Report Number : ICRR0021061

1. Project Data

Project ID P110462	**Project Name** AR Mining Environmental Restoration Proj
Country Argentina	**Practice Area(Lead)** Environment & Natural Resources

L/C/TF Number(s)	Closing Date (Original)	Total Project Cost (USD)
IBRD-75830	30-Nov-2013	34,250,000.00
Bank Approval Date	**Closing Date (Actual)**	
31-Jul-2008	27-Jun-2017	

	IBRD/IDA (USD)	Grants (USD)
Original Commitment	30,000,000.00	0.00
Revised Commitment	30,000,000.00	0.00
Actual	29,663,346.89	0.00

Prepared by	Reviewed by	ICR Review Coordinator	Group
Katharina Ferl	Ridley Nelson	Christopher David Nelson	IEGSD (Unit 4)

2. Project Objectives and Components

a. Objectives

According to the Project Appraisal Document (PAD) (p. 4) the objective of the project was to "(a) strengthen Government of Argentina's capacity to assess and mitigate environmental risks associated with closed uranium mines, processing sites, and related mining sector investments, in accordance with international good practice; and (b) reduce potential economic and health damages associated with a closed uranium milling site in Malargüe, Mendoza." The Loan Agreement of February 1, 2010 (p.4) states the objective, with no substantive difference, as "(a) to strengthen the Borrower's capacity to assess and mitigate environmental risks associated with closed uranium mines, processing sites, and related mining sector investments, in accordance with international good practice; and (b) to reduce potential economic and health damages

associated with the Malargüe Site."

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

No

c. Will a split evaluation be undertaken?

No

d. Components

The project included three components:

Component 1. Remediation of the Malargüe Site (appraisal estimate US$17.75 million, actual US$22.23 million): This component was to finance remediation works, including the safe disposal of 710,000 tons of tailings and soils, structures to prevent groundwater contamination and dust, and measures to abate radiation and radon emissions.

Component 2. Mine Restoration Planning and Institutional Strengthening (appraisal estimate US$11.6 million, actual US$9.28 million): This component was to finance technical assistance to study and design remediation options to clean up the additional sites, and support the environmental and social consultation processes required as per international best practice. The component was to finance an international advisory group to advise on the approaches being suggested for each site. Also, the project was to finance the strengthening of the National Atomic Energy Commission's (CNEA) Environmental Management Unit (GP) by supporting its organization, staffing, financial resources, and developing and implementing an Environmental Management and Information System (SIGA) and systematized public consultation and information processes. Furthermore, the component was to support the promotion of good environmental practices more broadly in the mining sector by strengthening the environmental entities in the two key national agencies involved in the sector, the Secretariat of Mining and the Secretariat of Environment, and in selected provincial mining and environmental agencies.

Component 3. Project Management (appraisal estimate US$1.25 million, actual US$0.24 million): This component was to support the project implementation unit in project implementation, reporting, monitoring, and conducting an impact evaluation of key interventions.

e. Comments on Project Cost, Financing, Borrower Contribution, and Dates

Project Cost: The project was estimated to cost US$34.25 million. Actual cost was US$35.8 million.

Financing: The project was financed by a US$30 million loan by the International Bank for Reconstruction and Development (IBRD). Actual disbursement was US$29.66 million.

Borrower Contribution: The Borrower was to contribute US$4.25 million which materialized.

Dates: The project was restructured four times:

- On July 25, 2013 the project was restructured to make adaptations of Intermediate Outcome Indicators in the Results Framework and extend the closing date by 21 months from November 30,

2013 to August 30, 2015 to account for an initial delay in project effectiveness.
- On August 28, 2015 the project was restructured to extend the closing date by three months from August 30, 2015 to November 27, 2015 to allow for the completion of three delayed activities (Malargüe remediation works, deployment of the Environmental Monitoring System Management Tool (SIGA) and capacity building for provincial authorities).
- On November 24, 2015 the project was restructured to modify some language in the Results Framework and extend the closing date by ten months from November 27, 2015 to September 27, 2016 to allow for the completion of works at the Malargüe site, the creation of a public (green) space in Malargüe, the final deployment of the SIGA system, and the institutional strengthening plan for provincial authorities.
- On September 26, 2016 the project was restructured to extend the closing date by nine months from September 27, 2016 to June 27, 2016 to allow for the implementation of remediation works at Malargüe and completion of other activities under component 2 which was delayed due to the impact of the national, provincial, and municipal elections.

