LIHIR GOLD LIMITED

LIHIR GEOTHERMAL POWER PROJECT
UNFCCC Reference Number 0279

MONITORING REPORT
2nd Reporting Period

Project Site: Lihir Island, New Ireland Province, Papua New Guinea
Monitoring Period: 1st October 2006 – 30th September 2007
Prepared By: Lihir Gold Limited (LGL)

The New Lihir Gold

People Results Growth

Certified Environmental Management

Cert No C10375

EXECUTIVE SUMMARY

This document reports on the emission reductions generated by the Lihir Geothermal Power Plant (LGPP), CDM Registration Reference No. 0279 for the second monitoring period beginning 1st October 2006 through to 30th September 2007.

Emissions reductions documented in this report contain data for both the first (33MW (nominal capacity)) stage and the second (additional 22MW (nominal capacity)) stage of the project. The second stage involved the installation of the two turbines which brought the 55MW (nominal capacity) power plant to full energy producing capacity during this monitoring period in Quarter 1, 2007.

This project has reduced emissions by displacing electricity that was generated through the combustion of heavy fuel oil (HFO) at the LGL Diesel Power Station.

Project activity emissions are calculated from reductions on burning of fossil fuels compared to baseline years 2002-2004. In this reporting period, four wells were used for the first six months and seven for the other six. Emissions associated with these wells are not considered under the CDM as they are used for mine depressurization purposes. The net power production for this reporting period was 240 466 MWhrs.

Based on the net power generation figure and the emission factor for the Project, the total emission reductions for this reporting period are 163 036 t CO_2 - e.

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ABBREVIATIONS AND GLOSSARY OF TERMS

LGPP	Lihir Geothermal Power Plant
LGL	Lihir Gold Limited
MW	Megawatt
HFO	Heavy Fuel Oil
PDD	Project Design Document
CER's	Certified Emission Reductions
SOP	Standard Operating Procedure
NCG's	Non-Condensable Gases
IGNS	Institute of Geological and Nuclear Sciences
$C0_2$	Carbon Dioxide
CH_4	Methane
E6	Ellipse 6
TFT	Tracer Flow Testing
GHG	Greenhouse Gas
PI	Process Information
CDM	Clean Development Mechanism
t CO_2 -e	tonnes carbon dioxide equivalent

1 INTRODUCTION

This document reports on the emission reductions generated by the Lihir Geothermal Power Plant (LGPP), CDM Registration Reference No. 0279 for its second monitoring period. The power plant remains under the ownership of Lihir Gold Limited (LGL).

The LGPP uses geothermal steam produced from mine depressurization operations to create an ultimate nominal power producing capacity of 55MW.

This project has reduced emissions by displacing electricity that was generated through the combustion of heavy fuel oil (HFO) at the LGL Diesel Power Station.

Approved consolidated monitoring methodology ACM0002 "Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources" is used for this project as stated in the Project Design Document (PDD).

2 IMPLEMENTATION AND CURRENT STATUS

The first monitoring report (LGL 200609), contained data for the first stage of the project which was the 33MW (nominal capacity) phase of the Geothermal Power Plant. Emission reductions generated by the three turbines installed initially were documented and certified emission reductions (CER's) were awarded.

Emissions reductions documented in this report contain data for both the first (33MW (nominal capacity)) stage and the second (additional 22MW (nominal capacity)) stage of the project. The second stage involved the installation of the two turbines i.e. turbines 4 & 5, which brought the 55MW (nominal capacity) power plant to full energy producing capacity in Quarter 1, 2007. Turbine 4 started producing commercial energy on the 5th February, 2007 and turbine 5 on the 3rd March, 2007.

A total plant shutdown was also carried out during this reporting period from the 15th January to the 24th January for service and maintenance of equipment.

