



**Petroleum Production Licence No. 62 & 168
(Katnook & Ladbroke Grove Complex)**

Development Plan

and

2001 Operational Review

PPL62 & 168

**Otway Basin
South Australia**

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Environment Objectives and Assessment Criteria

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1 Abstract

Origin Energy Resources Limited ("Origin Energy") as Operator of PPL 62 & 168 (Figure 1) presents this Development Plan and 2001 Operational Review, on behalf of the PPL 62 & 168 Joint Ventures, to PIRSA.

The following reports were provided to PIRSA during the year.

Reports	Remarks
Monthly Report	Monthly production summaries and plant activities.
Quarterly Report	Quarterly cased hole activity reports.
Annual Report	2000 Development Plan & Operational Review.
EIR	Environmental Impact Report (draft)
SEO	Statement of Environmental Objectives (draft)
SEMP	Site Environment Management Plan
FFP	Fitness For Purpose Report

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2 Compliance With Petroleum ACT and Regulations 2000

From September 2000, the Katnook and Ladbroke Grove operations were operated in accordance with the Petroleum Act and Regulations 2000. Origin Energy Resources Limited has taken considerable effort to ensure that activities conducted under the licence during the year comply with the Petroleum Act and Regulations 2000.

Also, Origin has kept PIRSA informed of its activities via regulatory reporting in accordance with the new Regulations and also participated in frequent meetings with PIRSA.

A Fitness-for-Purpose Assessment was completed and submitted to the Department in 2001. Environmental Impact Report (EIR), Statement of Environmental Objective (SEO) and Site Environment Management Plan (SEMP) reports were completed and submitted to the department.

Procedures are now in place with regard to submission of all regulatory reports. A Regulatory Compliance Management System been developed in order to manage the regulatory reporting requirements as prescribed by the Regulations under the Petroleum Act 2000.

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3 Introduction

This document describes the operational activities associated with the Katnook Gas Plant, Ladbroke Grove Gas Plant and the related gas fields located 10 km South of Penola in the South East of South Australia.

Katnook, Haselgrove, Haselgrove South and Ladbroke Grove are located within the production licence PPL62 while Redman is within the production licence PPL168.

The Katnook field came on line from February 1991. The Katnook Gas plant processes gas via low temperature separation to achieve both hydrocarbon and water specifications. The recovered condensate is trucked to the Mobil Refinery in Adelaide.

The Katnook Complex total production at the end of December 2001 stands at 22.7 PJ.

The commissioning of the Ladbroke Grove facilities was completed in December 1999 and gas production commenced in January 2000. Ladbroke Grove gas is processed for removal of liquids through the Ladbroke Grove Gas Plant before being delivered to the Power Station.

The Ladbroke Grove Power Station has two LM 6000 gas turbines for electricity generation. Construction of the first turbine was completed in 1999, and construction of the second was completed in April 2000. Sweet gas from the Katnook plant is used to start the turbines.

Total production for Ladbroke Grove at the end of December 2001 is 9.4 PJ.

Sales gas production from PPL62 and PPL168 in South Australia supplies a regional gas market in the south east of South Australia. In 2002 this gas market is expected to be 2.8 PJ with the major consumer being the KCA paper mill at Snuggery.

High CO₂ gas is also produced from the Ladbroke Grove gas field in PPL62 for use in on-site power generation. Demand in 2002 is expected to be approximately 6. PJ.

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4 Safety

4.1 Safety Issues

No lost time or medical treatment injuries occurred during the year.

As a matter of routine inspection due to the high Carbon Dioxide content of the Ladbroke Grove gas the meter runs, chokes and XSV valves were stripped for erosion/corrosion evaluation in July 2001.

The result revealed corrosion on the bodies of the two flow control chokes to a point whereby control of flow was being reduced rapidly. The chokes were removed from service, stripped and refurbished as an interim measure until new chokes could be purchased. The XSV valves showed corrosion levels similar to the time of the previous check made on the valves. It was not evident by visual inspection and previous photographs that any further corrosion had taken effect. The wells were left with the original valves in place with a commitment to replace these as a part of an overall upgrading programme. Similarly the flowlines when inspected showed no progression of corrosion to any marked degree. Photographs were taken as a record. Thickness tests taken shortly after confirmed that there was no measurable metal loss from previous testing. Caliper surveys were conducted in the Ladbroke Grove wells in May 2001 with favourable results.

A fitness-for-purpose assessment was made during 2001 and is copied to all relevant locations with due presentation upon its' release.

A review of operations was conducted and from that survey a commitment was made during 2001 to carry out some upgrading of equipment as well as revisiting the records of 'as built' and control loops.

The review and consequent works will be preparation for, and be a lead into, the next phase of operations at Katnook which will incorporate the installation of compression. A fitness-for-purpose assessment was completed in 2001 in accordance with the new Petroleum Act. This involved a systematic approach in accordance with the principles of Qualitative Risk Assessment in order to ensure that all of the risks associated with Katnook/Ladbroke Grove were appropriately identified, managed and mitigated.

At the time of writing, no new foreseeable threats have arisen that have not been previously reported, or that are not normally associated with producing operations.

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4.2 Safety Management System

Four audits of the Katnook/Ladbroke Grove operations were undertaken in 2001.

- Workcover site inspection conducted in June 2001
- FFP(Fitness For Purpose) assessment was undertaken on 5 and 7 March 2001 and a report was issued in April 2001.
- IBIS an Origin internal safety audit was conducted in May 2001.
- PIRSA site visit was undertaken on 26 June 2001.

5 The Environment

5.1 Environmental Issues

One significant environmental incident occurred in 2001.

A condensate spill occurred in May 2001 prompting appropriate responses and actions as covered by separate reports.

An Origin Energy internal environmental audit of the Katnook and Ladbroke Grove Gas Plants was completed in 2001.

Origin Energy Resources Limited developed an interim Statement of Environmental Objectives, for the Production Operations, as required under the Petroleum Act and Regulations 2000, which was accepted by PIRSA.

The Statement of Environmental Objectives came into effect from October 2000, Origin has effectively worked to these objectives throughout 2001. An on site presentation of the current SEO was put forward by management.

A separate Site Environmental Management Plan was developed and presented in accordance with the EPA Licence requirements for the Katnook and Ladbroke Grove Gas Plants.

EPA site inspection was undertaken on 2 August 2001.

5.2 Compliance with SEO

The operation of Katnook and Ladbroke Grove Gas Plant complied with the assessment criteria described in the Production and Producing SEO.

Appendix 1 contains a detailed summary of the performance against objectives.

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6 Reserves

The following table summarises the field's initial and remaining reserves.

Field gas production to 31 December 2001 totals 32.12 PJ. The field total initial estimated 2P gas reserve is 76.9 PJ (refer to the following summary and the attached tables) with approximately 44.78 PJ remaining as at 31 December 2001 of which Ladbroke Grove gas reserves (high CO₂ gas) accounts for 22.57 PJ.

Fields	Total Initial Gas Reserves (PJ)	Total Gas Production @ 31 Dec 01 (PJ)	Total Remaining Gas Reserves @ 31 Dec 01 (PJ)	Reserves Classification
Katnook (PPL62)	23.80	13.97	9.83	2P
HG & HGS (PPL62)	14.00	6.32	7.68	2P
Redman (PPL68)	7.10	2.40	4.70	2P
Ladbroke Grove	32.00	9.43	22.57	
TOTAL	76.90	32.12	44.78	2P

A simulation study of Katnook, Haselgrove/Haselgrove South and Redman fields undertaken in 2000 is the basis for the field gas reserves and deliverability. The Ladbroke Grove field was evaluated using conventional classical material balance techniques.

