to assist the Environmental Council of Zambia to allocate a higher proportion of its resources and efforts to its regulatory mandate, to strengthen the capacity of the Council and of the delegated authorizing agencies, such as the Mines Safety Department, to review Environmental Impact Assessments, effectively negotiate Environmental Management Plans with investors and with Investment Holdings, issue pollution permits, monitor the EMPs, collect fees, and enforce compliance if necessary through the imposition of penalties such as fines and temporary closure of facilities. The Component also intended to finance capacity strengthening of NGOs and relevant training institutions, such as the Copperbelt University, in order to increase national capabilities to address environmental issues associated with the mining sector.

d. Comments on Project Cost, Financing, Borrower Contribution, and Dates:

   Cost:
   Total project cost at closure was US$53.1 million, 34% higher than the appraisal estimate of US$39.5 million. Much of this was due to the higher cost than anticipated of the remedial measures financed under Component 1. These measures, while outlined in general terms in the PAD, were not identified in detail or pre-costed. This was done in the EMPs and the CEMP prepared during implementation.

   Financing:
   IDA financing consisted of a credit of Special Drawing Rights (SDR) 13.32 million, equivalent to US$19.00 million, and a grant of SDR 5.23 million, equivalent to US$21.00 million. While the grant was fully used, Annex 1 of the ICR indicates that only US$15.50 million of the credit was utilized. The ICR reports (paragraph 17) that the significantly higher than anticipated extent and cost of consulting services required a reallocation of IDA proceeds from credit-financed physical works to grant-financed consulting services. This was approved in November, 2009. At project closure, SDR 5.23 million remained undisbursed.

   In 2003, the Nordic Development Fund committed a €10 million credit (about US$13 million equivalent) for parallel financing of the project, which freed up IDA credit funds previously allocated to Component 2 and selected activities under Component 1. At closure, US$10.8 million of the Nordic credit had been disbursed.

   Borrower contribution:
   According to Annex 1 of the ICR, the Borrower contributed US$3.8 million, more than twice as much as expected at appraisal. The funds came from both the Government and Investment Holdings. The higher contribution is explained in part by the profitability of the mining sector at prevailing world copper prices.

   Dates:
   Project effectiveness was delayed from April 2003, when the Development Finance Agreement was signed, until September 2003 due to the delay in fulfilling effectiveness conditions, specifically the appointment of the Manager of the Environment Management Facility Secretariat and a project accountant. The mid-term review was postponed from August 2005 to February 2006, mainly because of delays in the start up of Component 2, the need for more time than projected to complete studies, and the slow inception of physical works. In light of persisting procurement and disbursement challenges (see Section 11 below), two extensions of the closing date totaling 32 months were granted.

3. Relevance of Objectives & Design:

   a. Relevance of Objectives:
b. Relevance of Design:

Substantial

- The planned activities in Component 1 were appropriate for the identification, prioritization and remediation of the environmental and related social issues leading to obligations and liabilities for Investment Holdings. In particular, the holistic approach used in guiding project interventions through the preparation of a CEMP, rather than relying on a piecemeal, case-by-case methodology, helped to ensure a comprehensive and internally coherent coverage of mining related externalities.
- The planned activities in Component 2 -- in particular, the revision and harmonization of environmental regulations in the mining sector, the establishment of an environmental emergency response system, monitoring and enforcement of compliance, and targeted training and institution building -- were relevant to the intended outputs and outcomes expected to lead to achievement of the second development objective in the DFA. The Component also facilitated capacity building in such institutions as the University of Zambia, the Copperbelt University and NGOs, all of which were, or were to become, involved in the mitigation of environmental impacts from mining.
- Design included provisions for monitoring progress in addressing environmental issues -- such as tracking the public health impact through measuring blood levels in children receiving treatment for lead poisoning under the project, and regular monitoring of ambient water and air quality. However, the outcome and intermediate outcome indicators chosen were insufficient to provide a logical linkage between the activities financed and the project objectives (see Section 10 below).

4. Achievement of Objectives (Efficacy):

“To assist the Borrower’s efforts in: (a) addressing environmental liabilities and obligations associated with the mining sector, following the privatization of the mining assets of ZCCM [Zambia Consolidated Copper Mines,
hereinafter Consolidate Copper}; and (b) strengthening the capacity of its environmental regulatory institutions to improve future compliance of the mining sector with environmental and social regulations.

(a) Addressing environmental liabilities and obligations associated with the mining sector, following the privatization of the mining assets of Consolidate Copper. Substantial.