Initially, three geothermal wells supplied steam to the 33MW (nominal capacity) phase of the project. To cater for the additional 22MW (nominal capacity) phase, two wells were taken offline and replaced and an additional six geothermal steam wells were added to the pipeline toward the geothermal power plant making it nine geothermal steam wells in total, supplying steam to the LGPP at the end of September.

3 MONITORING PERIOD

The monitoring period for this report is from the 1st October, 2006 to the 30th September, 2007 (both days included).

4 MONITORING PROCEDURES

4.1 Calibration and Maintenance of Monitoring Equipment and Instruments

4.1.1 Sampling Equipment and Instruments

Geothermal steam sampling is conducted on-site and monitored by the Mine Technical Department, Geothermal and Dewatering Section. Weber separators used to separate the two-phase steam/water mixture are calibrated and maintained on-site. Calibration is conducted quarterly after sampling, in preparation for the next quarterly sampling. Other pressure measuring instruments are calibrated by the Process Plant Maintenance, Instrumentation Section. Refer to Appendix 1 for further detail on gas sampling equipment and Appendix 3 for calibration certificates.

4.1.2 Laboratory Equipment and Instruments

The Institute of Geological and Nuclear Sciences (IGNS) in Auckland, New Zealand conducts analyses on the gas samples collected. The laboratory is accredited by International Accreditation New Zealand and the tests conducted are performed in accordance with its terms of accreditation.

4.1.3 Steam Flow and Electricity Monitoring Equipment and Instruments

From 1st October 2006 to 14th January 2007, steam flow was measured using steam flow meter tag # PGS: S700_FTn_020_FInn which measures steam flow from the separator to the Geothermal Power Plant. From 15th January to the 24th January

2007, the LGPP was closed for its maintenance and service shutdown period, whereby steam flow meter tag # PGS: S100_FTn_011_TOTn was installed on the 17th of January. The scheduled installation of this flow meter was stated in the first monitoring report and has been completed. After the shutdown in January, steam flow for the 33MW (nominal capacity) phase was monitored with flow meter tag # 'PGS: S100_FTn_011_TOTn and the 22MW (nominal capacity) phase, once commissioned was monitored with flow meter tag # 'PGS: S400_FTn_011_TOTn during this monitoring period. Other pressure measuring instruments, e.g. Gauges and annubars are calibrated by the Process Plant Maintenance Department, Instrumentation Section.

Energy meters are used for electricity monitoring and have been manufactured under an ISO9001 registered system and conforms to IEC 947-1, IEC 1010-1. Energy meters for the 22MW (nominal capacity) phase were calibrated in September, 2006 and flow meters were calibrated in May, 2006. Refer to Appendix 3 for further detail. Original test result certificates are kept by the LGPP personnel. Refer to Appendix 1 for further detail on steam flow and energy monitoring equipment.

4.2 Gathering of Data from Steam Wells and Power Generation

4.2.1 Gas Sampling

For this reporting period, steam was supplied by three geothermal wells (GW24, 26 & 28) for the first six months. During the next six, two wells (GW24 & 26) were taken offline and replaced (GW37 & 38) and six existing wells were connected. Thus, 9 geothermal wells (GW28, 37, 38, 39, 40, 43, 48, 17 & 18) which were originally drilled for mine depressurization are supplying steam to the LGPP at this point in time. See Map 1 for well locations and Table 4.2.1 showing well steam supply to the LGPP.

Table 4.2.1 Geothermal Wells Supplying Steam to the LGPP

ITEM	WELL NO.	SUPPYLING	ONLINE	OFFLINE
1	24	33MW (nominal capacity)	01 June'05	08 Jan'07
2	26	33MW (nominal capacity)	01 June'05	08 Jan'07
3	27	33MW (nominal	15 Nov'07	

		capacity)		
4	28	33MW (nominal capacity)	01 Jun'05	
5	37	22MW (nominal capacity)	17th Oct'06	
6	38	22MW (nominal capacity)	17th Oct'06	
7	39	22MW (nominal capacity)	17th Oct'06	
8	40	22MW (nominal capacity)	17th Oct'06	
9	43	22MW (nominal capacity)	17th Oct'06	
10	48	22MW (nominal capacity)	17th Oct'06	
11	17	22MW (nominal capacity)	01 Sept'07	
12	18	22MW (nominal capacity)	01 Sept'07	

Average steam amounts passing into the LGPP via the scrubbers for a 24 hour period is calculated and recorded daily. Steam released from well-testing is also monitored and samples are also taken. Refer to Appendix 4 for well-testing results.

