



Air Quality Results for a Proposed Coal Sulfur Option May 2008

Addendum to

**Coal Sulfur Levels on the Central Coast – Air Quality
Management Options
November 2007**

Michael Rae¹
William Lilley¹
Hugh Malfroy²
ET/IR 1039

¹CSIRO Energy Technology
²Malfroy Environmental Strategies

Commercial-in-confidence

Enquiries should be addressed to:
William Lilley
CSIRO Energy Centre
10 Murray Dwyer Cct
Steel River Estate
Mayfield West, 2304.

Copyright and Disclaimer

© 2008 CSIRO To the extent permitted by law, all rights are reserved and no part of this publication covered by copyright may be reproduced or copied in any form or by any means except with the written permission of CSIRO.

Important Disclaimer

CSIRO advises that the information contained in this publication comprises general statements based on scientific research. The reader is advised and needs to be aware that such information may be incomplete or unable to be used in any specific situation. No reliance or actions must therefore be made on that information without seeking prior expert professional, scientific and technical advice. To the extent permitted by law, CSIRO (including its employees and consultants) excludes all liability to any person for any consequences, including but not limited to all losses, damages, costs, expenses and any other compensation, arising directly or indirectly from using this publication (in part or in whole) and any information or material contained in it.

CONTENTS

- 1. INTRODUCTION..... 1**
- 2. EMISSIONS 1**
- 3. MODELLING RESULTS 2**
 - 3.1 Annual averages 2**
 - 3.2 Maximum 24 hour Averages..... 5**
 - 3.3 Hourly Averages..... 11**
 - 3.3.1 First highest hourly average 11**
 - 3.3.2 Ninth Highest Hourly Average concentrations 14**
 - 3.4 Days and hours exceeding 20pphm 17**
 - 3.5 Ten minute average 24**
 - 3.5.1 10min first highest concentrations 25**
 - 3.5.2 10min Exceedances 25pphm 28**
 - 3.6 Individual power station contributions to elevated predictions 31**

1. INTRODUCTION

This report is an addendum to the previous report completed in November 2007 (Rae et al. 2007), which examined potential air quality impacts with the three Central Coast power stations operating with coals of varying sulfur content. The current work examines the potential impacts for coal supply scenarios proposed by Delta Electricity.

The reader is referred to the previous report sections 2 and 3 for details on model set-up, including meteorological input and power station characteristics.

2. EMISSIONS

Previously hourly SO₂ emissions from the three power stations in the Central Coast region were modelled at full load for the years 2001 to 2006 using existing, regulated coal sulfur levels.

In this study the results from the modelled results at existing regulated sulfur contents have been scaled through post processing to provide results for the proposed coal sulfur contents as shown below:

Table 2.1 Existing and Proposed Coal Sulfur levels

Power Station	Coal sulfur content %		
	Existing	Proposed 0.7%	Proposed 0.75%
Vales Point	0.5	0.7	0.75
Munmorah	1.0	0.7	0.75
Eraring	0.5	0.5	0.5

3. MODELLING RESULTS

Section 3 provides modelling results for the proposed cases. As requested by the client only data are provided. Analysis and option development is to be provided to Delta Electricity by Malfroy Environmental Strategies.

3.1 Annual averages

For reference in the following report the current NEPM ambient standard for SO₂ is 2pphm annual, 8pphm 24hr average and 20pphm hourly. In addition the WHO goal for 10 minute peak is 25pphm.