Outcomes

- 15 investor and 12 Investment Holdings counterpart Environmental Management Plans were prepared by investors and by Investment Holdings respectively, and approved by the Environmental Council of Zambia. These plans define the remediation responsibilities of the Government, Investment Holdings and the investors for each mining operation.
- A Consolidated Environmental Management Plan (CEMP) was prepared and utilized.
- According to Table 2 of Annex 2 of the ICR, 85 groups of remedial activities and sub-projects (45 in the Copperbelt and 40 in Kabwe), which were identified through the CEMP, were carried out to address Investment Holdings’s historical and current environmental liabilities and obligations. In the Copperbelt, these included dredging of polluted rivers; demolition and site clean-up at mines; removal and proper disposal of hazardous materials from mine sites, such as 150,000 cubic meters of radioactive uranium tailings, about 220 tons of PCBs, and 56,000 m³ of lead contaminated soils in the Copperbelt and Kabwe, as well as extensive demolition, cleanup and re-vegetation efforts; resettlement from mine caving areas; and preparation for closure, and essential repair and maintenance, of tailings dams. In Kabwe, activities included the rehabilitation of the disused mine plant site; the securing of pits; the removal of mine waste materials; the dredging and rehabilitation of the Kabwe Main Canal; renovation and rehabilitation of community services and facilities, including water supply; and improvement of livelihoods through construction of markets and small manufacturing and commercial facilities.
- An in-depth study (the Kabwe Design and Scoping Study), financed under the project, was carried out to examine the nature, extent, pathways, and impact of lead contamination at household level. This study revealed that Investment Holdings was faced with serious liabilities related to lead zinc mining in Kabwe. Based on the study, the project financed a comprehensive set of interlinked activities to reduce the - by international standards - exceptionally high blood lead levels in children living in the vicinity of the smelter. The project supported "a state-of-the-art integrated Case Management program, which provided specialized care by a multidisciplinary team comprising a physician, nurse, sociologist, community volunteers, environmental technical specialist and caregivers" (ICR, paragraph 50).
- This program was reinforced by (i) provision of access to safe drinking water for 99,000 inhabitants of Kabwe; (ii) reduced exposure to lead-contaminated water as a result of the dredging of the Kabwe Canal, and removal and disposal of lead-contaminated material; (iii) greening of the yards of 3,100 households and 30 schools in order to reduce exposure to wind-blown lead dust; (iv) creation of 11 play parks to provide alternative play environments for children who would otherwise play in lead-contaminated dust or tailings dams; and (v) lead risk awareness campaigns supported by local NGOs, two new Environmental Public Information Centers (EPICs), and the rehabilitated Kabwe Public Library.

Outcomes

- The ICR (paragraph 50) reports that all Consolidated Copper’s priority contractual obligations relating to the environment were addressed, "albeit not always in a sustainable fashion due to insufficient focus on operation and maintenance responsibilities." Conversely, priority liabilities were addressed to a varying extent, especially in the Copperbelt. The ICR does not state how many interventions were related to obligations and how many to liabilities.
- The rest of the discussion of this objective focuses on the five major mining-induced environmental problems which the PAD had identified as giving rise to contractual liabilities for Investment Holdings, and which were confirmed by the CEMP: (i) air pollution; (ii) soil contamination; (iii) water pollution; (iv) risk of catastrophic failure of tailings dams; and (v) lead poisoning in Kabwe.
- **Air pollution.** The ICR reports (paragraph 38) that changes in air quality were not monitored during implementation. The limited data available suggest that "the project did not have a significant impact on improving ambient air quality" (ICR, Annex 3, paragraph 12). According to air quality data monitored by a private mining company for the period from July - December 2010, the SO2 concentration in ambient air in one location was 100% above the World Health Organization guideline limit, and in another location was more than 83% above the guideline limit. The ICR, however, also states (Annex 3, paragraph 13) that “in spite of a more than 100% increase in copper production between 2003 and 2010, from about 300,000 to 700,000 tons per year, the air quality has not deteriorated,” and that this is considered to be attributable to “the more vigorous compliance enforcement efforts on the part of the Environmental Council, as a result of the support provided to the agency under the project.” Although the ICR cites little evidence to back this, the Project Team subsequently informed IEG that “the project funded two mobile air quality monitoring stations which were deployed by ECZ [the Environmental Council] at times and locations of suspected high air pollution. This sophisticated equipment enabled continuous monitoring of multiple air quality parameters and real time transmission from the place of deployment to ECZ head office in Lusaka. While such occasional deployment of air quality monitoring equipment may not be considered systematic, mere...
availability of such equipment and ability of ECZ to deploy it at pollution sources contributed to the
compliance pressures that incentivized the polluters in Copperbelt to improve their air pollution
management.”

- **Soil contamination**. According to the ICR (paragraph 38), changes in soil contamination levels were not
systematically monitored during implementation (except for lead poisoning in Kabwe, considered separately
below). However, the Project Team subsequently stated that, with the project's support, most of the
identified contaminated soils, that would otherwise continue to pose environmental and health risks, were
removed in substantial quantities. These included the 150,000 cubic meters of uranium tailings, 220,000
kilograms of PCB-contaminated soils, and 56,000 cubic meters of lead-contaminated soils cited in "Outputs"
above. In addition, subsequent to project closure, Investment Holdings removed the remaining stockpile of
obsolete chemicals stored in the Copperbelt for safe disposal in South Africa.

- **Water pollution**. Baseline water quality data for the Kafue River watershed were collected for the CEMP in
2004 and 2005. The Environmental Council began to monitor the quality periodically in 2007. On average,
the water quality was found to be similar to levels registered before the project. The total suspended solid
level, used as a proxy for measuring water pollution, varied greatly, making it difficult to draw a conclusion
about the overall change in water quality. Nonetheless, the data suggest that water quality did not
deteriorate despite the more-than-doubling of copper production. Once again, the ICR attributes this to
Council’s strengthened reinforcement efforts supported by the project.