Gas sampling is conducted using the ASTM E1675-83: Standard Practice for Sampling Two-Phase Geothermal Fluid for the Purposes of Chemical Analysis on a quarterly basis. Standard Operating Procedure (SOP) # 2500-006 Geothermal Steam and Water Sampling describes the gas sampling process undertaken, nil changes to this procedure have occurred since the last reporting period . Refer to Appendices 2 & 4 for further detail.

Gas sampling is conducted by experienced and trained personnel from Century Drilling and Engineering Services (NZ) Limited and LGL.

Non-condensable gases (NCG's) in the samples are analysed by the IGNS. IGNS uses the method Geothermal Gas Analysis by Gas Chromatography for analyses of the gas samples taken. Refer to Appendix 4 for further detail on this method.

Carbon dioxide (CO_2) and methane (CH_4) contents in the produced steam is monitored along with other NCG's. For this reporting period, CO_2 and CH_4 have average values of 1.57 %w/w and 0.0024 %w/w respectively. In effect, a total of 32 402.61 tonnes of CO_2 and 53.22 tonnes of CH_4 were in the steam used to generate energy. Fractions of CO_2 and CH_4 are also measured in samples taken during well-testing. Results are supplied by the Geothermal and Dewatering Section. For this reporting period, a total of 46.57t of CO_2 and 8.61 tonnes of CH_4 were released. Refer to well-testing results in Appendix 4.

4.2.2 Electricity Generation

Electricity generation is monitored in the LGPP control room. Energy production figures for a 24 hour period are taken at midnight and entered in to the E6 database.

Total gross and net power production for this reporting period was 260 763 MWhrs & 240 466 MWhrs respectively. Table 4.2.1 and Figure 4.2.1 shows the monthly power generation figures. Refer to Appendix 5 for daily power generation and usage data.

Table 4.2.2 Monthly Power Generation Figures

Date	Gross Power Production	Total Usage	Net Power Production
	MWhrs	MWhrs	MWhrs
Oct-06	22206	1621	20585
Nov-06	21757	1547	20210
Dec-06	20986	1573	19413
Jan-07	9489	1007	8482
Feb-07	14657	1066	13591
Mar-07	17609	1845	15764
Apr-07	30563	2350	28213
May-07	32419	2329	30090
Jun-07	25613	2167	23446
Jul-07	20943	1484	19459
Aug-07	24397	1818	22579
Sep-07	20124	1490	18634
TOTAL	**260763**	**20297**	**240466**