Six static gradient surveys have been conducted in Ladbroke Grove 2 (2), Ladbroke Grove 3(2), Haselgrove 2 and Redman 1 during 2001.

Figures 2 to 5 show the well production performance.

6.1 Katnook Field (Initial=23.8 PJ, Rem=9.8 PJ)

A full field simulation study was carried out in 2000. Based on this study Katnook field estimated OGIP is 793.0 MMSCM from which 23.8 PJ is recoverable using a minimum compressor suction pressure of 1400.0 kpa.

6.2 Haselgrove/Haselgrove South Fields (Initial=14.0 PJ, Rem=7.7 PJ)

A full field simulation study was carried out in 2000. Based on this study the field estimated OGIP is 475.8 MMSCM of which 14.0 PJ is recoverable using a minimum compressor suction pressure of 1400.0 kpa.

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6.3 Redman Field (Initial=7.1 PJ, Rem=4.7 PJ) –PPL 168

A full field simulation study was carried out in 2000. Based on this study the Redman field estimated OGIP is 260.5 MMSCM from which 7.1 PJ is recoverable using a minimum compressor suction pressure of 1400.0 kpa.

6.4 Ladbroke Grove Field (Initial=32.0 PJ, Rem=22.6 PJ)

Volumetric mapping indicates that an original resource of 32 PJ was present within the Ladbroke Grove Structure. The volumetric calculations are consistent with the range of 25 to 37 PJ "seen" by Ladbroke Grove 2 during its production test. A pressure survey conducted at Ladbroke Grove 2 in December 2001 suggests a higher gas reserve may occur for this field. Another pressure survey is planned for mid-2002 to verify the reserves position.

7 Development Activities

7.1 Development activities in 2001

No development activities occurred in the PPLs during the year.

7.2 Development activities for 2002

Activities with respect to design, selection and procurement of Katnook compressor will be undertaken in 2002 in order to meet the second quarter 2003 planned compressor start-up date.

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8 Production

Production data sheets for the Katnook, Haselgrove/Haselgrove South, Redman and Ladbroke Grove reservoirs were forwarded to PIRSA on a monthly basis. Total production for 2001 were 269,173 MSCM (7,497 TJ) of gas and 5,874 KL of condensate.

Production was maintained throughout 2001 without interruption to customer supply.

Katnook 2, Katnook 3, Haselgrove South 1, Haselgrove 1, Ladbroke Grove 2 and Ladbroke Grove 3 were the primary producers throughout most of 2001 (Figure 6).

The Following table shows the monthly production figures for 2001.

2001 PRODUCTION FIGURES			
Month (2001)	Katnook Gas (TJ)	Ladbroke Grove (TJ)	Condensate (KL)
January	229	287	499
February	204	269	493
March	210	264	582
April	213	310	473
May	237	58	401
June	247	354	480
July	244	552	526
August	237	557	336
September	217	604	378
October	241	544	699
November	240	464	615
December	222	493	391
Total	2,741	4,756	5,874

8.1 Katnook

A total of 30,619 MSCM of raw gas, 1004 kl of condensate and 487 kl of water was produced from Katnook 2 and Katnook 3 in 2001.

Cumulative production from Katnook 2 and Katnook 3 at the end of 2001 was 361,304 MSCM of raw gas, 13,026 kl of condensate and 4,748 kl of water.

8.2 Haselgrove and Haselgrove South

A total of 39,867 MSCM of raw gas, 3,519 kl of condensate and 717kl of water were produced from the Haselgrove and Haselgrove South fields in 2001.

Cumulative production from Haselgrove and Haselgrove South at the end of 2001 was 164,927 MSCM of raw gas, 14,728 kl of condensate, and 2,524 kl of water.

8.3 Redman (PPL-168)

A total of 3 MSCM of raw gas, 16 kl of condensate and 2 kl of water were produced from Redman field in 2001.

Cumulative production from Redman Field at the end of 2001 was 61,547 MSCM of raw gas, 7,996 kL of condensate, and 825 kl of water.

8.4 Ladbroke Grove

A total of 198,684 MSCM of raw gas, 1,335 kl of condensate and 1,765 kl of water were produced from Ladbroke Grove field in 2001.

Cumulative production from Redman Field at the end of 2001 was 395,815 MSCM of raw gas, 2,800 kL of condensate, and 3,497 kl of water.

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8.5 Production Forecasts

The production forecasts for 2002 and 2003 presented in the following tables are provided as the “most likely” scenario. The forecasts reflect the continued growth demand in natural gas supply to the local south-east market. Kimberly-Clark continues to be the major gas consumer in the south east.

With respect to Ladbroke Grove both gas turbines are expected to run as base generators in 2002 and 2003.

PRODUCTION FORECAST FOR 2002

Month (2002)	Katnook Gas (TJ)	Ladbroke Grove (TJ)	Condensate (KL)
January	233	512	735
February	207	462	658
March	213	512	689
April	216	495	520
May	241	512	544
June	251	495	615
July	248	512	597
August	241	512	574
September	220	495	657
October	245	512	710
November	233	495	676
December	211	512	633
Total	2,759	6,026	7,607

PRODUCTION FORECAST FOR 2003

Month (2003)	Katnook Gas (TJ)	Ladbroke Grove (TJ)	Condensate (KL)
January	236	512	621
February	210	462	559
March	216	512	585
April	219	495	587
May	245	512	650
June	255	495	672
July	252	512	681
August	245	512	697
September	223	495	642
October	249	512	709
November	236	495	679
December	214	512	640
Total	2,800	6,026	7,722

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9 Surface Facilities

9.1 2001 Surface Activities

The sole significant construction activity for 2001 was the construction of a second evaporation pond to cater for the increased water production from the Ladbroke Grove wells.

Due to the corrosive nature of the Ladbroke Grove gas diligent monitoring of the production facilities has seen the need for some piping and control valve modifications.

Ladbroke Grove control chokes and ESD valves are to be replaced with all stainless corrosion resistant materials.

The corrosion inhibition programme is evidenced as effective by two corrosion thickness survey test results and a corrosion coupon survey result. Corrosion coupons throughout the Katnook and Ladbroke Grove fields are due to be pulled for inspection in April 2002.

Internal and external inspections on all due vessels were carried out during the year with favourable results.

PSV replacements were completed to comply with code to year 2006.

The Glycol Recovery Unit in the Katnook Gas Plant had a modification to its reflux column to improve the service of the unit and reduce maintenance frequency.

No other significant construction activities took place in 2001 either at the Katnook or Ladbroke Grove Gas Plants.

9.3 2002 Surface Activities

Activities under consideration for 2002 include:

- installation of stainless steel Ladbroke Grove control chokes and XSV valves.
- replacing evaporation pond No. 1
- a wellhead upgrade project to ensure all wells are available at any time.
- upgrading of SCADA system.

10 Reservoir and Downhole

10.1 Reservoir Management

Management of each fields gas production has been planned based on the following considerations.

- Safety and environmental considerations.
- Maximise gas recovery from the field.
- Reservoir considerations.
- Wellbore considerations.
- Contractual obligations and market requirements
- Plant constraints and operational considerations.
- Turbine operation and constraints (for high CO₂ gas)
- Field deliverability and production optimisation
- Data acquisition and field monitoring.
- Maximise condensate revenue.
- Availability of efficient back-up options.

The Pretty Hill reservoirs are highly compartmentalised and in order to maximise gas recovery and delay compression, it is necessary to program a depletion plan consistent with the behaviour of the compartmentalised reservoirs. High permeability compartments usually deplete first and one option to be considered is to shut in affected wells to allow them to be recharged from low permeability sands prior to resuming production. The compartmentalised characteristic of these fields is one of the main reservoir considerations in production management. A major factor with respect to compartmentalised reservoirs is the extent of the compartment and the degree of communication between them. This governs the accessibility of the wells to the field gas reserves. Another important reservoir consideration is the vertical variation of CO₂ found in the Ladbroke Grove Field.