Table 3.1: Domain wide statistics for annual averages (pphm) for the Central Coast region

2001	Ave	Stdev	Max	Min
PROPOSED 0.7%	0.13	0.06	0.27	0.04
PROPOSED 0.75%	0.14	0.06	0.27	0.04
CURRENT	0.14	0.06	0.27	0.04
2002	Ave	Stdev	Max	Min
PROPOSED 0.7%	0.15	0.07	0.33	0.03
PROPOSED 0.75%	0.16	0.08	0.34	0.03
CURRENT	0.16	0.07	0.33	0.03
2003	Ave	Stdev	Max	Min
PROPOSED 0.7%	0.14	0.07	0.36	0.03
PROPOSED 0.75%	0.15	0.07	0.37	0.03
CURRENT	0.15	0.07	0.37	0.03
2004	Ave	Stdev	Max	Min
PROPOSED 0.7%	0.15	0.06	0.26	0.03
PROPOSED 0.75%	0.15	0.06	0.27	0.04
CURRENT	0.15	0.05	0.26	0.04
2005	Ave	Stdev	Max	Min
PROPOSED 0.7%	0.13	0.05	0.27	0.04
PROPOSED 0.75%	0.14	0.06	0.27	0.04
CURRENT	0.14	0.05	0.27	0.04
2006	Ave	Stdev	Max	Min
PROPOSED 0.7%	0.13	0.06	0.31	0.02
PROPOSED 0.75%	0.14	0.06	0.32	0.02
CURRENT	0.14	0.06	0.32	0.02