- **Risk of catastrophic failure of tailings dams**. Repair and rehabilitation work on four out of 17 dams was
carried out. According to the ICR (paragraph 50), no spillage occurred at these dams following project
interventions, and their potential health and environmental risks have been reduced. For the 13 remaining
dams, it was found that reprocessing of the residual copper content was not economically viable, and they
were earmarked for closure. However, in view of the higher prevailing price of copper, the mining rights for
these dams were subsequently transferred to the private sector. This privatization effectively prevented
Investment Holdings from implementing the decommissioning works that would have been supported by the
project. Nor were the dam sites inspected and monitored by the Environmental Council as regularly as had
been intended, due to “human and financial resource constraints” (ICR, paragraph 65). The ICR reports
(paragraph 50) that little preventive maintenance was carried out at the 13 dams, and that “their current
contribution to the pollution flows into streams flowing out of the mine areas is unknown.”

- **Lead poisoning in Kabwe**. The ICR (paragraph 23) describes the lead contamination mitigation program
supported by the project as “an excellent, well thought-out, holistic high priority intervention package
designed to treat lead-affected children medically, as well as to reduce their exposure to renewed
contamination in their physical living, playing and learning environments.” The program resulted in a
reduction of blood lead levels in 2,822 children (out of 5,000 children tested) of between 20-25% in the case
of treatment with nutritional supplements (for children with blood lead levels between 20-64 micrograms per
deciliter) and by up to 74% for children with blood lead levels beyond 65 micrograms per deciliter who were
given chelation therapy. While the ICR (paragraph 65) reports that a long term solution has still to be found
for funding the continuation of the Kabwe lead management and treatment activities, subsequent
information provided by the Project Team indicates that the program has been continued with funding from
Investment Holding. According to a December 2012 report by that company, an additional 2,657 children
have been newly recruited into the program, and 1,598 children retested since project closure. Moreover,
new data confirm that the blood lead levels in affected communities continue to decrease. From 2010 to
2012, the geometric mean blood lead levels fell from 30.1 to 26.3 micrograms per deciliter in the affected
communities, and the downward trend in blood lead levels was observed in six out of eight of the affected
communities. Maintenance of the Kabwe Canal (a significant source of contamination when it flooded) has
been taken over by the Municipal Council and the Canal has not flooded since project closure. The water
supply system, introduced as part of the project's lead exposure reduction interventions, continues to
operate under a private company. On the negative side, the coverage of the clean water program is still
incomplete, and Kabwe's sewerage plant has only a 42% coverage. Consequently, untreated sewage is
being released into local rivers via the Kabwe Canal. The ICR reports that nine out of the eleven play parks
have been vandalized and their equipment broken. The Environmental Public Information Centers have
scaled back their activities due to lack of funding.

(b) Strengthening the capacity of its environmental regulatory institutions to improve future compliance of the
mining sector with environmental and social regulations. Modest

- **Outputs**

- Existing environmental legislation and related regulations were reviewed and adjusted where needed.
- A monitoring system has been established and is operated by Investment Holdings.
- The Environmental Council established a monitoring program and has been monitoring the Environmental
  Management Plans’ compliance with statutory limits, primarily based on compliance reports from mine
  operators. The Council is also periodically monitoring pollution loads and flows from mining operations.
- Capacity at the Council was strengthened, with a view to enhancing its enforcement, litigation and
  negotiating capabilities.
- The relationship between the Council and the Mines Safety Department was strengthened and formalized in
a revised Memorandum of Understanding and the Department was provided with logistical support.

- The preparedness of the Environmental Emergency Response System was reinforced through the acquisition of equipment (including a toll-free environment emergency hotline) and through staff training.

### Outcomes

- The Environmental Council has been monitoring mining companies’ compliance with their Environmental Management Plans, and with statutory limitations, basing its work primarily on reports from mine operators themselves. According to these reports, compliance rose from 35% in 2005 to 60% in 2010, though this was short of the CAS target of 85%. The lower than hoped for level of compliance “is partly due to the fact that, during privatization, the Government exempted various new investors from having to comply with environmental standards to give them time to phase out or retrofit the old technology they inherited, thereby effectively limiting the Council’s effectiveness as an enforcement agency” (ICR, paragraph 50).

- The Council organized some 90 visits per year between 2005 and 2010 to 23 mining business units or facilities to check the compliance data reported by the operators. However, the ICR reports (paragraph 50) that the monitoring program was not fully implemented, and the collection of monitoring data has been very limited, due to delays in the procurement of monitoring equipment financed by the Nordic Development Fund.

- The project succeeded in enhancing the Council’s powers to monitor and enforce, through fines, temporary suspensions of mining licenses and litigation, private mining operators’ compliance with environmental regulations. The number of pollution control permits increased from 1,392 in 2005 to 3,582 by December 2010 (no target was set for this indicator). Similarly, the number of enforcement notices rose, and two facilities were ordered to shut down temporarily - and had their licenses suspended - for non-compliance.

- However, the attempts to strengthen the Council’s capacity to exercise its enhanced functions more effectively have met with more limited success. In part this was because the entity was undermined by actions outside its control, such as exempting investors from compliance with environmental standards and transferring the tailings dams mining rights to the private sector. But the ICR also refers (paragraph 35) to the Environmental Council of Zambia’s “inefficient operating structure,” and indirectly to the need to reduce staff turnover. The ICR presents little evidence that these issues have been addressed. On the contrary, the significant weaknesses demonstrated by the Council in its capacity as project implementing agency (see Section 9 below) would appear to indicate that they had not been effectively tackled. According to the Project Team, the Environmental Management Act of 2011 upgraded the Council to the Zambia Environmental Management Agency and reinforced its mandate. However, no concrete results from this are yet available.