Acquiring production information, monitoring the well head shut-in and flowing pressure and measuring the CO₂ level (for Ladbroke Grove) on a routine basis are essential for updating the field gas deliverability forecast and on going reservoir evaluation.

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10.2 Well Schedule

The following well schedules have been programmed to meet all the reservoir and operating considerations.

10.2.1 Sweet Gas Production

There are 6 sweet gas producers in PPL 62 & 168 with flow capacity ranging from 200 to 7000 md.ft. In accordance with the planned reservoir management, the required gas demand is currently supplied with only one or two wells. The wells have been periodically switched to maintain field deliverability. As the fields deplete and reservoir pressure declines, more wells will be put on production to achieve required production rates.

10.2.1.1 Katnook 2 & 3

The Katnook Field came on production from February 1991 to supply gas to the southeast market. Katnook was the only producing field in this area until end of May 1997 when the Haselgrove Field commenced production. Katnook 2 and 3 have been used as back up wells since May 1997. Figure 2 shows Katnook 2 and 3 production histories. The total gas production from Katnook 2 and 3 at the end of December 2001 is 79,934 MSCM and 281,370 MSCM respectively.

Katnook 2 and 3 are scheduled to supply 14% and 18% of the total gas demand in 2002 respectively.

10.2.1.2 Haselgrove 1

The total gas production from Haselgrove 1 at the end of December 2001 is 56,382 MSCM (Figure 3).

Haselgrove 1 is scheduled to supply 22% of the total gas demand in 2002.

10.2.1.3 Haselgrove 2

Due to poor well deliverability Haselgrove 2 was put on production for a short period in 2000 (Figure 3). The gas production from Haselgrove 2 totals 7,119 MSCM at the end of December 2001 .

Haselgrove 2 is planned to be shut-in during 2002.

10.2.1.4 Haselgrove South 1

Haselgrove South 1 is scheduled to supply 24% of the total gas demand in 2002 (Figure 3). The total gas production from Haselgrove South 1 at the end of 2001 stands at 101,426 MSCM.

10.2.1.5 Haselgrove South 2 (PEL32 – outside PPL62 boundary)

This well has a very low deliverability and it is planned to be used as an observation well (not connected). As shown in the Figure 3 the Haselgrove South 2 wellhead shut-in pressure has declined due to production from Haselgrove South 1.

10.2.1.6 Redman 1 (PPL 168)

This well was mainly shut-in during the year (Figure 4). The total gas production from Redman 1 at the end of December 2001 stands at 61,547 MSCM. The well is scheduled to supply 22% of the total gas demand in 2002.

10.2.2 High CO₂ Gas Production

10.2.2.1 Ladbroke Grove 2 &3

The Ladbroke Grove Field came on production from January 2000 to supply gas to the Ladbroke Grove power generation station. Ladbroke Grove 2 and 3 are high CO₂ gas producers. These wells have flow capacity of 10,000.0 and 4160.0 md.ft respectively. Figure 5 shows Ladbroke Grove 2 and 3 production performance for the past two years. The total gas production from Ladbroke Grove 2 and 3 to the end of December 2001 is 230,780 MSCM and 165,035 MSCM respectively.

Ladbroke Grove 2 and 3 are scheduled to supply 33% and 67% of the total gas demand in 2002 respectively

10.3 Wellbore Activities

10.3.1 Static Gradient Surveys

During 2001 the following static gradient surveys were conducted in the wells.

- Ladbroke Grove 2 on 1 May 2001.
- Redman 1 on 13 December 2001.
- Haselgrove 2 on 12 December 2001.
- Ladbroke Grove 2 on 12 December 2001.
- Ladbroke Grove 3 on 13 December 2001.

The results of these surveys will be incorporated in the 2001 reserves updates.

10.3.2 Kinley Caliper Surveys

The following caliper surveys were undertaken at the following wells.

- Ladbroke Grove 2 on 1 May 2001.
- Ladbroke Grove 3 on 2 May 2001.

10.4 2002 Wellbore Activities

Activities under consideration for 2002 include:

- caliper survey of tubing at Ladbroke Grove 2 and 3.
- static pressure surveys in Ladbroke Grove and other fields

11 Operations

The Katnook Gas Plant maintained its high level of reliability during 2001 with no unplanned outages being experienced. Further, no incidents that had the potential to escalate to an unplanned outage occurred.

Efforts were made to maximise condensate production by preferential production from the most liquids-rich fields (Redman and Haselgrove).

The Katnook Gas Plant was shutdown on one occasion. A shutdown on December 24 and 25 was undertaken to conduct minor maintenance, PSV changeouts and emergency shutdown system checks.

The Ladbroke Grove Gas Plant also achieved a high level of reliability during 2001. Whilst the plant is designed with effectively no redundancy, the unplanned downtime achieved was less than 0.5%, whilst planned downtime was also less than 1%.

The Ladbroke Grove Gas Plant was shutdown on one occasion for Origin Generation to carry out planned maintenance:

- During the shut-down the opportunity was taken to conduct vessels inspections, filter changes and minor maintenance.
- A function check of 'Cause and Effects' was carried out.
- All shut-down devices were tested

12 Corrosion Program

12.1 Katnook Facilities

Corrosion coupon analysis and dissolved iron count analysis suggested continued low internal corrosion levels.

12.2 All Facilities - External Corrosion

Monitoring of the Impressed Current cathodic protection system and sacrificial anode systems was again undertaken by Incospec and Associates during 2001. All systems were found to be operating effectively.

12.3 Ladbroke Grove Facilities – Internal Corrosion

A detailed Corrosion Monitoring and Management Plan for the Ladbroke Grove facilities has been in operation all year. Key elements of the plan include:

- daily checks of corrosion inhibitor injection rates
- ultrasonic thickness surveys
- corrosion coupon monitoring
- dissolved iron count analysis
- vessel inspection (more frequent than mandatory requirements)

APPENDIX 1

ENVIRONMENTAL OBJECTIVES AND ASSESSMENT CRITERIA

PERFORMANCE AGAINST OBJECTIVES

ENVIRONMENTAL OBJECTIVES - KATNOOK & LADBROKE GROVE FACILITIES AND WELLS

A Report on the Performance against Environmental Objectives for the year ended December 2001

The objectives of the Petroleum Act 2000, include:

- To minimise environmental damage from the activities involved in exploration for, or the recovery or commercial utilisation of, petroleum and other resources; and
- To protect the public and employees from risks inherent in regulated activities.

The broad objectives of the Origin Energy Resources Limited 'Statement of Environmental Objectives', derived from the Draft Environmental Impact Report (November 2001), are in keeping with the above objects of the Act, and are:

- To manage and facilitate rehabilitation of the impacts of regulated activities that have, or are likely to have, only short to moderate term adverse consequences on the biological diversity or cultural features of a region or on other land users.
- To avoid undertaking all regulated activities that have, or are likely to have, long term significant adverse consequences on the biological diversity or cultural features of a region or on other land users in accordance with the environmental objectives.

During the report period:

- The land area occupied by the gas plants, well sites, and pipelines has not changed
- A new evaporation pond was constructed within the existing plant area
- Activities associated with Katnook/Ladbroke Grove operation have not had an adverse impact on local or regional land users/use
- A bubble formed under the liner of evaporation pond #1, the integrity of the liner has been maintained
- A condensate spill occurred at the loadout bay as a consequence of a mechanical failure during loading
- Minor incidents occurred within the perimeter of the facility

In review, the stability and the simple processes at the site contributed to the negligible offsite impact. The new evaporation pond provided improved water handling capability.