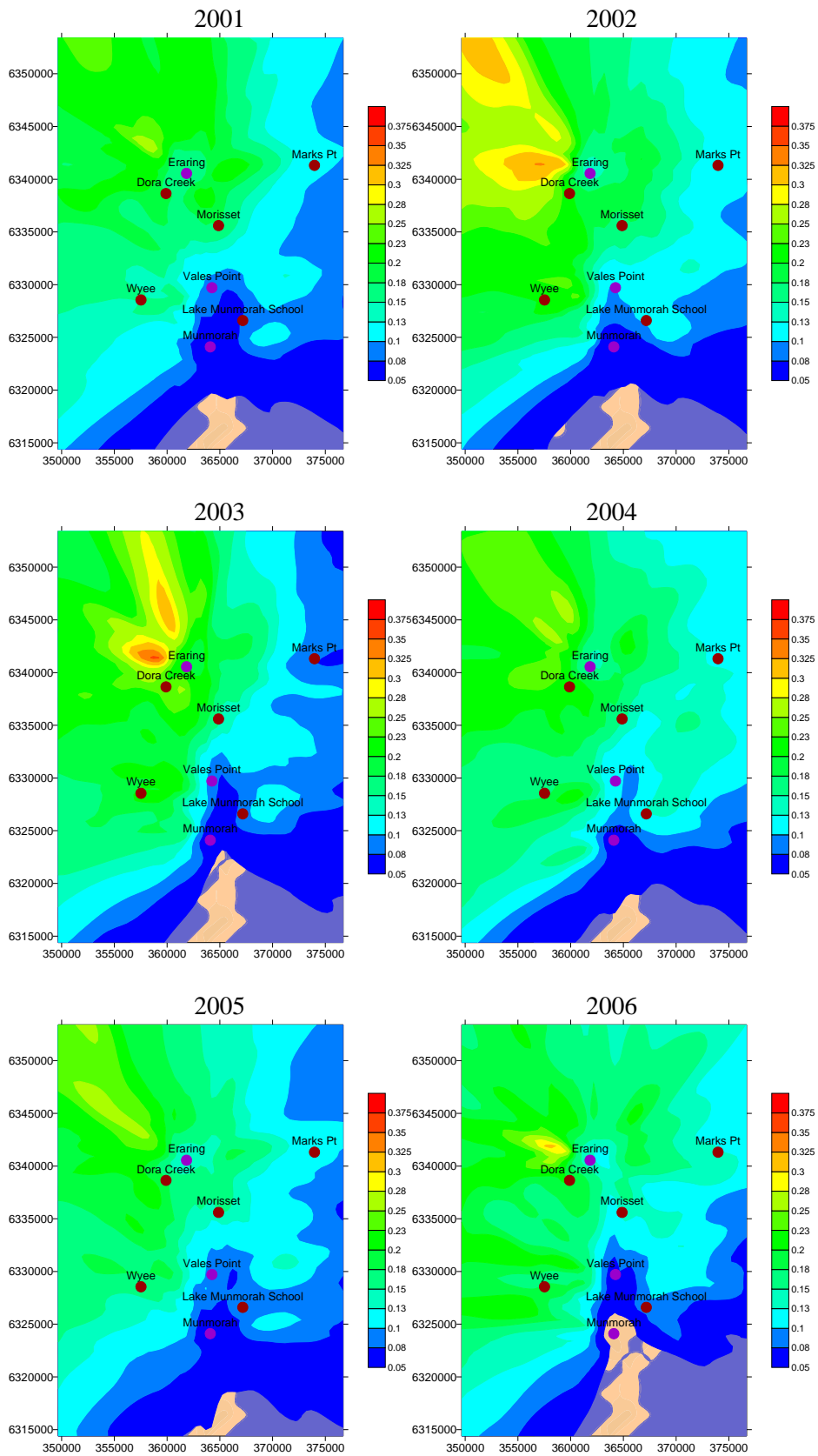


Figure 3.1a. Domain wide annual average concentrations for full load conditions (pphm) with proposed coal sulfur content of 0.7%

