Reducing Methane Gas Leaks at Cherkassytransgas

Project Title: Program for Saving Fuel and Energy Resources at Cherkassytransgas
Project Leader: Cherkassytransgas Natural Gas Transmission Company
Project Partner: Indaco Air Quality Services, Inc (Durham, NC)
Location of Project: Cherkassy, Ukraine
Project Duration: March 2002 - February 2003
EcoLinks Project Contribution: Total EcoLinks Project Investment: $83,328: EcoLinks Grant Support: $49,976 Project Team Cost-share Contribution: $33,352.

Best Practice: Transferable Solutions

The project "Reducing Methane Gas Leaks at Cherkassytransgas" is an EcoLinks Best Practice. Through this EcoLinks funded project, one of Ukraine's largest natural gas transmission companies teamed with Indaco Air Quality Services (USA) to develop and implement a methane gas leak mitigation program for Cherkassytransgas gas compressor stations. Measurements taken after project implementation and repair works at two selected Cherkassytransgas compressor stations demonstrated that gas leaks were reduced by 1,953,900 m^3 /year, resulting in an annual savings of $80,000. Environmental fees were also significantly reduced. These savings will multiply as Cherkasssytransgas expands the leak mitigation program to all of its 23 compressor stations during the coming year.

As a result of this project, US methodology and technology for implementing a gas leak mitigation program was transferred to Ukraine. Through this EcoLinks funded project, over 200 leaks were repaired at two Cherkassytransgas compressor stations, reducing methane gas emissions by 1,953,900 m^3/year. The leak mitigation program demonstrated through this project is highly transferable to other gas transmission companies in the NIS.

Project Summary

Cherkassytransgas (CT) is one of Ukraine's largest natural gas transmission companies. CT operates 6 transit gas pipelines from Russia and Turkmenistan through Ukraine and into Western Europe. The company provides about 120 billion m^3 of natural gas to 11 regions in Ukraine, through a 5,000 km network. Methane gas leaks throughout the pipe-line network, and in compressor stations in particular, represent a safety risk and a wasted energy resource as well as contribute to global warming.

Through the project, Cherkassytransgas teamed with Indaco Air Quality Services (USA) to develop and implement a methane gas leak mitigation program for CT gas compressor stations. Using US equipment and methodology to measure leaks, the Project Team first conducted in-field leak detection and measurement on two Cherkassytransgas compressor stations. 27 Cherkassytransgas employees from all of the company's 23 compressor stations were trained in detecting, measuring, recording and evaluating gas leaks using US-made equipment. Based on the data gathered in the field, the Project Team next prioritized detected leaks and a leak repair plan was developed and implemented. Measurements taken after implementation of the repair program demonstrated that gas leaks at the two selected Cherkassytransgas compressor stations were reduced by 1,953,900 m^3/year.

Project Activities

The main goal of this project was to develop and implement a methane gas leak mitigation program at Cherkassytransgas, based on US tested equipment and experience. Project Activities included the following:

1. Field Training in Detection and Measurement of Leaks at Zadniprovska and Kremenchutska Compressor Stations

Action: The Project Team began by making a general overview of the Zadniprovska and Kremenchutska compressor stations. An Indaco Air Quality Services representative worked with CT employees, demonstrating how to use the Hi-Flow Sampler equipment to measure detected gas leaks. Leak detection was conducted using a combination of soap solution and catalytic oxidation/ thermal conductivity conductors. Identified leaks were tagged and numbered. Following this, leak rate measurements were made, using Hi-Flow Sampler equipment (vent bag system).

Results of measurements were recorded in specially designed format for further analysis. The advantage of the Hi-Flow Sampler is that it measures the rate of gas leaks, therefore allowing repair work to be prioritized, focusing on the most serious leaks first. It is common for 10-20% of the leaks to account for 80-90% of total gas leaked.

Results of the field measurements showed a total of 280 gas leaks at the two compressor stations, resulting in 2,957,900 m^3 of methane gas leaks per year.

Product(s): 1) Training in using Hi-Flow Sampler equipment to measure gas leaks; 2) Identification and measurement of gas leaks at Zadniprovska and Kremenchutska compressor stations.

2. Seminar on Gas Leak Detection/Measurement Equipment

Action: A seminar was held for 27 CT specialists from 23 different compressor stations. Participants were trained in measuring methods and equipment. After classroom training sessions, the participants traveled to the field to measure leaks at near-by compressor stations. A decision was made to test for leaks at all of CT's 23 compressor stations.