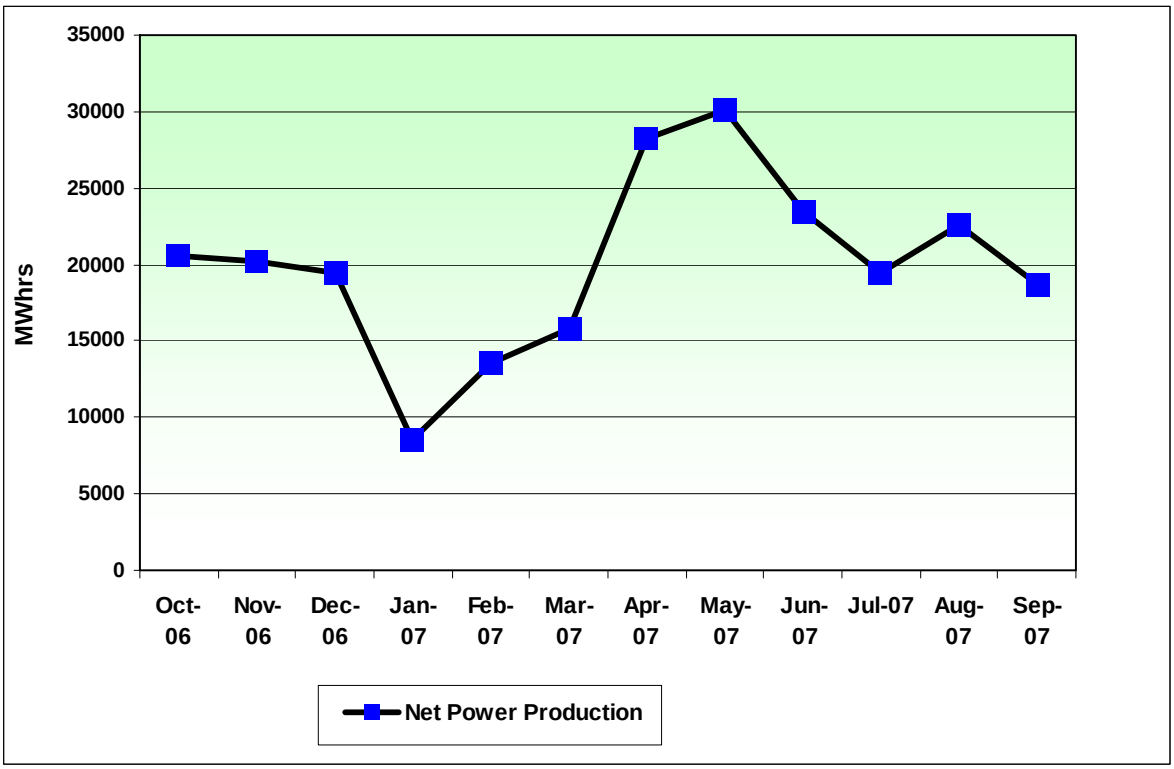


Fig. 4.2.1 Monthly Net Power Generation Figures

The LGPP has a back-up Cummins 350 KVA diesel generator that is to be used only during power failures. Run hours for this reporting period stands at 54.9hrs which have accumulated again due to testing of the generator.

4.2.3 Steam Flow

LGL uses a PI database system which allocates tag numbers to all meters used throughout process plant operations. Tag number PGS: S700_FTn_020_FInn has been allocated to the meter that measures steam flow from the separator. This meter was used to measure steam flow from October 2006 to January 2007. After the January shutdown, new flow meter tag # PGS: S100_FTn_011_TOTn was installed at the 33MW (nominal capacity) scrubber and steam was monitored using that particular meter. Once the 22MW (nominal capacity) phase was commissioned, tag # 'PGS: S400_FTn_011_TOTn was used to monitor steam flowing to the 22MW (nominal capacity) phase. To get the total steam flow, values from the 33MW (nominal capacity) and 22MW (nominal capacity) phases are added together. Data collected from the flow meters are documented in this report. Problems occur with the measurement of steam flow either (1) when the PI server fails and readings are given as 'No Good Data for Calculation'; (2) if there is a data

communication problem from the meter to the SCADA screen in the control room or (3) if the flow meter is reading incorrectly due to damage from vibrations or other various reasons. Problems 1 and 2 are solved when the system is restarted and takes measurements again. Problem 3 is sorted out when the meters are replaced during shutdown periods.

Table 4.4.2 Steam Flow from Separator and Scrubbers

Date	Total Steam Flow (tonnes)
Oct-06	63 890
Nov-06	69 720
Dec-06	67 154
Jan-07	55 241
Feb-07	90 414
Mar-07	177 994
Apr-07	321 944
May-07	337 401
Jun-07	278 642
Jul-07	226 563
Aug-07	272 480
Sep-07	215 988
Total	2 177 431

The Tracer Flow Test (TFT) method is used to measure well discharge steam flow rates generated from well-testing. TFT discharge measurements are done for a single tracer injection and sampling period which takes about less than 1 hour for each well. This is conducted by the Mine Technical, Geothermal and Dewatering Section.