There were several Objectives that were not 100% achieved:

Objective 6 - Analysis of pond water composition has been sporadic , and a condensate tanker spill that encroached outside the bunded area.

Objective 11 - Analysis of pond water composition has been sporadic, and a condensate tanker spill that encroached outside the bunded area.

Objective 13 - Analysis of pond water has been sporadic

As a consequence of not meeting these objectives, improvement actions have/will be implemented, these being:

- the condensate loadout procedures have been improved to better reflect conditions at the loadout facility (completed)
- regular analysis of pond water (half yearly basis) will be re-instigated (to be completed by March 31 2002).

A review of compliance with Objectives will be conducted in June 2002.

APPENDIX 1: ENVIRONMENTAL OBJECTIVES AND ASSESSMENT CRITERIA

OBJECTIVE	ASSESSMENT CRITERIA	Performance Against Objectives
1. Avoid disturbance to known sites of Aboriginal and European Heritage significance.	<ul style="list-style-type: none"> ▪ The plant site and access tracks scouted by appropriately trained and experienced personnel for sites of Aboriginal and European heritage significance before commencement of construction ▪ Records of scouting have been kept wherever possible from previous operators and those records which are available may be audited ▪ Any sites identified flagged and subsequently avoided ▪ Trained personnel used to identify and respond appropriately to sites discovered during operational activities ▪ Consultation with defined Aboriginal groups ▪ No prosecutions in relation to Aboriginal and European Cultural Heritage 	<ul style="list-style-type: none"> ▪ There are no known sites within the facilities areas and there have been no activity outside the facilities areas. Consequently there has not been a requirement for consultation and there have been no prosecutions. <p>Objective achieved</p>
2. Avoid disturbances that have long term impact on biological, cultural or agricultural values of a particular area.	<ul style="list-style-type: none"> ▪ No programme to expand the plant or construct new well sites will be carried out without the specific approval of the Minister and notifying the respective landowner(s) ▪ Appropriate studies and approvals in place ▪ Audit of any expansion outside existing plant area 	<ul style="list-style-type: none"> ▪ There has been no expansion outside the existing plant and well site areas. <p>Objective achieved</p>
3. Prevent the introduction and establishment of exotic weed species.	<ul style="list-style-type: none"> ▪ All vehicles and equipment from an area containing declared weeds, appropriately cleaned prior to entering the Otway Basin/ Penola district. ▪ Washdown carried out in accordance with specified Company procedures and accepted practices. ▪ Records of vehicle and equipment washdown are kept and available for auditing. ▪ Introduction of declared weed species as a consequence of industry activities are eliminated. 	<ul style="list-style-type: none"> ▪ No vehicles recognised as potentially introducing exotic weed species were admitted into the gas plant and well yards. ▪ Existing vehicles local, consequently, wash-downs were not required ▪ No changes in grass or plant types within plant and well yard areas were observed <p>Objective achieved</p>

OBJECTIVE	ASSESSMENT CRITERIA	Performance Against Objectives
4. Minimise impacts to soil and grazing capacity of farm land.	<ul style="list-style-type: none"> ▪ Hazardous material stored, used and disposed of in accordance with relevant legislation on dangerous substances ▪ The landowner informed of procedures and confirms satisfaction about rehabilitation of the soil ▪ Pipeline construction and operation to be in accordance with AS2885 ▪ Topsoil stockpiled if removed ▪ Any significant spill site rehabilitated and monitored to ensure no long term contamination of soil or groundwater ▪ Use of local materials where possible ▪ On rehabilitation of sites removal of foreign soils as far as practicable 	<ul style="list-style-type: none"> ▪ Hazardous materials are stored in appropriate areas ▪ All activity has been confined within the fenced areas and roads ▪ There has been no offsite spill ▪ No impact to soil or grazing capacity of farmland <p>Objective achieved</p>
5. Minimise unavoidable loss of reservoir and aquifer pressures and contamination of freshwater aquifers.	<p><u>Producing Wells</u></p> <ul style="list-style-type: none"> ▪ Casing design (including setting depths) have, at the time of drilling, been carried out in accordance with Company defined procedures which satisfy worst case expected loads and environmental conditions determined for the particular well ▪ Monitoring programs, carried out in accordance with Company approved procedure(s), demonstrate no crossflow or fluid migration occurring behind casing. ▪ Casing integrity and corrosion monitoring programs, carried out in accordance with Company approved procedure(s), show adequate casing condition to satisfy the objective ▪ Reduction in reservoir pressure as a natural consequence of production will be monitored in accordance with good industry practice, pressure known <p><u>Plant Operation</u></p> <ul style="list-style-type: none"> ▪ Formation water evaporation pond lined with impervious layer to protect the underlying limestone aquifer, liner intact 	<p>Well Monitoring</p> <ul style="list-style-type: none"> ▪ Weekly monitoring of tubing and production casing pressure was carried out every Sunday. ▪ Half yearly monitoring of intermediate casing pressure was carried out in September and December 2001. <p>Well Inspection & services Carried out by Expertest (Service Company) in September 2001.</p> <ul style="list-style-type: none"> ▪ Monitoring tubing, production casing, intermediate casing and surface casing pressure. ▪ Function test valves and check for obstruction ▪ Test wellhead seals ▪ Top up surface casing with corrosion inhibitor and perform pressure test ▪ Top up intermediate and production casing with corrosion inhibitor and perform pressure test ▪ Inspect wellhead flanges <p>Caliper Survey</p> <ul style="list-style-type: none"> ▪ Caliper survey was conducted at Ladbroke Grove 2 and