- The ICR reports (Annex 2, Box 1) that the project’s impact on the capacity of the Mines Safety Department and other intended beneficiaries, such as academic and research centers was minimal, and that interagency cooperation did not improve significantly due to infrequent and irregular meetings of the Interagency Committee.

### Higher-Level Objective

According to the PAD, the project had a higher-level objective of supporting the Government in removing constraints to private investment in mining assets. The ICR (page 19) indicates that this objective was met. It refers to two private-sector financed site rehabilitations at a total cost of US$245 million, “which would not have occurred without the project, [and which] far exceeded the clean-up costs of US$2.9 million. The project had provided necessary funding to assure investors that Investment Holding and the Government would not default on their environmental mitigation obligations. It is known that such a default would have led certain investors to pull out of Zambia.

### 5. Efficiency:

- Efficiency is rated modest

- A cost-benefit analysis was carried out at both appraisal (ex ante) and closure (ex post). The methodology was essentially the same. The costs were those of investment and of operation and maintenance of the mitigation activities. These activities, together with enhanced oversight by the Environmental Council and other regulatory agencies, were expected to generate benefits in the form of lower soil contamination, water pollution and air pollution levels, as well as a reduction in the likelihood of tailings dam failures. The ex ante economic rate of return (ERR) was 18%, while that at closure was 10%, at or even below the most usual measure of the opportunity cost of capital. The difference reflects both lower benefits and higher costs than anticipated, though the former are of more significance than the latter. Soil contamination levels in the Copperbelt were not monitored. In Kabwe, the benefits from reduced lead contamination in the soils were substantial, but lower than expected. Benefits in the form of prevented water and air pollution were also lower than anticipated, while the risk of failure at 13 of the 17 tailings dams covered under the project was not mitigated as intended due to non-implementation of the planned decommissioning.

- The ICR (paragraph 49) points to what it considers to be indications of the project’s cost effectiveness. It
reports that the clean-up and rehabilitation of mining sites paved the way for new investments in mining and smelting activities. For example, the rehabilitation of the Kansanshi Mine near Sowezi and of the disused high grade leaching plant at Nchanga, was followed by investments, "which would not have occurred without the project," of about US$245 million, compared to the clean-up costs at the two sites of US$2.9 million. The difficulty with this analysis is that the project-supported work, while a necessary condition for promoting the new investment, is unlikely to have been a sufficient one. Moreover, in isolated cases like these, it is impossible to be certain about the "without project" situation. It cannot, for example, be ruled out that the clean-up work would have been undertaken by the private investor in the absence of the project.

- There were some significant administrative and implementation inefficiencies. Project costs were 34% higher than estimated at appraisal, while the outputs and outcomes did not increase correspondingly. There were considerable procurement related and other implementation delays, and the project closed nearly three years behind schedule.

### a. If available, enter the Economic Rate of Return (ERR)/Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation:

<table>
<thead>
<tr>
<th>Rate Available?</th>
<th>Point Value</th>
<th>Coverage/Scope*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appraisal</td>
<td>Yes</td>
<td>18%</td>
</tr>
<tr>
<td>ICR estimate</td>
<td>Yes</td>
<td>10%</td>
</tr>
</tbody>
</table>

* Refers to percent of total project cost for which ERR/FRR was calculated.

### 6. Outcome:

The project’s objectives were highly relevant, and the relevance of design was substantial. A wide range of mitigation activities was carried out. The project was one of the factors paving the way for completion of the privatization process and new investments in the copper mining sector. According to the evidence available, the remedial activities carried out have, at least, prevented further deterioration of air, water and soil quality, despite an increase of more than 100% in copper production between 2003 and 2010. In some areas, such as the blood lead levels in children in Kabwe, there have been marked improvements resulting from the project's interventions. Efficacy of the first objective is, therefore, rated substantial. While the project's support enhanced the powers of regulatory environmental institutions, evidence of strengthened capacity remains limited. Efficacy of the second objective is thus rated modest. Efficiency is modest since most benefits were either lower than anticipated at appraisal or could not be measured, while costs were higher. There were also significant implementation delays. Overall outcome is assessed as moderately satisfactory.

### a. Outcome Rating: Moderately Satisfactory

### 7. Rationale for Risk to Development Outcome Rating:

There are a number of significant risks to development outcome:

**Institutional.** The efforts made under the project to reinforce the capacity of Zambian regulatory institutions to negotiate and enforce environmental agreements and obligations effectively are unconsolidated and incomplete.

**Technical.** According to the ICR (paragraph 65), “insufficient attention was paid by both the Bank and ZECU [Investment Holdings’s Environmental Coordination Unit] teams to ensuring an effective handover of operation and maintenance responsibilities for assets created under the project to the designated entities.”

**Political.** Project experience indicates that there is a danger of a lack of political will to enforce compliance with environmental regulations. The ICR reports that “the interface between Government, Investment Holdings, the private sector and communities, which was supposed to facilitate the remediation of active, as well as historical, environmental liabilities, remained difficult throughout the project.”

**Financial.** The lack of political will may extend to official reluctance to increase the mining companies’ contribution to the Environmental Management Facility. More generally, funding needs to be found to ensure the continuation of successful activities such as the Kabwe lead management and treatment program. Investment Holdings has agreed to provide temporary funding but this is not a long term solution.