3. Relevance of Objectives

Rationale

Argentina's mining industry was relatively new and therefore, the country had little experience in closing and cleaning up mines resulting in the accumulation of harmful solid and liquid wastes associated with uranium mining and processing, and the generation of waste tailings and low-grade ore containing low levels of radioactivity. Some of the closed uranium processing sites were located in near proximity of urban areas and caused concerns among the population regarding the environmental impacts on air, soil, and water quality. The objectives of the project supported the government's agenda to improve environmental management and governance through increased transparency through a more participatory approach. Currently, the government has been developing a "unified environmental strategy" that focuses on the environmental management of energy, mining, oil, and gas. The Bank team stated that this strategy has not been implemented yet.
The project was in line with the Bank's most recent CPS (FY2015-2018) which includes "reducing environmental risks and safeguarding natural resources" as one of its three broader themes.

Rating

Substantial

4. Achievement of Objectives (Efficacy)

Objective 1

Objective

To strengthen the Borrower's capacity to assess and mitigate environmental risks associated with closed uranium mines, processing sites, and related mining sector investments, in accordance with international good practice:

Rationale

Outputs:

- Baseline environmental studies and environmental legacy management studies at Los Gigantes and El Chicon sites were conducted to highlight the environmental risks (leachate of radioactive material to the aquifer, exposure through suspended materials etc.) and potential impacts at both sites. Also, a methodology on how to address these risks was developed, achieving the target. By developing baselines studies, the national government and the provincial government of Cordoba have strengthened their capacity to understand the magnitude of the mining legacies and its associated risks.
- Based on the environmental studies and legacy characterization, engineering design studies were developed. These studies included seismic analyses and outline the technical solutions for the remediation plan on how to address and mitigate the latent environmental risks posed by the mining uranium legacies.
- Remediation plans were developed and included a population perception analysis and identified social and communication aspects. Both, the local authorities in El Chichon and Los Gigantes agreed with the remediation plans.
- Environmental risks of five other legacy sites (Tonco-Salta, Pichinan-Chubut, La Estela-San Luis, Los Colorados-La Rioja, and Huemul-Mendoza) were identified and baseline environmental studies were completed, achieving the target.
- Seven legacy sites (El Chicon, Los Gigantes, Tonco, Pichinan, La Estela, Los Colorados, and Huemul) completed their proposals for the remediation of the contaminated sites and engineering designs, achieving the target.
- 12 governmental agencies, where legacy sites are located, were trained on environmental monitoring, procedures for management and supervision of mining operations or uranium legacy sites, achieving the target.
- Six key trainings modules were delivered to 80 technical and administrative staff of the Nuclear Regulatory Authority, the Environmental, Irrigation, Water and Mining Agencies from Mendoza Province, the Environmental Public Works Secretariat from the municipality of Malargüe and the mining agencies of the province and municipality of Cordoba, achieving the target. As a result, staff has been applying updated environmental monitoring protocols.
- A communication strategy on tailing remediation in Malargüe was designed, implemented and results were evaluated, achieving the target. The communication strategy was aimed for the communities at the project sites. Two additional communication strategies were developed and delivered at El Chicon and Los Gigantes, achieving the target. However, so far CNEA has refused to share information on radiological monitoring with the public which would be important to do. The entity indicated that it will publish broad parameters once its website is operational.