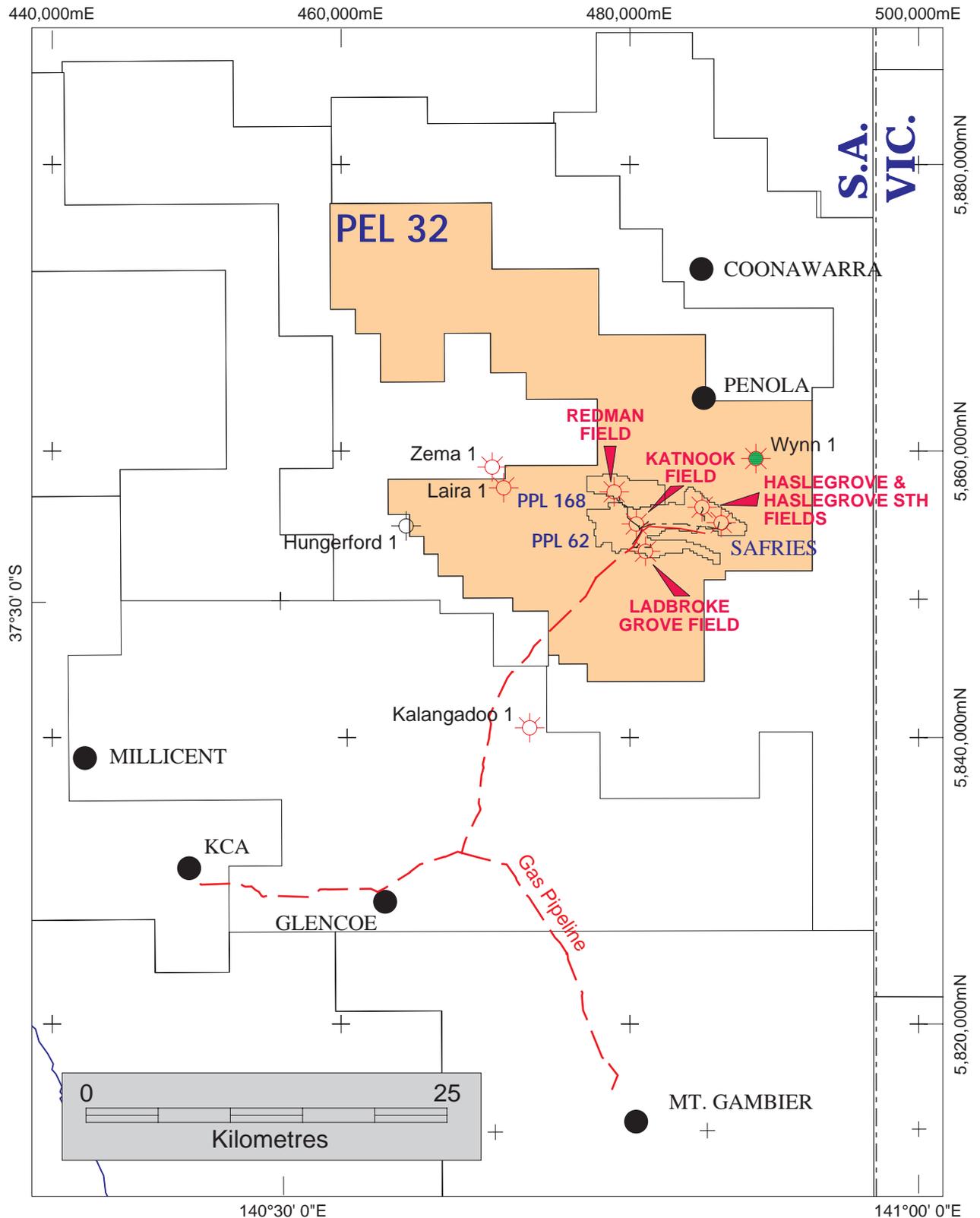
OBJECTIVE	ASSESSMENT CRITERIA	Performance Against Objectives
	<ul style="list-style-type: none"> ▪ Monitoring for possible leakage carried out on a regular basis according to Company approved procedures ▪ Manage pond water level ▪ Investigate any detected leaks <p><u>Inactive Wells</u></p> <p>In the case where a well is suspended for a prolonged period of time:</p> <ul style="list-style-type: none"> ▪ Monitoring methods for detecting fluid migration, carried out in accordance with Company approved procedures, are in place and show no fluid migration 	<p>3 in May 2001.</p> <p>Plant operations</p> <ul style="list-style-type: none"> ▪ The containment of produced water into lined evaporation ponds is continued ▪ No leaks have been detected in the pond liners ▪ Pond #1 liner has developed a “bubble” which has displaced some capacity of the pond, however the liner’s integrity remains intact. A plan is being implemented to remove the ‘bubble’. <p>Objectives achieved</p>
<p>6. Minimise Impact on Surface Water by contaminants.</p>	<ul style="list-style-type: none"> ▪ Water production monitored closely during periods of heavy rainfall and consequent threat of pond overflow, number of overflow events ▪ Evaporation ponds monitored regularly, especially over winter and consequent periods of low evaporation, number of overflow events ▪ Contingency plans for “100 year rainfall event” ▪ Regular monitoring of evaporation pond fluid composition so that effects of a possible spill may be anticipated and ameliorated. ▪ <i>In situ</i> treatment of pond water should pH vary from neutral ▪ <i>Any spill of product/chemical within bunds</i> 	<ul style="list-style-type: none"> ▪ There have been no pond overflow events during the year ▪ Monitoring of pond water composition has been sporadic ▪ Rainfall events have been such that there has not been a runoff stream from the site ▪ There has been one significant spill (tanker overflow see Objectives 11) that encroached outside bunded area. <p>Objective 70% achieved</p>
<p>7. Minimise visual and audible impact on the surrounding landscape.</p>	<ul style="list-style-type: none"> ▪ Establish consultation with landowners regarding visual impact of the two plants. New metallic fittings are likely to be conspicuous but will dull with exposure to the atmosphere ▪ Noise emissions from the two gas plants are acceptable to the landowner; number of complaints received to date - nil ▪ Plant operations regulated so that procedures likely to cause noise are not conducted at night 	<ul style="list-style-type: none"> ▪ There have been no recorded complaints about noise from the facilities and gas wells. <p>Objective achieved</p>

OBJECTIVE	ASSESSMENT CRITERIA	Performance Against Objectives
<p>8. Minimise risks to the safety of the public and other third parties.</p>	<p><u>Producing Wells</u></p> <ul style="list-style-type: none"> ▪ Pipelines to be constructed and operated in accordance with AS 2885 to control corrosion of pipe and fittings ▪ Adequate fencing, signage and precautions taken for warning third parties of the potential danger and to keep away from producing or suspended wells ▪ Casing integrity and corrosion monitoring programs, carried out in accordance with the Company approved procedure(s), show adequate casing condition to satisfy the objective ▪ Origin management systems are in place to maintain the integrity of the gas plant and minimise the likelihood of any serious incident ▪ Effective Emergency Response Plan and procedures are in place in the event of a serious incident in the gas or generating plant ▪ Hazardous material stored, used and disposed of in accordance with relevant legislation on dangerous substances for occupational, health and safety ▪ MSDS information readily accessible on site <p><u>Vehicular Movements</u></p> <ul style="list-style-type: none"> ▪ Drivers aware of risks of intersections ▪ Number of vehicle incidents <p>Periods of increased activity within the rural community to be flagged and supply companies requested to schedule deliveries at alternative times</p>	<ul style="list-style-type: none"> ▪ Status of pipelines has not changed ▪ Appropriate fencing and signs maintained ▪ Downhole well monitoring programmes conducted (see Objective 5) ▪ Vessel inspections and relief valve inspections and re-certifications conducted ▪ Emergency Response plan updated to reflect changes ▪ Hazardous materials stored appropriately ▪ MSDS information up to date <p>Objective achieved</p> <ul style="list-style-type: none"> ▪ There were no reported vehicle incidents involving the public and other third parties. <p>Objective achieved</p>
<p>9. Minimise impact on the environment of gaseous emissions and wastewater handling and disposal.</p>	<ul style="list-style-type: none"> ▪ All emissions meet standards imposed by EPA licence conditions. ▪ All wastes generated on site (except sewage) to be disposed at an EPA licensed facility. 	<ul style="list-style-type: none"> ▪ EPA licence conditions met ▪ Emissions reported through the National Pollution Inventory ▪ Wastes have been disposed of appropriately <p>Objective achieved</p>