4.3 Calculation of GHG Emission Reductions

4.3.1 Project Activity Emissions

Project activity emissions are calculated from reductions on burning of fossil fuels compared to baseline years 2002-2004. In this reporting period, four wells were used for the first six months and seven for the other six. Emissions associated with these wells are not considered under the CDM as they are used for mine depressurization purposes. There have also been nil project emissions from the combustion of fossil fuels in relation to the LGPP as zero fossil fuels are used by the

LGPP. Thus the calculated project activity emissions for this reporting period are zero.

4.3.2 Emissions Offset from the Grid

The emissions offset from the grid associated with the project activity are zero based on detail provided in Section 4.3.1.

4.3.3 Emission Reductions

Total emission reductions for this reporting period are 163 036 t CO_2 - e. Monthly emission reduction data is given in Table 4.3.1 and Figure 4.3.1. Refer to Appendix 6 for daily emission reduction data.

Table 4.3.1 Monthly Emission Reductions produced for this reporting period

Date	Net Power Production	CO2 Emission Factor	Emission Reductions
	MWhr		
Oct-06	20585	0.678	13956
Nov-06	20210	0.678	13702
Dec-06	19413	0.678	13162
Jan-07	8482	0.678	5751
Feb-07	13591	0.678	9214
Mar-07	15764	0.678	10688
Apr-07	28213	0.678	19128
May-07	30090	0.678	20401
Jun-07	23446	0.678	15896
Jul-07	19459	0.678	13193
Aug-07	22579	0.678	15309
Sep-07	18634	0.678	12634
Total	**240466**		**163036**