**Environmental.** The privatization of 13 tailings dams and the subsequent lack of regular inspection and monitoring of the sites create a risk that the dams will fail, leading to widespread environmental damage and possible loss of human life. The CEMP requires regular updating (and, according to the ICR, needs to be updated now) to reflect modifications in accountability due to changes in the ownership of mining rights. It is unclear which entity or
entities will assume institutional and financial responsibility for this.

Social. Although the project did engage in various forms of community consultation, it was recognized that greater involvement of mining communities in the project decision-making processes would have helped to ensure sustainability. To facilitate this involvement, it was proposed to establish a Community Development Small Grants Fund to finance demand-driven community sub-projects during the second half of the project’s lifetime. However, this Fund was not established, and communities played more of a consultative than a participatory role.

a. Risk to Development Outcome Rating : Significant

8. Assessment of Bank Performance:

a. Quality at entry:

- **Background analysis.** Preparation included a review of existing analytical work on the environmental dimensions of Zambia’s mining sector, and the completion of an Environmental Assessment. Preparation also took into account lessons learned from Bank-supported environmental projects in Zambia, mining sector operations in the country supported by other development partners, as well as the Bank’s experience with mine closure and reform activities in other countries. This work resulted in a preliminary identification of the environmental issues to be addressed by the project which were remarkably similar to those ascertained in the more detailed CEMP. However, the assessment of liabilities presented in the PAD was not matched by an equally thorough analysis of the environmental regulatory framework or of the institutions responsible for its enforcement.

- **Implementation arrangements.** The choice of Investment Holdings’s environmental management arm, to implement mitigation measures was appropriate, given its familiarity with, and vested interest in, addressing pressing environmental and social issues. However, there were a number of weaknesses in the design of implementation arrangements. First, oversight of Environmental Management Fund operations was to be provided by a Steering Committee chaired by the Secretary to the Treasury (a senior permanent official in the Ministry of Finance). The Fund Secretariat was also housed in the Finance Ministry. While this arrangement generally worked well from an administrative standpoint, the ICR notes that a more independent oversight of the Secretariat would have been preferable. Second, the selection of the Environmental Council as the principal implementing agency for Component 2, while institutionally appropriate, was problematic given the entity’s capacity weaknesses and what the ICR describes as ineffective organizational structure. Third, the division of oversight and implementation responsibilities according to project component was not conducive to monitoring and coordination difficulties (see Section 10 below).

- **Risk assessment.** Several risks were underrated or not acknowledged. For example, the risk of insufficient political will on the part of the Government to enforce environmental regulations was rated substantial rather than high, although there were already perceptible signs of reluctance at appraisal—for instance, the Canadian CIDA-supported restructuring of the Mines Safety Department to transform it into a stronger and more autonomous agency was not approved; and less stringent environmental requirements were applied to investors in the mining industry than in other privatized activities.

- **Design.** As noted in Section 3b above, the design of component 2, supporting the regulatory framework, had a number of shortcomings. The description of the Component in the PAD is less detailed, as is the corresponding volume of the Project Implementation Manual. A Draft Plan of Action for the reorganization and strengthening of Environmental Council had been completed under an earlier operation (the Environmental Support Project), but had not been implemented. Preparation of Component 2 was carried out by the Nordic Development Fund, which was also planning to fund the greater part of it. The ICR reports (footnote 40) that “even though there was close coordination between the Bank and Nordic Development Fund teams prior to effectiveness, it appears that the thinking spelled out in the Draft Plan of Action might not have been fully captured during preparation.” The 14-month delay in the start up of Component 2 activities and the fact that Bank Management called for restructuring of Component 2 only eight months after project effectiveness, were indicative of design weaknesses.

- **Realism.** Design was over-ambitious. During a five-year implementation period, it was unrealistic to expect to achieve not only reorganization and capacity strengthening of the Environmental Council and other regulatory agencies such as the Mines Safety Department, but also their full participation in enforcing the mining sector’s compliance with environmental regulations. Experience has shown that the restructuring of public agencies needs to be appropriately paced and financed.

Quality-at-Entry Rating : Moderately Unsatisfactory
b. Quality of supervision:

- There were several weaknesses in the staffing of the supervision effort. First, there were four task team leadership changes over the life of the project – one of them involving the replacement of a Senior Environment Specialist by a Senior Mining Specialist - that adversely affected project oversight. Second, the lack of the continuous presence of a social safeguards specialist hindered the degree of intended community involvement. Third, despite the focus of one of the two components on the restructuring and strengthening of public institutions, there was no institutional development or public sector governance specialist in the team. Fourth, the project was entirely supervised from Headquarters, whereas greater involvement by the Country Office could have resolved some of the implementation difficulties more quickly.

- Supervision missions were conducted regularly, with 15 taking place over an eight-year implementation period. However, Implementation Status Reports were less than fully candid, with the first five rating both implementation progress and progress towards attaining development objectives as satisfactory and the following ten as marginally satisfactory, despite modest efficacy and delays severe enough to warrant extensions of the closing date totaling nearly three years. The ICR reports (paragraph 69) that the quality of Implementation Status Reports varied considerably, with some very thorough and others barely documenting implementation status.

- The ICR reports (paragraph 68) that positive aspects of supervision included (i) the team’s adaptability to changing circumstances, as demonstrated, for example, by the inclusion in the project of uranium tailings removal after the problem had been uncovered during implementation; (ii) innovation in supporting the creation and initial operation of an Environment Project Fund (see Section 11c below); and (iii) the productive collaboration with NGOs that transformed initial antagonism into a mutually trustworthy partnership.