OBJECTIVE	ASSESSMENT CRITERIA	Performance Against Objectives
10. Avoid adverse impacts on livestock.	<ul style="list-style-type: none"> ▪ Defined policy relating to use of motor vehicles on country roads and access tracks. Policy specifies acceptable speeds when near stock and emphasise that stock may become complacent when familiar with vehicle movements ▪ All above ground equipment fenced off where practicable ▪ Perimeter fencing around the plant and evaporation ponds intact ▪ In the case of a producing well, the well cellar, rat hole and mouse hole are made safe for livestock either through appropriate covering or fencing ▪ Pipelines constructed and operated in accordance with AS 2885 	<p>There were no recorded incidents involving live stock</p> <p>Objective achieved</p>
11. Avoid spills of produced water, oil or hazardous material outside of impermeable sumps or other areas designed to contain such spills.	<ul style="list-style-type: none"> ▪ MSDS information readily accessible at plants ▪ Conduct and record analyses of evaporation pond fluids ▪ Cumulative number and volume of spills at any point in time during the year is less than the cumulative spills for the same period from the previous year and a general declining trend in number and volume of spills over the long term ▪ Thorough review of the cause of the spill to prevent such an incident re-occurring 	<ul style="list-style-type: none"> ▪ MSDS information is up to date and available ▪ Analysis of pond water composition has been sporadic ▪ Condensate spill occurred early in the year (see Objective 13) ▪ Cause of spill has been investigated and prevention improvements implemented <p>Objective 50% achieved</p>
12. In the event of an oil spill or overflow from bunded evaporation ponds, minimise the impacts on fauna, flora, soil, livestock and surface and ground water.	<ul style="list-style-type: none"> ▪ In the event of an oil spill, contingency plan implemented after the spill event ▪ Results of emergency response procedures carried out in accord with Regulation 31 show that oil spill contingency plan in place in the event of a spill is adequate and any necessary remedial action needed to the plan is undertaken promptly by the licensee 	<ul style="list-style-type: none"> ▪ One condensate spill at the load-out bay occurred early in the year, contingency plans were implemented, appropriate authorities notified, investigation conducted, results conveyed to authorities, improvement programme implemented, clean up implemented. <p>Objective achieved</p>
13. Minimise the risk of initiation and/or propagation of fire	<ul style="list-style-type: none"> ▪ The Plant Emergency Response Plan includes a section for the safety of plant personnel should a fire approach, or be initiated within, the plant. 	<ul style="list-style-type: none"> ▪ No incidents relating to fire occurred ▪ Contact maintained with Country fire services ▪ Fire fighting equipment ready

OBJECTIVE	ASSESSMENT CRITERIA	Performance Against Objectives
	<ul style="list-style-type: none"> ▪ Adopt aggressive procedures to minimise risk of initiating and propagating fire at all times. Welding and grinding are regarded as high risk activities that should be avoided wherever possible and deferred or curtailed until weather conditions are suitable. ▪ Fuel stores are monitored and equipped with extinguishers. ▪ Clearly define the risks of fire to staff and transport drivers and plan to minimise or eliminate heavy vehicle movements on defined high risk days. ▪ Maintain contact with the local Country Fire Service in order to keep roads clear during episodes of fire and predict their likely movements. ▪ Maintain pumps and a water supply in readiness during periods of high fire danger. Inform the CFS that a volume of water in the evaporation pond is suitable for high extraction rates should it be required in an emergency. Up to date chemical analyses are available to confirm negligible toxicity and harm to the environment. 	<ul style="list-style-type: none"> ▪ Chemical analysis of pond water has not been kept up to date <p>Objective 95% achieved</p>
<p>14. To maintain a current Emergency Response Plan that addresses both Environmental and Safety emergencies</p>	<ul style="list-style-type: none"> ▪ Emergency Response Plan contains correct communications and responsibilities ▪ Addresses hazard events identified in the EIR <p>Reviewed at least every 12 months or when significant administration or hazard events identified</p>	<ul style="list-style-type: none"> ▪ Emergency Response Plan has been updated to reflect changes in responsibility and communication. ▪ Critical Hazard identified in the EIR are being addressed <p>Objective achieved</p>
<p>15. Minimise risk to security of supply</p>	<ul style="list-style-type: none"> ▪ . Supply of product conducted per sales contact requirements 	<ul style="list-style-type: none"> ▪ Sales contracts met during the report year <p>Objective achieved</p>

PPL 62 LOCATION MAP



PEL 32-PPL62/168 JOINT VENTURE PARTICIPANTS

Origin Energy Resources Ltd. (OP)	75.7%
Australian Worldwide Exploration (AWE)	24.3%