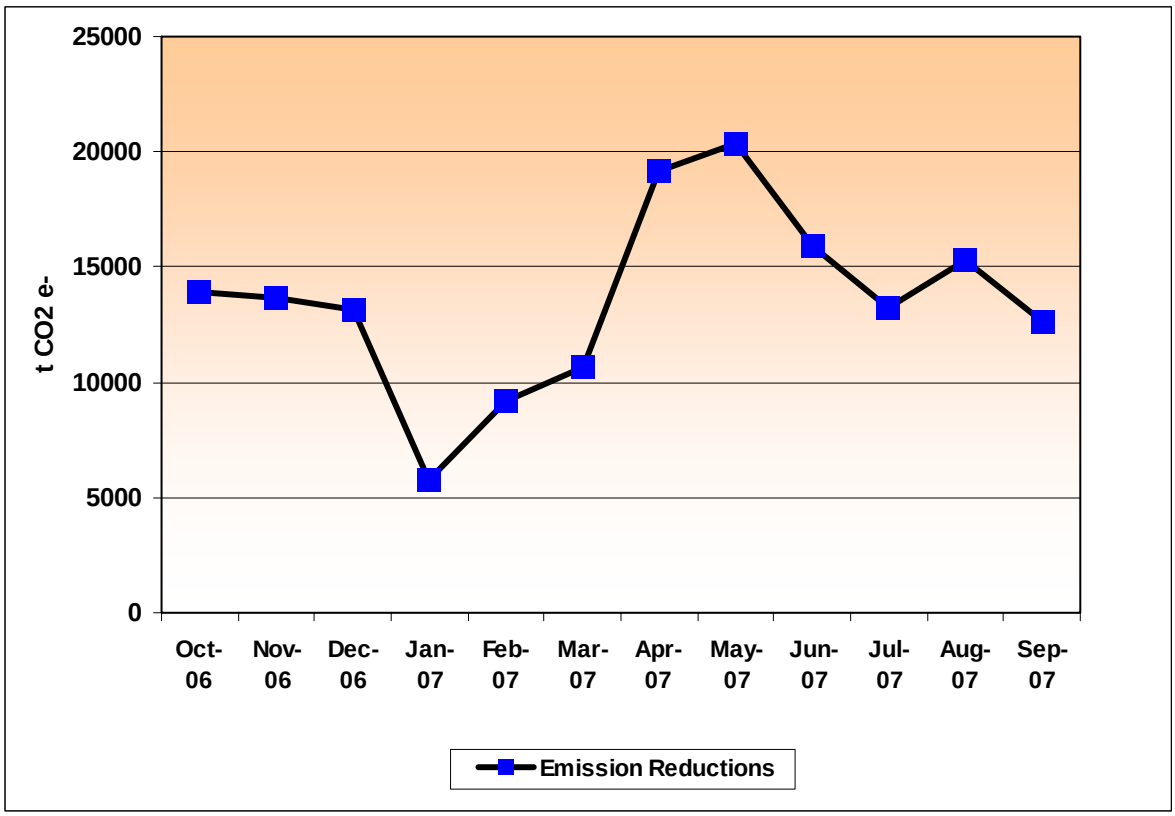


Fig 4.3.1 Graph showing Emission Reductions produced for this reporting period

Total emissions for 2007, estimated from baseline information, are 287 $ktCO_2$ equivalent emission reductions (see Table 4.3.2). Delays in the commissioning of the additional 22MW (nominal capacity) and shutdown periods for service and maintenance of equipment prevented the Project from achieving the estimated emission reductions.

Table 4.3.2 Total Estimated Emissions for the 10 Year Crediting Period

Total Estimated Emissions				
Year	**Installed Capacity**	**Annual Operating Hours**	**GWh**	**KtCO2/Year**
2006	**31.7**	**5333**	**169**	**115**
2007	**52.8**	**8000**	**422**	**287**
2008	**52.8**	**8000**	**422**	**287**
2009	**52.8**	**8000**	**422**	**287**
2010	**52.8**	**8000**	**422**	**287**
2011	**52.8**	**8000**	**422**	**287**
2012	**52.8**	**8000**	**422**	**287**
2013	**52.8**	**8000**	**422**	**287**
2014	**52.8**	**8000**	**422**	**287**
2015	**52.8**	**8000**	**422**	**287**
2016	**52.8**	**2667**	**141**	**96**

(*Source: CDM-PDD Version 02 pg39*)

4.4 Management and Storage of Data

Data for this monitoring period is collected daily as specified in the PDD and entered into a spreadsheet and stored on the company's common drive. As previously stated, LGL uses a tag database system known as PI for all monitoring meters used in process plant operations. Steam flow data is obtained via PI and entered into the spreadsheet. Power generation figures are entered into E6 by LGPP personnel and later extracted and entered in the CDM spreadsheet by the CDM monitoring officer. All data is summarised at the end of month and results submitted in the end-of-month report.

4.5 Supervision of the Quality of the Monitoring Process

End of month figures for CDM are submitted to the Environment Superintendent for review and stored on the Department common drive. Regular communication between the CDM monitoring officer and LGPP staff ensure changes in operating conditions are picked up and reported.

4.6 Issuance of Reports for Internal and External Verification

This report is issued to LGL's General Manager External Affairs and Sustainable Development, the Chief Financial Officer, and External Auditors. The results are summarised in LGL's Annual Environment Report.