- The Borrower’s ICR and stakeholders consulted during the ICR mission complained about IDA’s delays in granting no-objections, blaming this for much of the slow implementation progress.

- At a fairly early stage of implementation, and certainly prior to the mid-term review in 2006, it had become clear that a reallocation of project funds was necessary because, first, the Nordic Development Fund contribution had freed up substantial IDA financing, and second, the allocation of project proceeds for consultancies was insufficient. According to the ICR (paragraph 69), "Bank management had urged the supervision team in June 2006 to redeploy project funds. The (Development Financing Agreement, DFA) was not amended to permit such a redeployment until November, 2009. “Cash constraints brought project implementation almost to a halt in 2007.”

- In identifying remedial priorities, the CEMP gave its highest ranking to economic empowerment and job creation among the affected communities in the Copperbelt and Kabwe. Consequently, the MTR recommended that the DFA’s amendment should permit the introduction of community grants to create economic opportunities. However, in the event, the amendment of the DFA did not include community grants, and therefore the proposed community grant component was not implemented.

- The weakly designed M&E system was not improved during implementation despite Bank Management requests to do so (see Section 10 below).

- Agreed changes in implementation arrangements did not take place. The ICR reports (paragraph 35): “During the MTR, it was agreed that project oversight would be transferred to the Ministry of Mines and Minerals Development in line with the Government’s decision that projects be assigned to ministries by thematic area. The Project Implementation Manual was revised accordingly, but for unknown reasons the change did not materialize and was thus not reflected in the November 2009 DFA Amendment. In addition, the team proposed the incorporation of simplified procurement procedures to facilitate community participation in project implementation which also did not occur since the Community Grant Component did not materialize.”

- The ICR reports (footnote 101) that “Multiple implementation supervision reports underscored the importance of tackling the complex and difficult interaction/interface between the Government and the private sector and of identifying more efficient mechanisms for soliciting private sector commitment to addressing active, as well as historical environmental liabilities.” Although Bank management and stakeholders in Zambia emphasized the importance of increasing the interaction between the supervision team and private mining companies, “there is no evidence of any efforts having been made by the Bank team to this effect.

<table>
<thead>
<tr>
<th>Quality of Supervision Rating</th>
<th>Unsatisfactory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Bank Performance Rating</td>
<td>Unsatisfactory</td>
</tr>
</tbody>
</table>
9. Assessment of Borrower Performance:

a. Government Performance:

- The Government’s initial support for the identification, prioritization and mitigation of environmental issues in the mining sector was strong, given the importance of this project for completing the privatization program. The establishment of the mandatory Environmental Protection Fund against political opposition is also a positive step (see Section 11c below).
- Commitment to the regulatory and institutional reforms supported by Component 2 was less evident from the beginning, as witnessed by the early non-approval of measures to strengthen regulatory agencies such as the Mines Safety Department.
- Although the signing by the President of the Republic of the 2011 Environmental Management Act demonstrates the Government of Zambia’s continuing commitment to environmentally sustainable development, the Authorities’ willingness to hold individual mining companies accountable for their lack of full compliance with environmental standards, has been shown to be ambiguous. Less rigorous standards are applied to the mining industry than to other privatized activities.
- The transfer of tailings dams (where processing was found to be economically unviable) to private investors poses serious environmental risks because investors are reportedly not undertaking routine maintenance.

Government Performance Rating: Moderately Unsatisfactory

b. Implementing Agency Performance:

The two agencies responsible for implementing Component 1 were Investment Holdings’ environmental coordinating unit (ZECU) and the Fund Secretariat. The Environmental Council implemented Component 2.

- Although ZECU showed strong commitment to the project’s goals and good progress was made under its leadership in tackling lead pollution issues in Kabwe, its inexperience in procurement documentation and unfamiliarity with IDA procurement requirements caused implementation delays. ZECU’s adoption in several instances of what the ICR (paragraph 73) describes as "unconventional practices to overcome implementation delays" were frequently ineffective. Its contract supervision was, at times, sub-optimal, leading to poor quality work that required subsequent repair. Arrangements to hand over operational and maintenance responsibilities for completed sub-projects were sometimes not fully thought through (as, for example, with the health clinics’ water supply facilities, play parks and environmental information centers in Kabwe).
- Major financial management shortcomings were observed on the part of both ZECU and the EMF Secretariat (see Section 11 below). These included delayed submission of quarterly interim financial reports; slow implementation of auditors’ recommendations; shortcomings in the internal audit function; non-operational accounting software for months at a time, necessitating a reversion to manual systems; and their persistent difficulty in accounting for expenditures. Both entities were slow in resolving outstanding claims and payments to contractors were delayed.
- Some of the implementation delays in Component 2 were beyond the control of the Environmental Council, such as delays in procurement process and availability of funds due to Nordic Development Fund’s internal procedures.
- Nonetheless, the Council demonstrated significant performance shortcomings. Mining sites rehabilitated under the project were not inspected or monitored on a regular basis. Annual work plans, budgets, and annual progress reports were not submitted to the Nordic Development Fund and IDA in a timely fashion. The Interagency Regulatory Committee established by the Council to coordinate contributions from delegated authorizing agencies (such as the Mines Safety Department), did not function effectively. Its meetings took place less frequently than the anticipated quarterly schedule. The Committee reportedly requires reorganization (ICR, paragraph 47).