KATNOOK 2&3

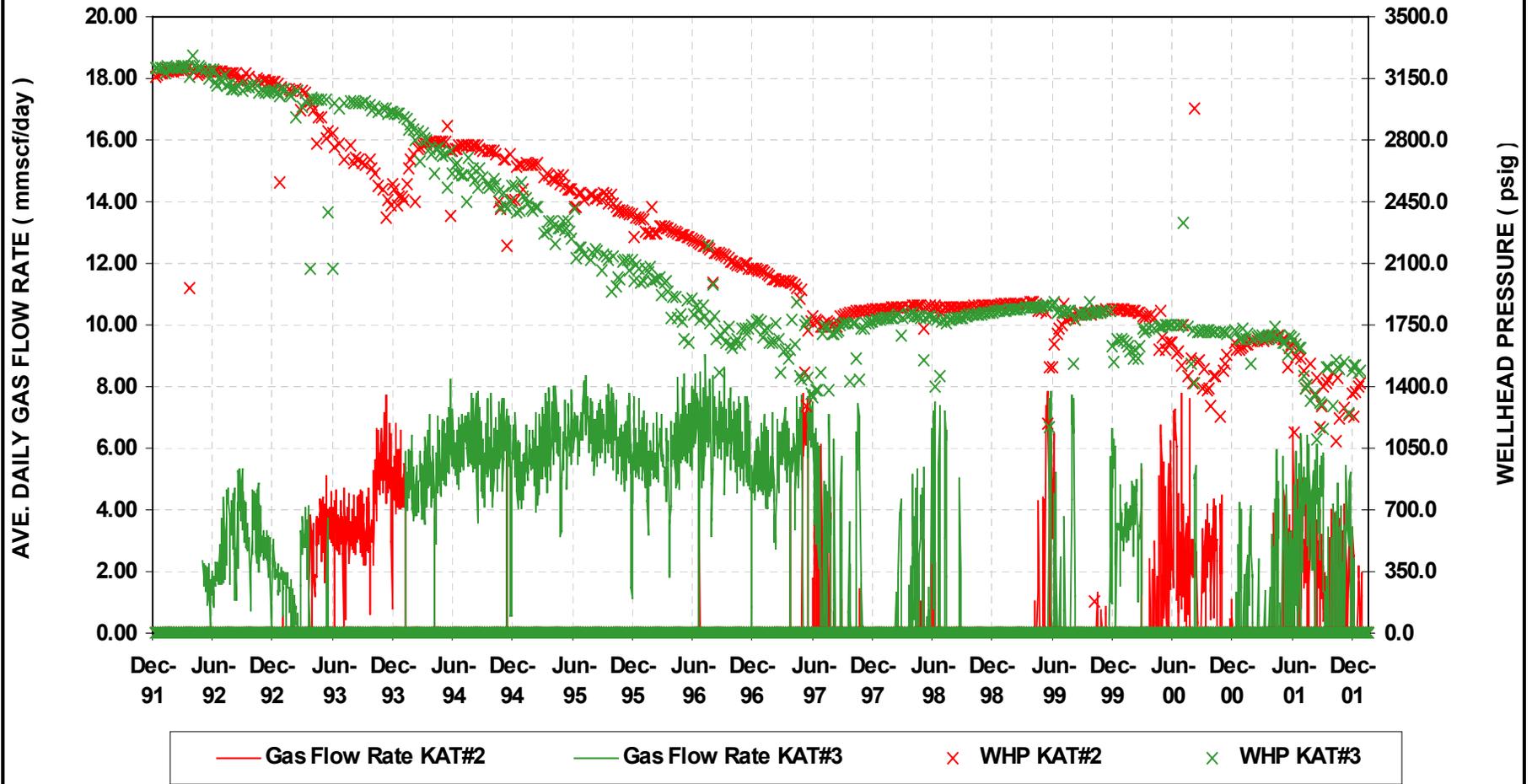


Figure 2

HASELGROVE / HASELGROVE SOUTH

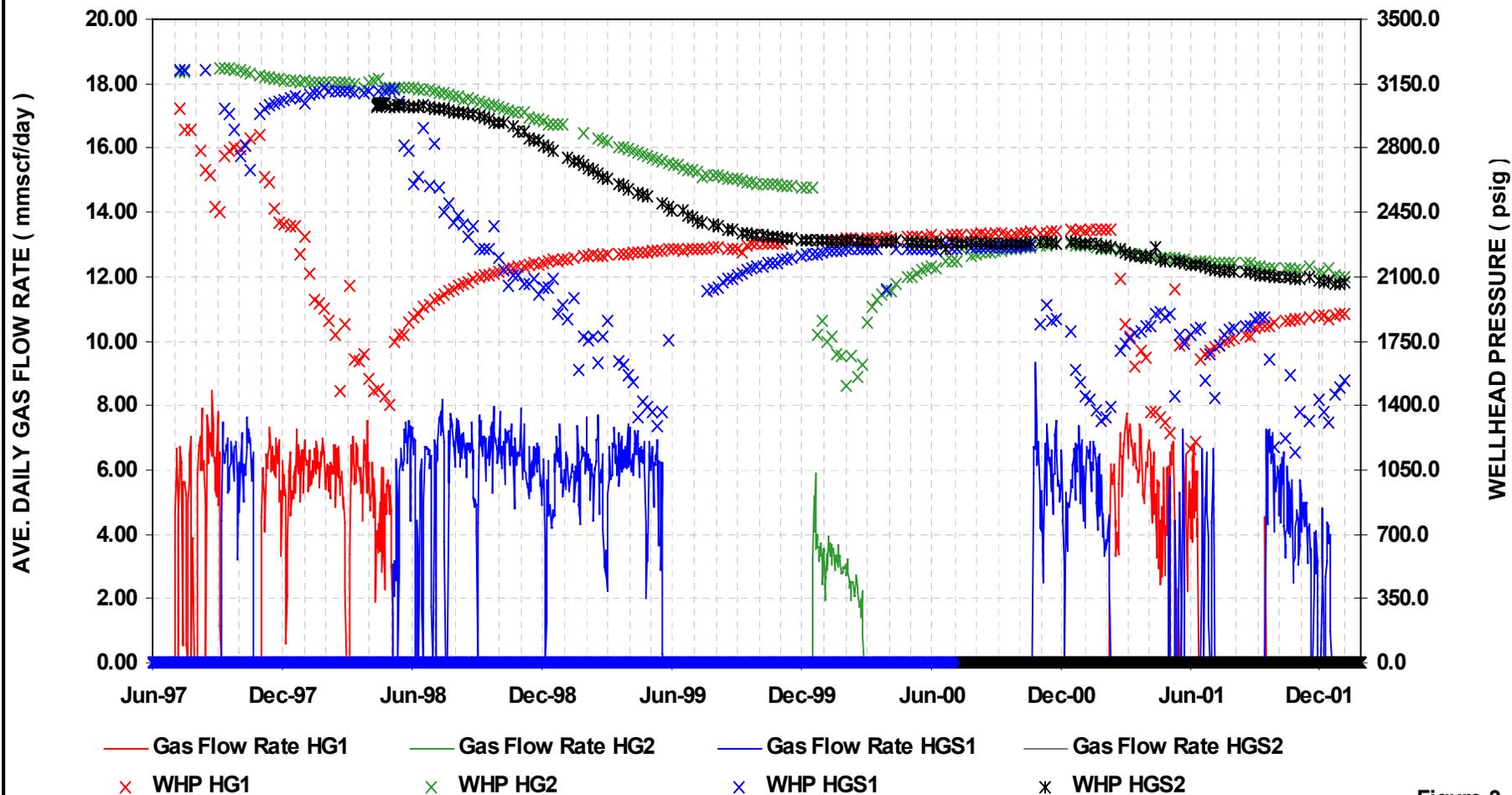


Figure 3

REDMAN 1