Intermediate Outcomes and Outcomes:

- Environmental risks of the Los Gigantes and El Chicon sites were identified.
- Through conducting baseline studies and environmental risks analysis at the five additional legacy sites, the local authorities were able to identify key impacts and risks posed to the environment and the population. Also, key elements to be included in the remediation plan were identified.
- All field samples and lab analysis adhered with quality assurance/quality control procedures, achieving the target.
- An Environmental Information Management System (SIGA) was developed and is fully functional at the PRAMU sites providing live environmental and radiological data for decision makers. The SIGA follows monitoring protocols and collects data on more than 50 parameters to determine the environmental conditions and risks associated at eight uranium legacy sites. The target is not completely achieved since data has not been shared on public websites as originally planned.
- Four CNEA laboratories were accredited ISO 17025 to monitor water, air, soil, and radiological parameters. In order to be accredited ISO 17025 a laboratory has to demonstrate the installed capacity and standards to be deemed technically competent for processing, testing and interpreting water, air, soil, and radiological samples according to international principles and criteria. One laboratory in Buenos Aires Province was equipped and has the technical capacity to perform the same activities, however, it has not been certified by the Qualification Committee of Laboratories and Nuclear Facilities (COCALIN) yet.

Rating
Substantial

Objective 2
Objective
To reduce potential economic and health damages associated with the Malargüe Site:

Rationale
Outputs:

- Different works at the Malargüe milling site were conducted including the complete removal, transportation, containment, encapsulation, and final closure of the uranium tailings.
- A public green spaces was designed in a non-contaminated area at the Malargüe site, achieving the target. Local citizens were consulted during the design phase.

Intermediate Outcomes and Outcomes:

- The risk of environmental pollution by the transportation and removal of tailings was reduced, achieving the target.
- In December 2006, results of baseline reports showed that radon exposure from plumes of the untreated uranium tails could reach as far as 2.5 kilometers and that the population (70%of the town's population) directly exposed to the site and its plume could be at risk of gamma ray radiation and contamination from Radon 222 inhalation. In addition, the reports also showed that surface and shallow groundwater systems had traces of uranium contamination from untreated tailings. However, the latest CNEA Technical Environmental Monitoring Reports included the analysis of several samples at Malargüe which showed that the radon, gamma ray and pollution parameters tested for air, water, soil, and households have been contained below the permissible international and local levels. Therefore, the contamination exposure to the nearby population has been controlled. Also, CNEA workers at the Malargüe site showed radiation levels which were under the norm, which is a critical achievement.
- The economic impacts associated with the pollution from uranium milling sites were not estimated at appraisal or monitored during project implementation. Therefore, no quantitative data is available to measure the impact of the project. However, the ICR (p. 20) states that the effective containment and greening of the site would have a positive impact on tourism and on the marketability of local potato seedlings. Unfortunately, no evidence on changes in land values is available although it may be too early to pick up such second order impacts.

Rating
Substantial

Rationale
Both the first and second project objectives were rated Substantial.

Overall Efficacy Rating
Substantial

5. Efficiency

Economic Efficiency:
The PAD (p. 16) used a least-cost approach to assess the investment in Malargüe since it was not possible to conduct a cost-benefit analysis due to the inability to quantify project benefits. The analysis applied an investment cost of US$16.2 per ton of tailings to achieve the imposed standard of remediation. The PAD did not explain how this number was derived. However, the cost was within the range of unit costs for similar international projects. The ICR applied a similar approach. The remediation cost was higher than initially expected at US$28.8 per ton. This number was based on the assumption that the total amount of material to

be removed was 710,000 tons. However, it is not possible to compare the remediation cost calculated at appraisal and at project closing since the actual quantity of contaminated materials moved and stored from the Malargüe site was measured in cubic meters instead of tons due to the mixture of different substances having different weights and densities. The total amount of materials moved was 801,520m3. This is an increase of 14.5% in the actual volume moved compared to the first estimated volume stated in contracts which was 700,000 m3.
The ICR compared the revised estimated remediation costs of US$29.25/m3 at the time of the first restructuring with the actual remediation costs of US$25.95/m3. The increased actual remediation costs were largely due to an increase in volume of material that had to be moved. This remediation cost was similar to the ones in other Bank projects.
Operational Efficiency:
The project's closing date was extended four times, for a total of 43 months, to allow for the completion of project activities, indicating an **inefficiency.** The extensions were mainly necessary due to delays in receiving government project funds. Also, inefficiencies in the implementation of civil works at the Malargüe site resulted in the delay of the final deployment of the project's Environmental Monitoring System Management Tool (SIGA). Taking everything together, the project's Efficiency is rated Modest.