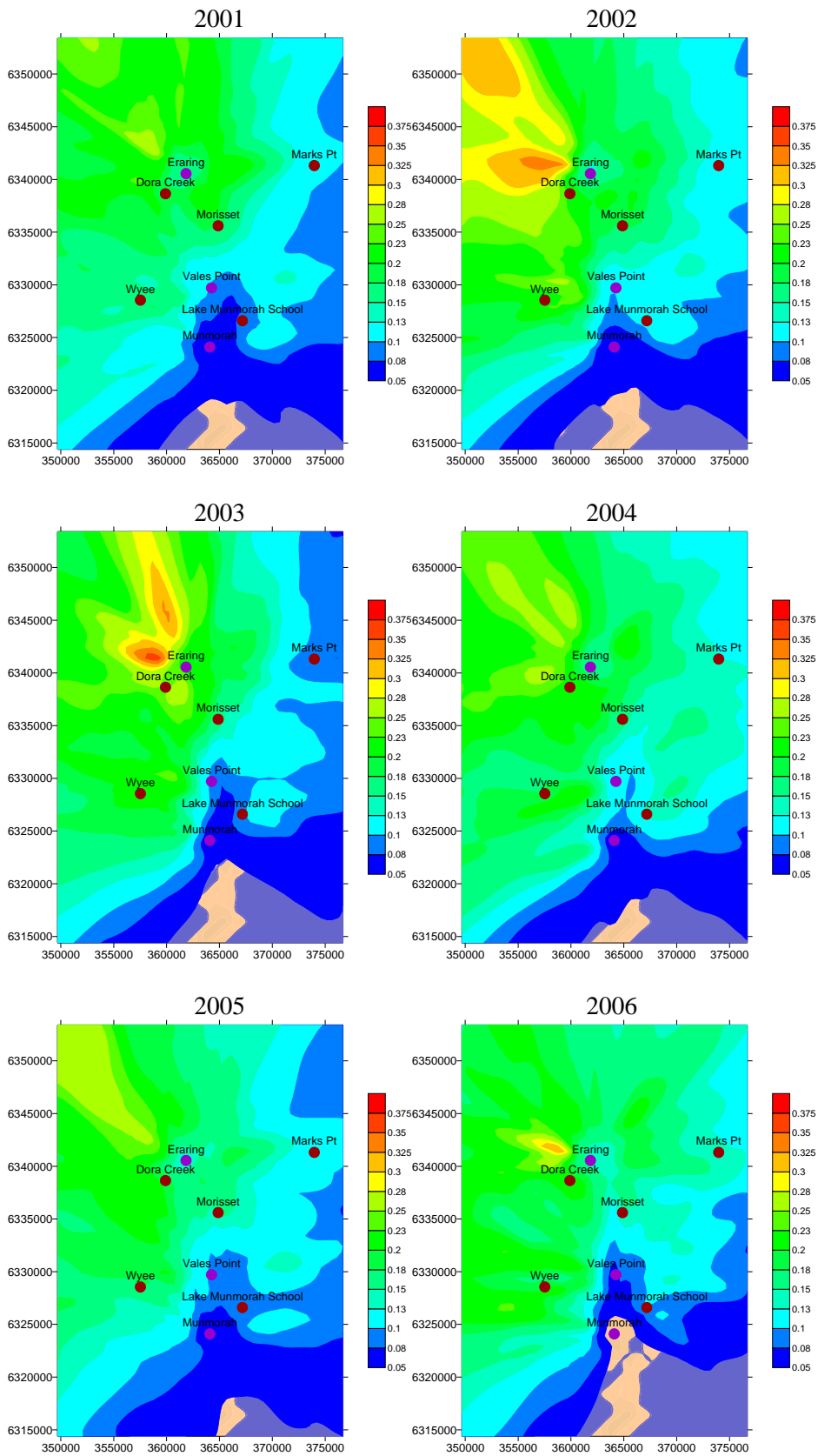


Figure 3.1b. Domain wide annual average concentrations for full load conditions (pphm) with proposed coal sulfur content of 0.75%

3.2 Maximum 24 hour Averages

Table 3.2a: Domain wide statistics for 24 hour averages (pphm) for the Central Coast region

2001	Ave	Stdev	Max	Min
PROPOSED 0.7%	2.49	1.29	8.51	0.84
PROPOSED 0.75%	2.61	1.33	8.51	0.85
CURRENT	2.57	1.26	8.51	0.82
2002	Ave	Stdev	Max	Min
PROPOSED 0.7%	2.56	1.13	7.37	0.77
PROPOSED 0.75%	2.67	1.16	7.37	0.80
CURRENT	2.65	1.12	7.37	0.79
2003	Ave	Stdev	Max	Min
PROPOSED 0.7%	2.93	1.30	7.79	0.91
PROPOSED 0.75%	3.07	1.34	7.79	0.94
CURRENT	3.01	1.32	7.79	0.95
2004	Ave	Stdev	Max	Min
PROPOSED 0.7%	2.89	1.25	9.55	0.82
PROPOSED 0.75%	3.00	1.29	9.74	0.85
CURRENT	2.84	1.19	9.15	0.81
2005	Ave	Stdev	Max	Min
PROPOSED 0.7%	2.61	1.11	7.04	1.05
PROPOSED 0.75%	2.71	1.13	7.04	1.09
CURRENT	2.71	1.16	7.15	1.06
2006	Ave	Stdev	Max	Min
PROPOSED 0.7%	2.47	1.08	5.65	0.59
PROPOSED 0.75%	2.60	1.12	5.65	0.61
CURRENT	2.54	1.00	6.29	0.59