Implementing Agency Performance Rating: Unsatisfactory

Overall Borrower Performance Rating: Unsatisfactory

10. M&E Design, Implementation, & Utilization:

a. M&E Design:
Most indicators listed in Annex 1 of the PAD were not quantified, time bound or easily measurable. One of the few numerical targets (“zero leakage of tailings dams rehabilitated by the project”) was found to be non-measurable. Physical works were to be classified as either “ongoing” or “completed.” Such classification focuses more on engineering outputs than on outcomes. There was little or no emphasis on sustainability. Some indicators, for instance “pollution flows and loads resulting from mining operations are regularly monitored,” measured process (in this case monitoring) and not outcome (compliance with environmental standards). There were no targets to measure the project’s public health impact (although reduction in blood lead levels in children receiving treatment under the project were tracked, M&E design did not include this or similar indicators).

Responsibility for M&E was divided by project component, with the Fund Secretariat in charge of Component 1 and the Environmental Council of Component 2. The Council was to rely to a considerable extent on periodic reports by independent consultants.

b. M&E Implementation:

- According to the ICR (paragraph 37), IDA country management had expressed concerns about the weak M&E framework. The project team was “repeatedly encouraged to work closely with the Africa Region’s quality assurance team to ensure a well designed and monitorable M&E system is in place.” Project files, however, “[do] not contain any evidence of such consultations and the M&E framework was not changed.”
- Many indicators, e.g. reduction in pollution flows, were not monitored because it was considered impossible to distinguish between flows from historical liabilities and those from active mining operations. Changes in the levels of air and soil contamination, critical for assessing the project’s outcome, were not monitored during implementation.
- The findings of many of the consultants’ reports on progress under Component 2 were “more descriptive than analytical and more output-oriented than outcome-focused” (ICR, paragraph 39). For example, the 2006 report lists the main issues identified during Environmental Council of Zambia’s inspections of mine sites, but offers no information on the impact of these infractions, whether or how they were resolved, or whether any fines or penalties were imposed. The ICR reports that the findings of these performance reviews were not adequately addressed by the Bank team, which did not include institutional development or public sector governance specialists.
- No beneficiary survey was conducted under the project. A Stakeholder Workshop took place during the MTR, but not at closure.

c. M&E Utilization:

There is no indication that the M&E information gathered during the project was used to inform any policy or other decisions the Government or the implementing agencies.

M&E Quality Rating: Negligible

11. Other Issues

a. Safeguards:

Environment. The project was classified as Category A for purposes of OP 4.01 (Environmental Assessment) thereby necessitating a full environmental assessment. The ICR reports (paragraph 40, page 15) that “throughout project implementation, safeguard implementation was consistently rated satisfactory.” The Government prepared a comprehensive Environment and Resettlement Framework that set out the actions necessary to comply with such policies. The environmental assessment and the CEMP were publicly disclosed and meetings were organized to discuss the latter in all Copperbelt towns. Environmental Project Briefs were completed for all sub-projects. Initially, Investment Holdings’s Environmental Coordination Unit's in-house preparation of the Briefs slowed implementation, but this was resolved through the retention of consultants. Subsequently the Unit, with the assistance of an international consultant, prepared an environmental and social screening methodology that was used to vet all sub-projects.

Resettlement. A total of 175 families living in unsafe mining caving areas (vulnerable to land subsidence due to underground activities) were resettled to new permanent homes in the Copperbelt area. The resettlements were carried out as remedial measures funded under Component 1 of the project. The ICR does not mention the preparation of a Resettlement Action Plan (except for 58 families resettled from the mine in Kitwe) and does not state specifically that the resettlements were carried out in accordance with Bank safeguard policies. However,
the ICR does state (paragraph 51) that “the families reported great satisfaction with their new residences, and Investment Holdings’s Environmental Coordination Unit has been commended on this successful intervention, including its meaningful involvement of communities in decision making by stakeholders including mining companies, NGOs and development partners.” The project team subsequently confirmed to IEG that the resettlements were carried out in accordance with Bank safeguards policies. Resettlement Action Plans were prepared for all potentially affected communities, and for the two Plans implemented under the project, supervision was carried out by senior Bank social development and resettlement specialists, who made regular on-site visits. The Project Team reiterated that, although the resettlements took longer than foreseen, they were considered successful by the project-affected persons interviewed.

b. Fiduciary Compliance:

**Financial management.** After being assessed as satisfactory in the early stages of implementation, the rating of financial management varied subsequently between moderately satisfactory and moderately unsatisfactory. The latter rating prevailed in the last supervision report. This reflected delayed submission of quarterly reports and the auditors’ management letters. The EMF Secretariat’s internal control environment was inadequate, due to insufficient clarity in assignment of duties and responsibilities, shortcomings in the internal audit function, and the failure to reconcile reported financial statement figures with the Bank’s Disbursement Department. Remedial actions were limited and incomplete. Later, the automated accounting system crashed. The reversion to a manual system delayed submission of reports and was susceptible to manipulation. Although the external audit reports were unqualified, the auditors raised several issues regarding ineligible expenditures for unauthorized salary and honorarium increases and for advancing funds between different project accounts in contravention of the DFA. The ICR reports (paragraph 41) that “the EMF Secretariat and Investment Holdings’s Environmental Coordination Unit failed to address the auditors’ recommendations in a timely fashion, and the Government was requested to refund to the Bank all remaining ineligible expenditures.”