Efficiency Rating
Modest

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

	Rate Available?	Point value (%)	*Coverage/Scope (%)
Appraisal		0	0 ☐Not Applicable
ICR Estimate		0	0 ☐Not Applicable

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

6. Outcome

Relevance of the objective was Substantial given the danger of the accumulation of harmful solid and liquid wastes associated with uranium mining and processing, and the generation of waste tailings and low-grade ore containing low levels of radioactivity. The achievement of both objectives was Substantial. Efficiency was Modest. Taking everything together there were moderate weaknesses particularly in operational efficiency, the project's outcome rating is Moderately Satisfactory.

a. Outcome Rating

Moderately Satisfactory

7. Risk to Development Outcome

The legal agreement between the Bank and the government states that the remediation of Malargüe and other sites, which were included in the environmental and radiological monitoring plan, will have to be monitored for a minimum 20 years by CNEA. The project established an Environmental Monitoring System Management Tool (SIGA) to support the collection, storage, and management of data from the remediation sites. Also, the local governments of San Rafael and Malargüe have established procedures, and are being supported by the University of Cuyo to monitor the remediation sites. The project also built capacity within CNEA to assess risk and conduct remediation activities at the other seven contaminated sites. Also, CNEA was able to strengthen its mine planning and environmental management arrangements. However, the project experienced significant implementation delays due to not receiving government project funds. The lack of a timely provision of funds could have a negative impact on the sustainability of the outcomes achieved under the project.

8. Assessment of Bank Performance

a. Quality-at-Entry

The project took lessons learned from other projects around the world into account. The Bank team organized two Project Preparation Facilities to prepare the counterparts for project preparation. The Bank identified relevant risk factors. Only the risk to the Bank's reputation if the overall progress does not meet expectations was rated Substantial. However, the risks that the government would not prioritize the project and that the Ministry of Finance would not provide the necessary resources, were not identified and resulted in implementation delays. The Bank underestimated in its Economic analysis the average remediation cost and used weight (US$/ton) instead of volume (US$/m3) as a unit of measurement. In addition, the Bank did not trigger OP/BP 4.12 (Involuntary Resettlement) even though the project design included the cleaning of land.

The project's Results Framework had significant shortcomings and needed to be revised twice (see section 9a for more details).

Quality-at-Entry Rating

Moderately Satisfactory

b. Quality of supervision

The Bank team consisted of members with relevant expertise and conducted supervision missions on a bi-annual basis. In addition, the team was supported by a mining engineer and a social specialist to address implementation challenges. The team produced comprehensive implementation status reports which highlighted key issues to Bank management. Also, the Bank restructured the project successfully to modify design shortcomings and allow for the completion of project activities. Even though OP/BP 4.12 was not triggered during project preparation, the Bank ensured that the project correctly complied with it during

implementation. The Bank was responsive to the government's request to incorporate the creation of a public green space in Malargüe under Component 1. The change of four Task Team Leaders caused continuity issues.

Quality of Supervision Rating
Moderately Satisfactory

Overall Bank Performance Rating
Moderately Satisfactory

9. M&E Design, Implementation, & Utilization

a. M&E Design
The project's objectives were clearly specified. The original Results Framework included four PDO indicators and 15 intermediate outcome indicators. The Results Framework had several shortcomings. Some of the indicators were vaguely defined and had targets that were overly ambiguous. Also, some indicators did not sufficiently capture progress towards the project's objective and focused on activities that were outside of the scope of the project, and outside of the control of the CNEA. The project's M&E design included the formation of a National Steering committee, a social fora and the development of the SIGA. These instruments were to enhance monitoring and supervision. The M&E design and provisions developed under the project were embedded in the functions and structure of CNEA and are likely to be used after project closing.

b. M&E Implementation
The project collected data to monitor the environmental conditions of the risk associated in the Malargüe area and in the other seven legacy sites. The data collection included more than 50 parameters such as air, water, soil and radiological levels on more than 50 sites across all project sites in five participating provinces. However, CNEA did not submit quarterly progress reports which made the monitoring more challenging. The Bank team revised the Results Framework twice during the project's restructurings to clarify indicators and make targets more realistic.

c. M&E Utilization
The project used country portfolio performance reviews, data produced by the project, and supervision missions to identify key issues of project implementation. The SIGA was implemented at the Malargüe site. The system is fully functional, however, CNEA has not shared information on radiological monitoring with the public but indicated that it will publish broad parameters on its website. The M&E design and provisions developed under the project were embedded in the functions and structure of CNEA and are likely to be used after project closing.