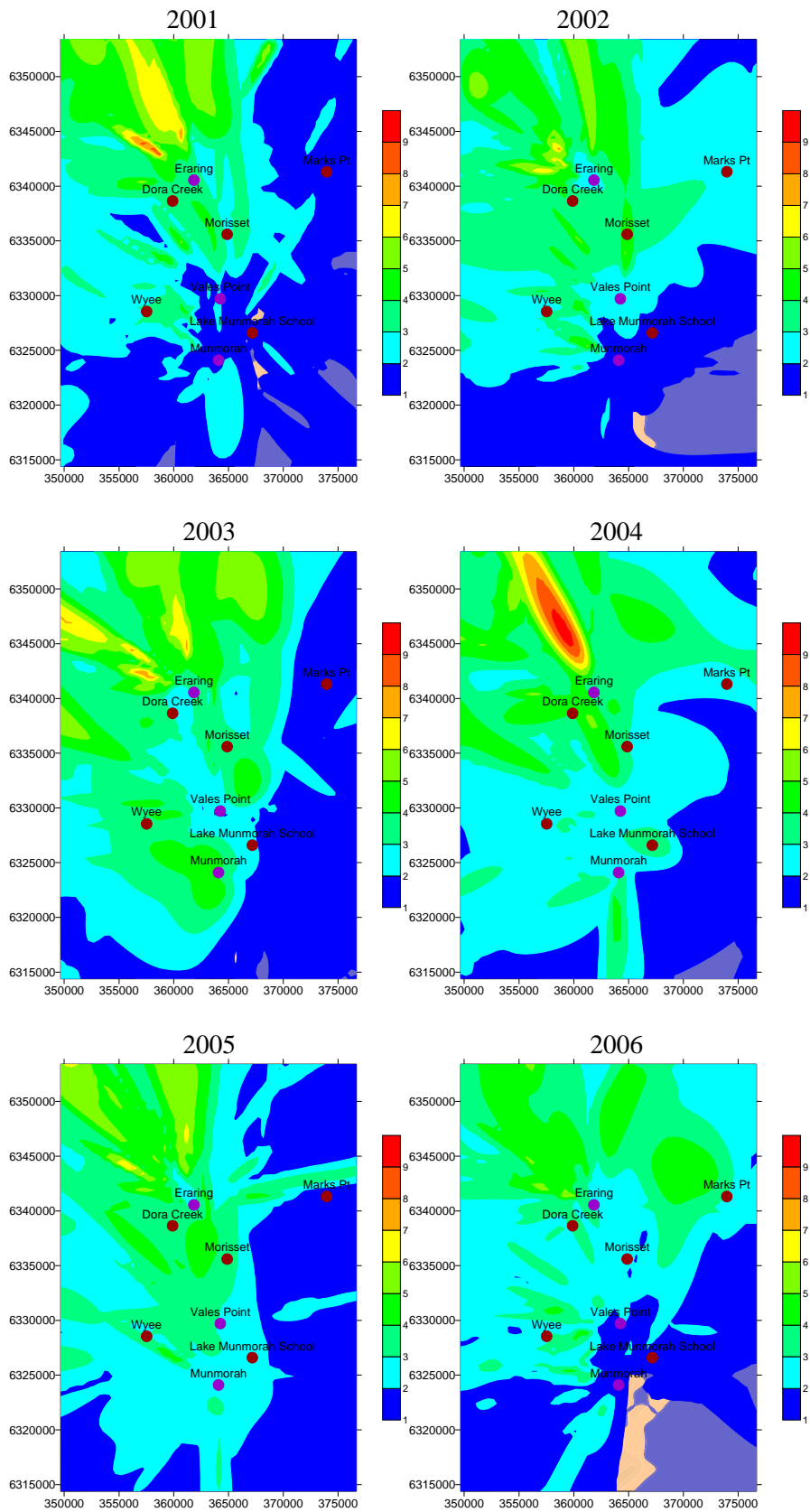


Figure 3.2a: Maximum 24 hour average concentrations (pphm) for full load conditions with proposed coal sulfur content of 0.7%