**Procurement and disbursement.** Lack of familiarity with Bank and Nordic Development Fund’s procurement procedures and weak procurement capacity in the implementing agencies led to serious delays and were a major contribution to the need for a 32 month extension to the closing date. Difficulties were also experienced in complying with IDA’s disbursement requirements. The ICR reports (paragraph 36) that a large number of items on disbursement applications were repeatedly rejected by the Bank’s Disbursement Department due to inadequate documentation. The reconciliation of the Special Accounts (including reconciliation of funds from the EMF to Investment Holdings’s Environmental Coordination Unit and repayment of all the rejected expenditures had not been completely resolved by the end of the disbursement grace period. When the ICR was completed, about US$580,000 in Designated Account balances still did not have the required justification and documentation for disbursement against IDA Special Accounts.

c. Unintended Impacts (positive or negative):

There were two originally unintended positive effects:
- The project managed to effectively engage the participation of NGOs, some of which were initially hostile to privatization, in key project activities. This has improved environmental governance.
- The project led to the establishment of an Environmental Protection Fund. This is a statutory entity which aims to ensure, through mandatory contributions from mining companies, that sufficient funds are available to Government to cover cleanup costs in the case of mine closure or investor pullout. The amount which has been collected to date from 30 mining companies (US$8 million) is below the projected (and needed) amount; however, the Environmental Protection Fund represents an important institutional accomplishment that had to overcome significant political and industry resistance. This was not foreseen at appraisal.

d. Other:

<table>
<thead>
<tr>
<th>12. Ratings:</th>
<th>ICR</th>
<th>IEG Review</th>
<th>Reason for Disagreement/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcome:</strong></td>
<td>Moderately Satisfactory</td>
<td>Moderately Satisfactory</td>
<td></td>
</tr>
<tr>
<td><strong>Risk to Development Outcome:</strong></td>
<td>Significant</td>
<td>Significant</td>
<td>The ICR uses the term “substantial.”</td>
</tr>
<tr>
<td><strong>Bank Performance:</strong></td>
<td>Unsatisfactory</td>
<td>Unsatisfactory</td>
<td></td>
</tr>
<tr>
<td>Borrower Performance</td>
<td>Moderately Unsatisfactory</td>
<td>Unsatisfactory</td>
<td>There were major shortcomings in compliance with fiduciary requirements. The Government has shown ambiguity in its willingness to hold individual companies to account for their lack of compliance with environmental standards. Mining sites rehabilitated under the project were not inspected or monitored on a regular basis.</td>
</tr>
</tbody>
</table>

| Quality of ICR | Satisfactory |

NOTES:
- When insufficient information is provided by the Bank for IEG to arrive at a clear rating, IEG will downgrade the relevant ratings as warranted beginning July 1, 2006.
- The "Reason for Disagreement/Comments" column could cross-reference other sections of the ICR Review, as appropriate.

13. Lessons:
Of the Lessons identified in the ICR, three stand out, and are presented here with some adaptation.

- Projects such as this, which benefit a prosperous and burgeoning extractive sector, should make a strong effort to ensure that local communities share in the benefits. In the Zambian Copperbelt, most communities continue to struggle with adverse mining-related environmental and public health impacts, poor access to basic social infrastructure services, and poverty. Such projects should also endeavor to engage affected communities more actively in the implementation of project-funded investments.
- Projects designed to address environmental issues should pay particular attention to the development and implementation of a robust M&E system so that reliable results are available from an early stage onwards to inform project supervision and oversight.
- The Bank’s relative lack of prior experience in such an operation as this increased its risks. For such operations, adequate staffing of the preparation and supervision teams and the logistics of supervision assume an additional weight. It is important that the team be staffed continually with experienced specialists in all the fields involved - in this case, mining as well as environmental and social dimensions, and institutional restructuring, as well as public sector governance. Moreover, supervision of such projects would be enhanced by a strong involvement, if not team leadership, from the Country Office, and by close collaboration between Headquarters and country-based staff in order to ensure due diligence in project supervision, and to seize opportunities for dialogue.

14. Assessment Recommended?  ○ Yes  ● No

15. Comments on Quality of ICR:

The ICR is thorough, analytical and candid. It provides a substantial amount of useful information on the environmental issues in the Zambian Copperbelt and the measures taken to address them. The ICR’s main shortcoming is that the discussion of the project’s outcomes is less well-organized than it could have been. The reader has to search diligently and move around the document constantly in order to obtain a complete and coherent picture of the project’s actual achievements, especially with regard to Component 1. The inclusion of “higher level objectives” in the Section of the ICR dealing with outcomes - objectives which do not feature in the statements of either the PAD or the Development Financing Agreement, but which may nonetheless have influenced the ICR’s outcome rating - was inappropriate. Some more minor points: the component costs at closure in Table (a) of Annex 1 include physical contingencies; there is a discrepancy in Annex 1 between the total cost in Table (a) and total financing required in Table (b); it is unclear if the Nordic Development Fund's contribution was cofinancing or parallel financing; there is no indication of whether the entire original Nordic credit of €10 million was disbursed or not; the Data Sheet states that the 2010 restructuring was approved by the
Board, but the ICR text (paragraph 30) says it was approved at the level of the Regional Vice President; there
appears to be an undisbursed balance of the IDA credit, but this is not explained; the correct rating for risk to
Development Outcome is “significant,” not “substantial;” and the total extension of the closing date granted was
32 months, not 36.

**Quality of ICR Rating**: Satisfactory