Product(s): 1) CT staff trained in measuring methods, recording and equipment.

3. Study Tour to USA

Action: Two representatives from CT (the Head of the Department of Ecology and the Ecology and Energy Saving Engineer) traveled to the USA to learn about leak reduction techniques used by US gas transmission companies. During the trip, the group met with the Director of the USEPA's Natural Gas Star Program and attended a conference on mitigation techniques for the natural gas industry. They also met with Heath Consultants, Sealweld, Bacharach, ICF Consulting and BC Hydro to learn about available techniques and equipment to reduce gas losses and greenhouse gas emission offset programs.

Product(s): 1) Improved understanding of US leak reduction techniques and methodologies.

4. Development and Implementation of a Leak Repair Plan

Action: Using the information gathered during Activity 2, the Project Team worked together to prioritize detected leaks, develop a Leak Mitigation Plan, and implement repair work. A total of 227 leaks were repaired in accordance with the Plan.

Following leak repair work, post-project measurements were made. The measurements showed that leak reduction exceeded initial estimates: as a result of the project, about 1,953,900 m^3 of methane gas leaks were mitigated at the Zadniprovska and Kremenchutska compressor stations.

Cherkassytransgas purchased the US made Hi-Flow equipment in order to implement the leak abatement program throughout the entire CT network.

Product(s): 1)Prioritization of identified gas leaks and corresponding Leak Mitigation Plan developed. 2) Leak repair work on 227 leaks was carried out. 3) US made Hi-Flow equipment purchased.

Project Benefits

This project draws on US-developed methodology and equipment for measuring, recording and prioritizing gas leaks. The project built capacity within the Cherkassytransgas network to implement natural gas mitigation measures. Environmental benefits from the project include reductions in greenhouse gas emissions through the measurement and mitigation of gas leaks. The economic benefits of the project result from saved natural gas resources, which in turn mean an economic savings for Cherkassytransgas.

Capacity Building Benefits
The major achievement of this project is the increased capacity of the Project Leader (Cherkassytransgas) to a implement a natural gas mitigation program. Drawing on methodology and equipment developed and tested in the US, Cherkassytransgas staff was trained in making field measurements, recording and prioritizing gas leaks. The project demonstrated the cost effectiveness of the implementation of such a program and provided CT with the skills to implement the program as part of regular business operations.

Through outreach (training programs and informational publications), the methodology and equipment demonstrated in this project has been shared with other gas transport companies within the Ukrtransgas network.

In addition, through Indaco, Cherkassytransgas submitted a proposal to British Columbia Hydro for the sale of emissions offsets from leak reductions at CT. If realized, this would be the first such deal in the natural gas transmission sector in Ukraine.

Environmental Benefits
The environmental benefits resulting from this project stem from reduction of gas leaks at Cherkassytransgas. Through the project, greenhouse gas emissions were significantly reduced at two of CT's compressor stations (reduction of methane gas emissions equaling approximately 1, 953,900 m^3/ year).

- Plans to implement the leak abatement program at all of Cherkassytransgas compressor stations will result in additional environmental benefits in the future.

Economic Benefits
Economic benefits resulting from leak abatement work carried out on the two selected CT compressor stations will save CT about $100,000 per year. The cost of the repair works was about $19,000, thus net benefits from the gas leak mitigation measures carried through this project equal over $80,000/year. CT can expect further economic benefits as it expands the leak abatement program to its other 21 compressor stations.

In addition, as a result of accurate emissions measurement made possible through use of Hi-Flow equipment, Cherkassytransgas environmental fees for NO_x and CO have been significantly reduced (CT was previously over-charged for NO_x and CO emissions, based on estimates, rather than direct measurements).

- If the emissions reduction credit deal between Cherkassytransgas has British Columbia Hydro is finalized, Cherkassytransgas can expect to earn an additional $160,000/year, over the course of 10 years.

Lessons Learned

Lessons learned from this project include the following:

Critical to this project's success was the involvement and active support of Cherkassytransgas top management from the outset of the project. As a result CT management saw first hand the benefits of implementing the leak measurement and abatement program, and was able to

spread the benefits of the program throughout the entire CT network and to other gas transport companies within the Ukrtransgas network.

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