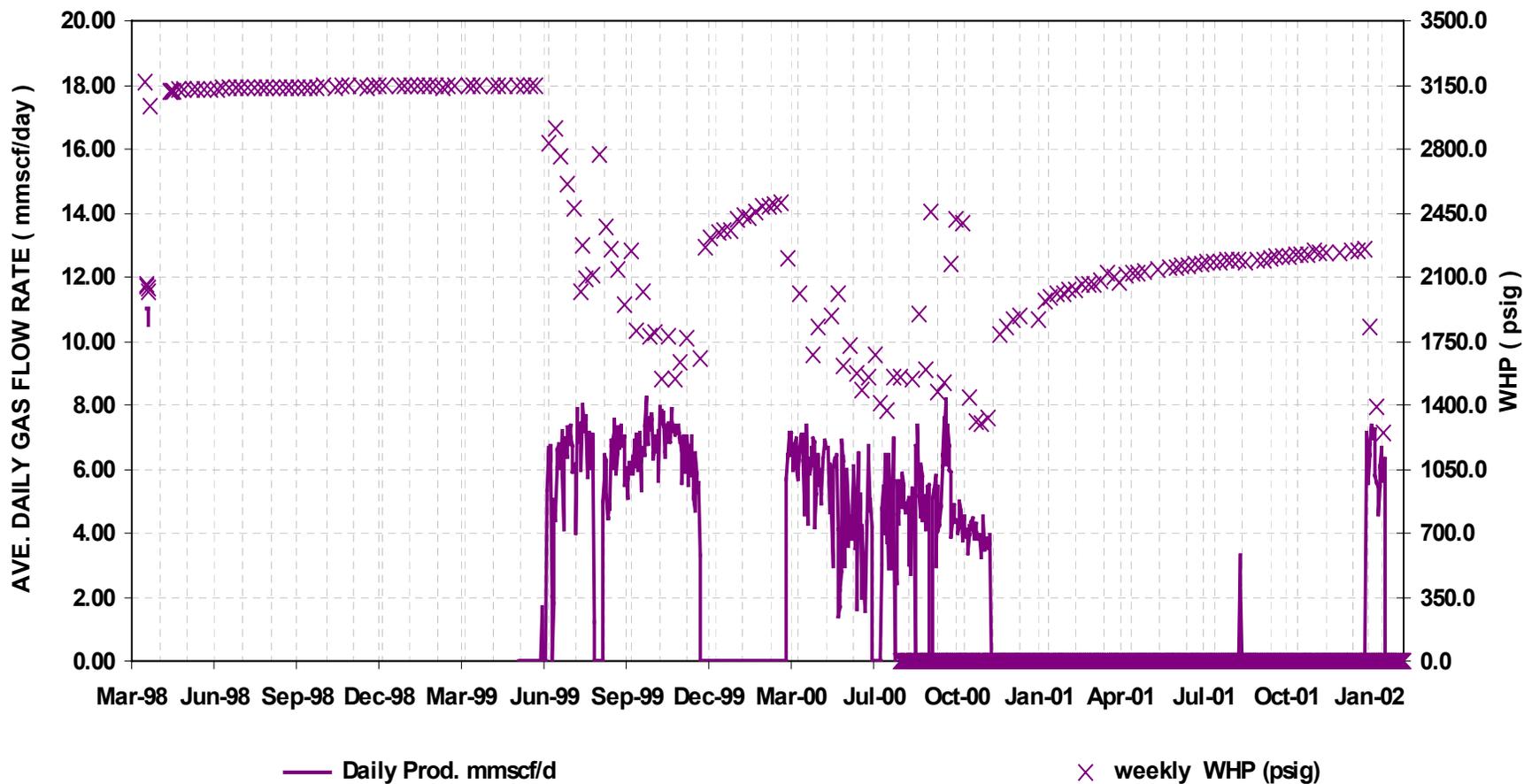


Figure 4

LADBROKE GROVE FIELD

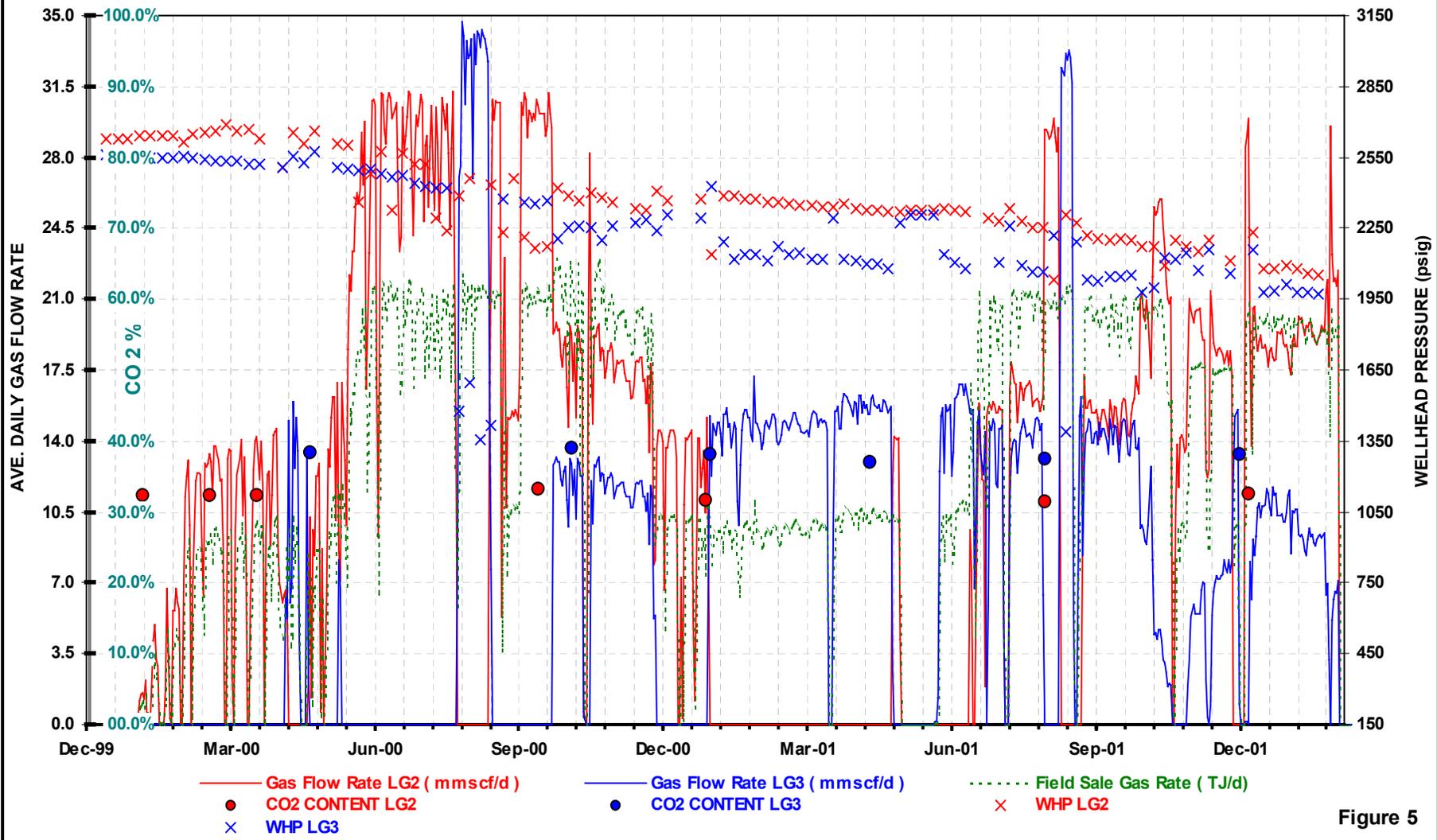


Figure 5

WELL PRODUCTION RATES

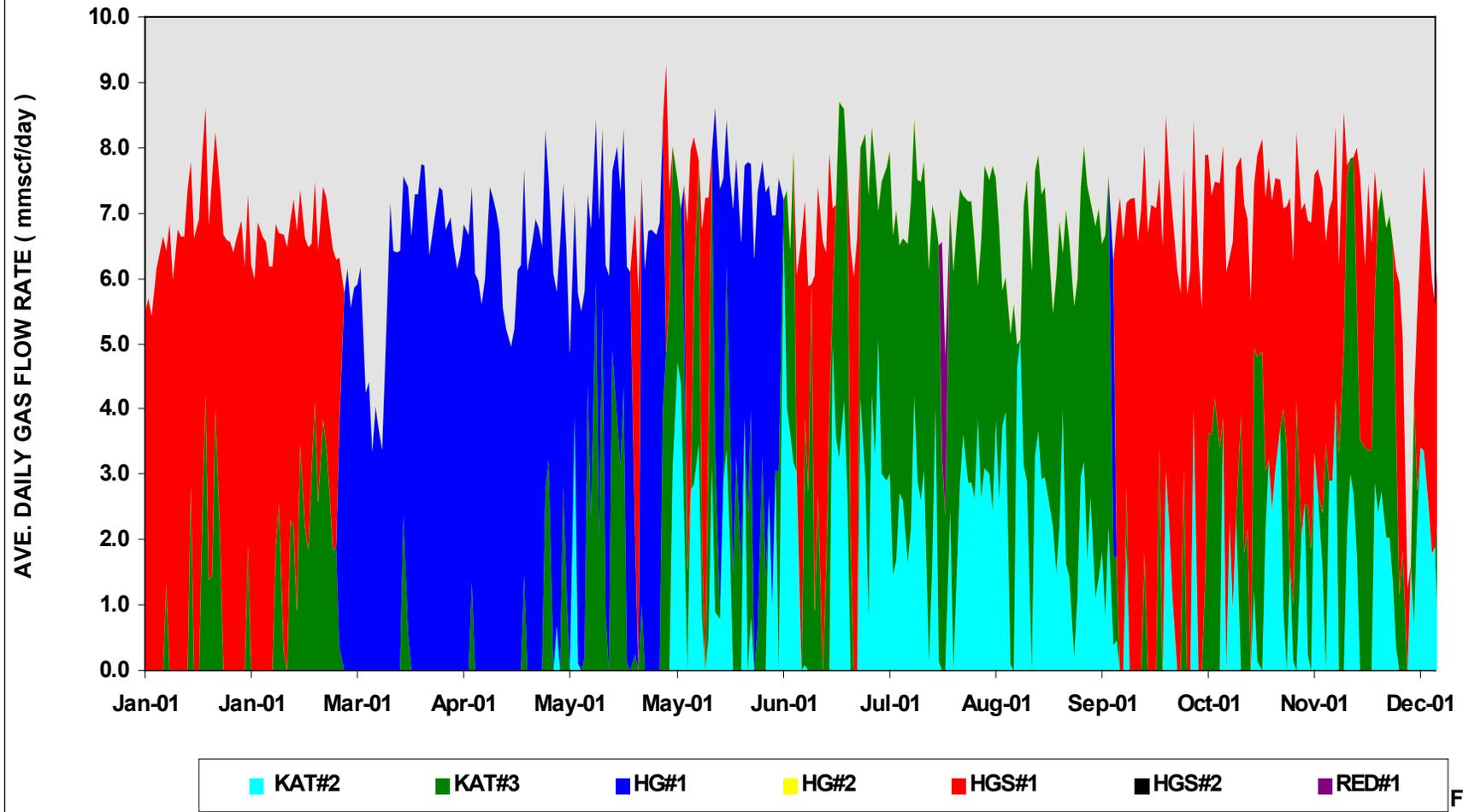


Figure 6