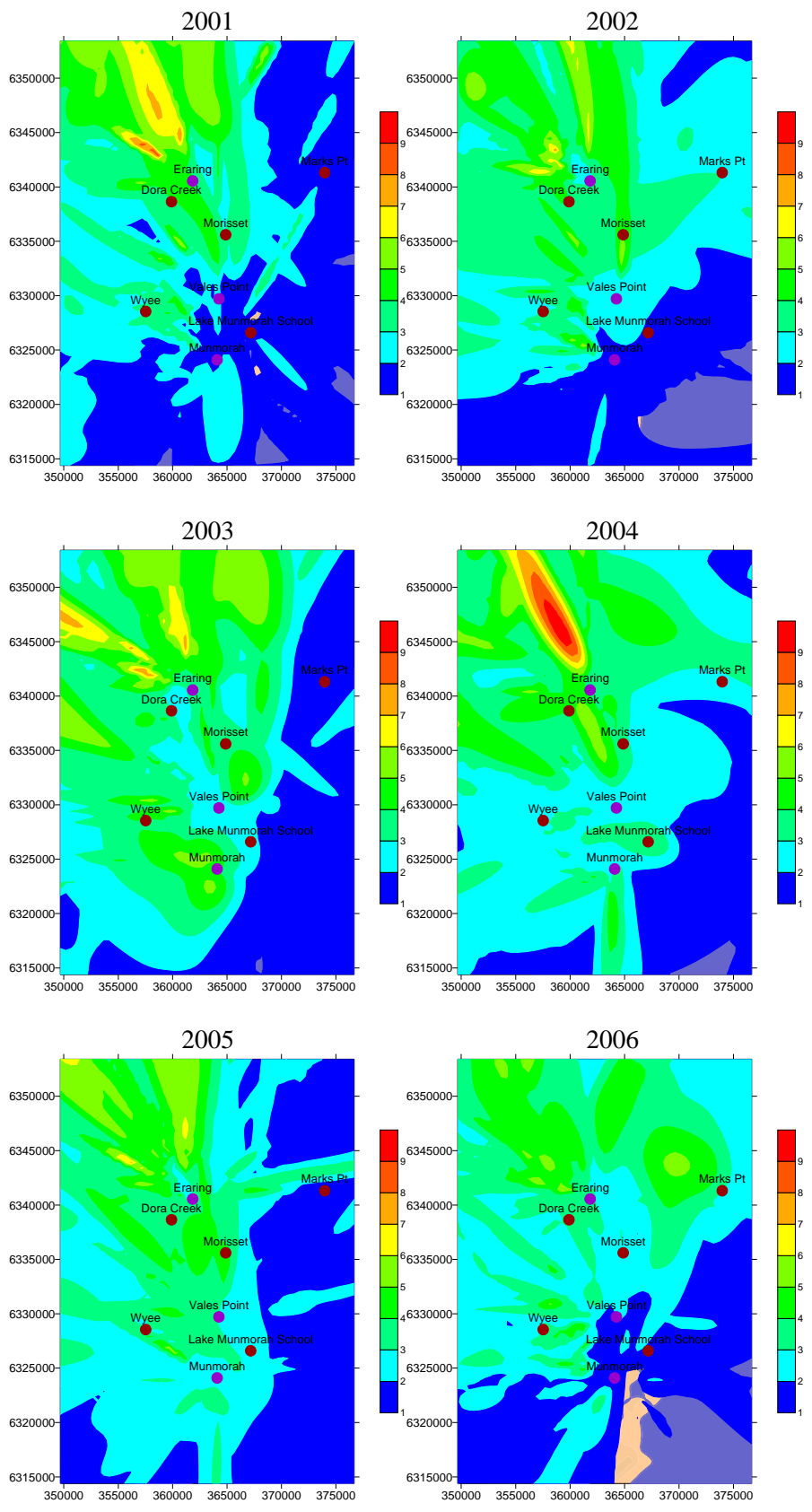


Figure 3.2b: Maximum 24 hour average concentrations (pphm) for full load conditions with proposed coal sulfur content of 0.75%

Table 3.3: Number of 24 hourly averages predicted to exceed 8pphm in the Central Coast region with proposed coal sulfur content

2001	Max
PROPOSED 0.7%	1
PROPOSED 0.75%	1
CURRENT	1
2002	Max
PROPOSED 0.7%	0
PROPOSED 0.75%	0
CURRENT	0
2003	Max
PROPOSED 0.7%	0
PROPOSED 0.75%	0
CURRENT	0
2004	Max
PROPOSED 0.7%	1
PROPOSED 0.75%	1
CURRENT	1
2005	Max
PROPOSED 0.7%	0
PROPOSED 0.75%	0
CURRENT	0
2006	Max
PROPOSED 0.7%	0
PROPOSED 0.75%	0
CURRENT	0