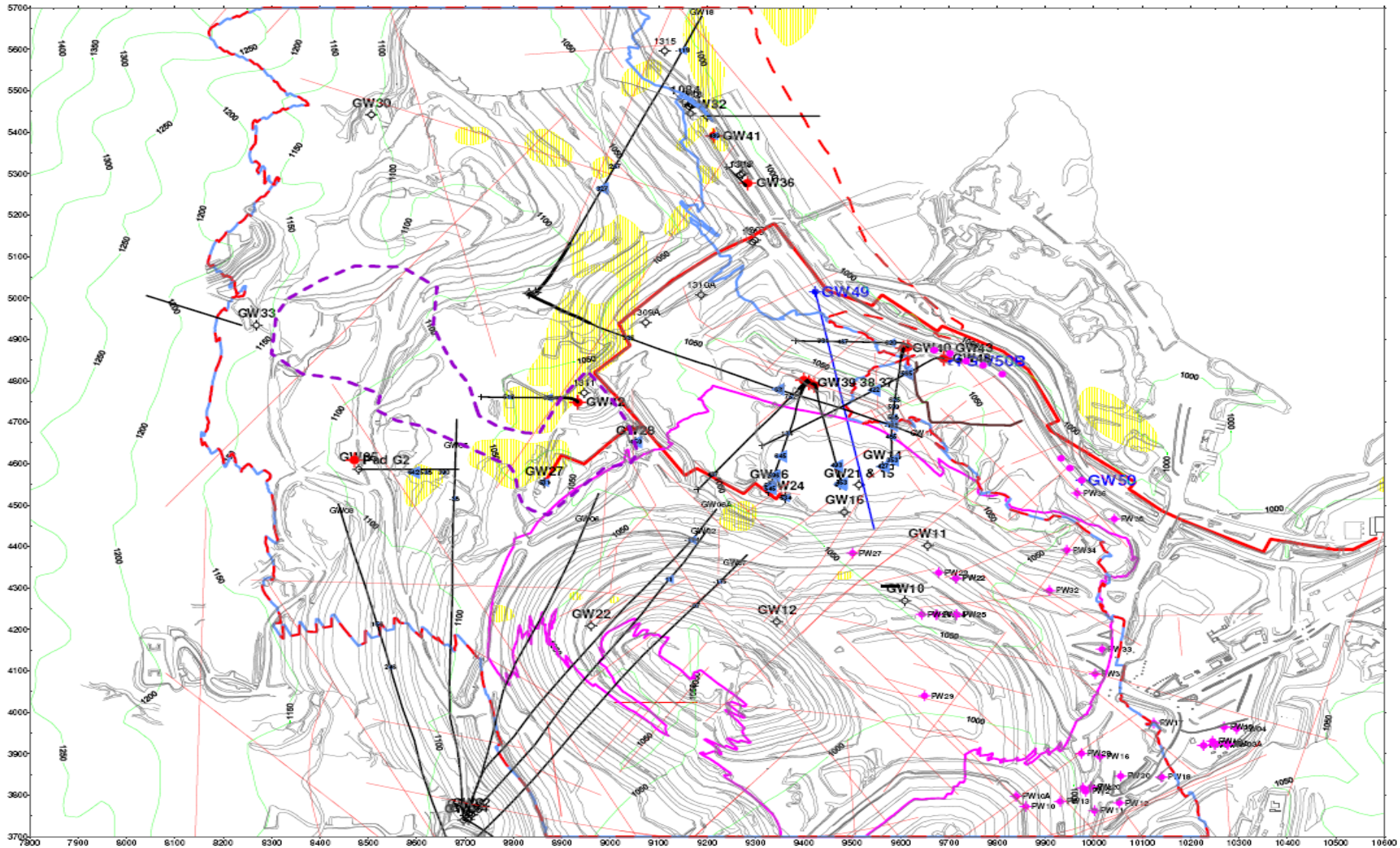
5 CONCLUSION

A large amount of monitoring data covering a spectrum of parameters associated with the generation of power from geothermal steam is presented in this report and is discussed frequently in light of previously reported data.

Data presented in this report provide evidence on the emission reductions generated by the Lihir Geothermal Power Plant.

6 REFERENCES

LGL 2006. CDM Monitoring Report. September 2006
UNFCCC 2005. CDM Project Design Document July 2005
SMEC 2006. Monitoring of CDM Project Proposal. March 2006
SMEC 2007. CDM Project Cycle and Issuance of CER's. January 2007



Map 1 – Geothermal Well Locations