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**ENVIRONMENTAL ASSESSMENT  
ARMENIA POWER SECTOR METERING  
PROJECT  
TASK ORDER NO. 2  
CONTRACT NO. LAG-I-00-98-00005-00**

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**ENVIRONMENTAL ASSESSMENT**  
**FOR ARMENIA POWER SECTOR METERING PROJECT**

**SUMMARY**

In accordance with Delivery Order Task Order No. 2, contract No. LAG-I-00-98-00005-00 and USAID environmental procedures 22 CFR 216, this environmental assessment has been prepared to describe the possible environmental impact resulting from the proposed metering project for the transmission and distribution networks in Armenia.

Based on the results of this review, the following can be concluded:

- The project is not expected to produce adverse environmental impacts;
- The project, as proposed, should have a neutral to positive environmental impact on air quality and human health due to better metering equipment, improved cabling and reduced outages;
- To the best of Hagler Bailly's knowledge, no hazardous materials will be handled as part of this project's procurement process.

**OVERVIEW OF PILOT PROJECT AND AFFECTED ENVIRONMENT**

By way of background, USAID and the Government of Armenia (GoA) had been planning on a \$15 million purchase of natural gas in 1998. However, after the Spring presidential election, the new Armenian government decided that improving the commercial operation of the power sector was a more critical need. Thus, the GoA requested that the US Government fund electricity metering, billing and collection improvements for the transmission network and distribution subsector instead.

The US Government, acting through USAID, and the Government of Armenia, acting through the Ministry of Energy, are cooperating on a comprehensive \$15 million program to improve power sector electric metering, collections and internal controls. This report presents the recommended elements of work plans and their impact for this \$15 million project.

The work plan is proposed to cover four areas in the transmission and distribution networks. The following activities are contemplated in the transmission network:

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- Placement of meters and current transformers (CTs) on the ARMTRANS boundaries (to measure power flows flowing into ARMTRANS from generation and power flows out to distribution companies);
  - Placement of data acquisition systems at high voltage substations (220 kV/110 kV) to collect meter data.

It is expected that under this project nearly all meters and some CTs in the transmission network will be replaced as proposed, including data acquisition at each substation. Currently, there are no meters and CTs on the inlet to ARMTRANS from generation; all of the primary inlets are being targeted for placement of meters and CTs. While there are meters on the border with distribution companies, most will be replaced due to low accuracy. Only selected CTs will be replaced.

The following activities are contemplated in the distribution network:

- Replacement of meters and CTs at “commercial” points at each of the four distribution companies to improve the quality of metering;
- Refurbishment of electrical wiring in apartment buildings to reduce electricity theft and possibility of collusion between meter readers and customers.

In the distribution networks only a certain percentage of meters will be replaced given budgetary constraints. Refurbishment of electrical wiring, which has not been planned in detail at this point, will most likely cover a percentage of buildings that are in the worst shape in that regard. Distribution companies will help identify the worst cases. It is expected that under this project no more than 25 percent of eligible buildings will be covered.

## **POTENTIAL ENVIRONMENTAL IMPACTS OF THE PROJECT**

The majority of activities in this project will be associated with removal of old equipment and installation of new equipment. Due to the nature of proposed activities in the transmission and distribution networks, limited environmental impacts are anticipated. Safety issues associated with the electrical installation procedures are addressed by standard training of employees.

There will be a positive impact for employees from replacement of old, worn-out cables in substations. There will be a positive impact resulting from cabling refurbishment in apartment buildings that today represent a substantial source of electrical hazard to customers. Other minor impacts are neutral at worst.

Specifically, in reviewing the four potential improvement areas within the scope of this project, two possible environmental impacts were identified. These include:

- Waste and scrap resulting from the replacement of electric distribution equipment such as meters, cables and boxes;
- Potential safety impacts associated with equipment replacement.