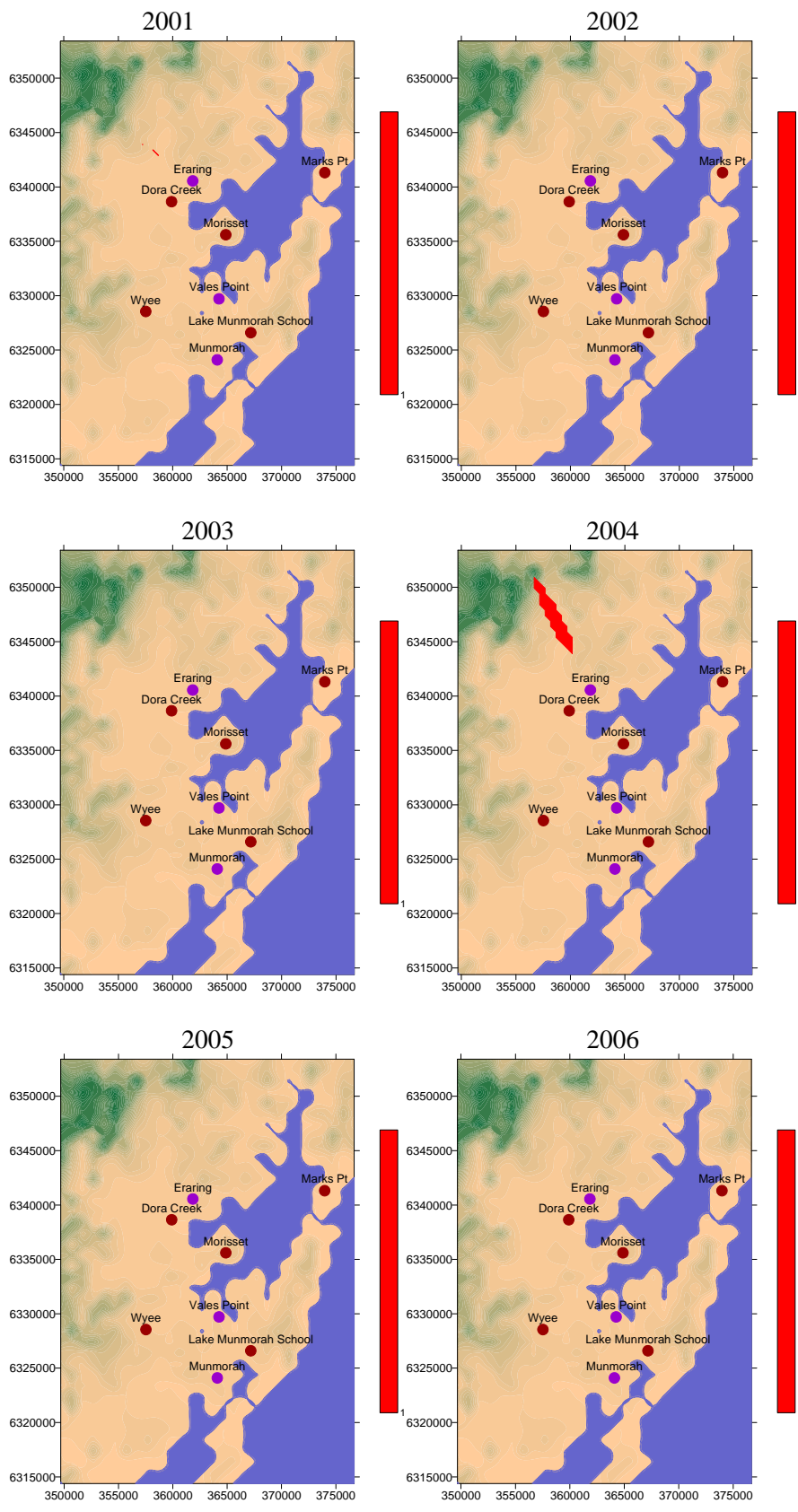


Figure 3.3a: Number of 24 hour maximum averages exceeding 8pphm for full load conditions with proposed coal sulfur content of 0.7%