M&E Quality Rating
Modest

10. Other Issues

a. Safeguards
The project was classified as category A and triggered the Bank's safeguard OP/BP 4.01 (Environmental Assessment). The project prepared an Environmental Assessment to identify critical issues and relevant mitigation measures. The PIU set up a team of experts to implement a detailed monitoring system at Malargüe to measure air, water, and soil quality and radiation at the project site and the cities of Malargüe, Cordoba, and other urban areas. External technical experts were hired to support the team in supervising the security and stability of civil works. However, there were several shortcomings. First, monitoring reports were only shared with the Bank one year after measurements had taken place, resulting in a delayed response. Second, CNEA did not share radiological information with the public as planned. And third, CNEA missed to inform the Bank in a timely manner about a neighbor who did not want his land cleaned by the project. During project preparation, the Bank's safeguard OP/BP 4.12 (Involuntary Resettlement) was not triggered. However, a social specialist had to be added to the team when it was considered to purchase a neighboring property. The ICR (p. 30) states that the project mostly complied with the Bank's safeguard.

b. Fiduciary Compliance
Financial Management:
The project complied with the Bank's financial covenants and had adequate financial management arrangements in place. Interim Financial Reports were found adequate by the Bank but were submitted with some delays. The Argentina Supreme Audit Institution conducted the project's financial statement audits which were found acceptable by the Bank but were also submitted with some delays. Some of the external auditor's opinions on the project's financial statements were qualified over the course of the project implementation due to a claim presented in a court against CNEA whose resolution was uncertain by the time the audit reports were issued. It was determined that there were no ineligible expenditures. Also, none of the auditors' qualifications raised accountability issues.
Procurement:
The PIU lacked procurement capacity. The project experienced several procurement issues such as delays in payments, and low quality of contracts which required a lengthy back and forth between the PIU and the Bank. The PIU executed the Project following the Bank's Procurement Guidelines. No substantial deviations were detected in Prior or Post review. No misprocurement was declared. The Bank addressed procurement issues through regular and ad-hoc supervision. In addition, the Bank team hired a consultant to closely monitor the Malargüe's works. Over time, the PIU's procurement capacity improved, having a positive impact on project implementation.

c. Unintended impacts (Positive or Negative)

NA

d. Other

---

11. Ratings

Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Moderately Satisfactory	Moderately Satisfactory	---
Bank Performance	Moderately Satisfactory	Moderately Satisfactory	---
Quality of M&E	Modest	Modest	---
Quality of ICR		Substantial	---

12. Lessons

The ICR (p. 33) includes valuable lessons learned:

- **When designing a project, it is important to take internal regulations of local entities into account.** In this project, a panel of international experts was to be hired to provide advice on international best practice in planning and designing remediation efforts. However, the Ministry of Energy and Mines had internal contractual regulations in place which did not allow for the panel to be established as planned.
- **Local ownership is critical for a successful project implementation.** In this project, a new project activity – the construction of a public green space – was added as a mitigation measure at the legacy site during project implementation by the CNEA, the municipality and the Bank. Allowing for this flexibility resulted in a higher acceptance for the remediation activities at Malargüe.
- **By engaging in high risk-high return operations, the Bank can set an example and create models for future environmental remediation efforts:** Even though this project had some shortcomings, the Bank, in collaboration with the government, implemented the first and critical uranium site remediation in the country by bringing international technical expertise, adequate environmental and social standards, and financial resources to the table.

13. Assessment Recommended?

No

14. Comments on Quality of ICR

The ICR provides a good overview of project preparation and implementation. The ICR is consistent with the guidelines and is internally consistent. It includes useful lessons learned. However, it lacks information in some critical areas such as Financial Management, Procurement, and M&E. It does not include a traditional economic analysis incorporating, for example, health or land values, but uses a least-cost approach on achieving a defined benefit, however for health changes or land values it may have been too early and data may have been limiting. Overall, the quality of the ICR is rated Substantial.

a. Quality of ICR Rating
Substantial