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### *Waste and Scrap*

As part of the project, it is expected that some quantity of equipment will need to be replaced. This will probably include some old cabling, meters and boxes that will be substituted with new equipment. Some scrap equipment may be disposed off; however it is expected that due to general shortages, some of the equipment may be reused elsewhere. For instance, in cases where there are existing meters with low accuracy, some will be replaced with high-accuracy electronic meters. Old meters may be placed at points in the system where accuracy is not critical or where meters are absent. For the material that will be discarded and to limit the environmental impact from waste and other scrap materials, it is recommended that any scrap materials be transported to a licensed landfill or commercial scrap recycler.

### *Potential Safety Impacts*

Typical installation work in this project will include one or more of the following:

- Installation of meters at transmission substations;
- Installation of data acquisition systems at transmission substations;
- Installation of meters within distribution networks;
- Replacement of wiring in apartment buildings.

The major safety issue is the hazard associated with working on electrical wiring. To adequately address that issue, the labor force must be trained in conducting such installations safely and in following basic safety rules. The installation work within the transmission and distribution networks is within the scope of fairly well established procedures for utility companies. Hagler Bailly's expectation is that utility companies operating those lines have staff familiar with installing meters and current transformers. The targeted transmission and distribution companies are aware that they will need to provide employees to conduct installation.

The replacement of wiring in apartment buildings will be conducted by outside contractors. It will be their responsibility to ensure that their employees are trained to make installations in a safe fashion. This will be one of the conditions of participating in the refurbishment program.

### **CONCLUSIONS**

After review of potential areas of work, the following conclusions can be drawn. The project should have an overall positive to, at worst, neutral environmental impact. The positive impact results from elimination of hazards associated with poor wiring at substations and at apartment buildings. The neutral impact results from the substitution of old equipment (meters, current transformers and boxes) with new equipment. Any other environmental impacts are minor.

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Based on the results of this environmental review, the following strategies are recommended to minimize any negative environmental impacts.

- Management at the transmission and distribution networks involved in this project should ensure that their staff is qualified to conduct required installation.
- Management at distribution companies involved in this project should ensure that personnel conducting wiring refurbishment at apartment buildings are properly trained to do so.
- Any scrap material that results from the project should either be reused by respective utility companies (and documented) or transported to a licensed landfill or commercial recycler.

Finally, to the best of Hagler Bailly's knowledge, no hazardous materials will be handled as part of this project's procurement process. No mitigation strategy is needed.

## APPENDIX

### List of Authors

In accordance with the requirements found in 22 CFR 216.1, the qualifications of the authors of this report are to be included in the environmental assessment. The following provides a brief biography of the authors of the report.

#### *Matt Chwalowski*

Dr. Chwalowski is a consultant at Hagler Bailly's Global Management and Operations Consulting group. He has 13 years of combined engineering, managerial and consulting experience working in diverse areas within government, non-profit and private business. While he works mostly with US utilities, he participates in various utility industry projects worldwide. Dr. Chwalowski served as an advisor on Hagler Bailly's previous pilot distribution commercialization activities in Armenia.

Dr. Chwalowski specializes in customer-related information systems strategy and implementation for regulated and unregulated utility industry segments, technology analysis and evaluation, and alignment of business processes with technology. His articles about technology-oriented changes due to industry deregulation have been published in the trade press.

#### *Dean White*

Mr. White was the lead researcher for the environmental assessment completed as part of Delivery Order 12. In addition to writing several articles discussing the environmental impacts of energy use. Mr. White worked with a U.S. utility to help develop its approach to reflecting environmental considerations as part of its resource planning process. He has also

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written one chapter in a book examining the environmental impacts of energy use. Mr. White.

Mr. White holds a BA in urban studies/planning and political science from the University of California and an MPP from the John F. Kennedy School at Harvard University.

Other staff that participated in this assignment includes Mr. Mike Ellis (engineer) who is a Principal at Hagler Bailly. Mr. Ellis is the task order manager for this assignment.