

CONTENT

- INTRODUCTION
- NO₂ AIR QUALITY OBJECTIVES.
- HEALTH EFFECTS OF NO₂
- GIBRALTAR'S AIR QUALITY MONITORING PROGRAMME.
- THE DIFFUSION TUBES NETWORK.
- NO₂ READINGS IN THE SOUTH DISTRICT.
- REASONS FOR NO₂ READINGS IN THE SOUTH DISTRICT.
- MODELLED EMISSIONS FROM POWER STATIONS.
- HEALTH CONCERNS.
- CONCLUSIONS/CURRENT POSITION.

INTRODUCTION


- 1) DIFFUSION TUBES MONITORING PROGRAMME INDICATES THAT NO₂ LEVELS ARE HIGH IN PARTS OF GIBRALTAR'S SOUTH DISTRICT.
- 2) LOOKING AT NO₂ LEVELS IN THESE AREAS.
- 3) REASONS FOR HIGH NO₂ LEVELS.
- 4) HEALTH CONCERNS AND HOW THESE WERE ADDRESSED.
- 5) CONCLUSIONS AND THE CURRENT POSITION.

NO₂ AIR QUALITY OBJECTIVES FOR THE PROTECTION OF HUMAN HEALTH

- i) ANNUAL MEAN SET TO PROTECT AGAINST LONG TERM EXPOSURE – **40 ug/m³ TO BE ACHIEVED BY 2010.**
- ii) HOURLY MEAN SET TO PROTECT AGAINST SHORT TERM EXPOSURE – **200 ug/m³ TO BE ACHIEVED BY 2010.**

HEALTH EFFECTS OF NO₂

- 1) IRRITATION OF LUNGS.
- 2) LOWER RESISTENCE TO RESPIRATORY INFECTIONS.
- 3) CONTINUED OR FREQUENT EXPOSURES TO NO₂ LEVELS IN EXCESS OF AMBIENT CONCENTRATIONS INCREASES INCIDENCE OF ACUTE RESPIRATORY ILLNESS IN CHILDREN.



GIBRALTAR'S AIR QUALITY MONITORING PROGRAMME

- 1) PROGRAMME BEGAN IN FEBRUARY 2005.
- 2) PROGRAMME IS DESIGNED TO PROVIDE INFORMATION AND ENSURE COMPLIANCE WITH THE AIR QUALITY FRAMEWORK AND DAUGHTER DIRECTIVES.
- 3) DIRECTIVES TRANSPOSED INTO LOCAL LEGISLATION.






GIBRALTAR'S AIR QUALITY MONITORING PROGRAMME

(CONTD)

MONITORING IN THE PROGRAMME IS CARRIED OUT USING:-

- TWO AUTOMATIC MONITORING STATIONS. (MEASURING RANGE OF DIFFERENT POLLUTANTS)
- PASSIVE MONITORING NETWORK MEASURING SPATIAL VARIATIONS OF NO₂ AND BTX.

7



GIBRALTAR'S AIR QUALITY MONITORING PROGRAMME (CONTD)



7



ZOOM OF ROSIA ROAD MONITORING STATION

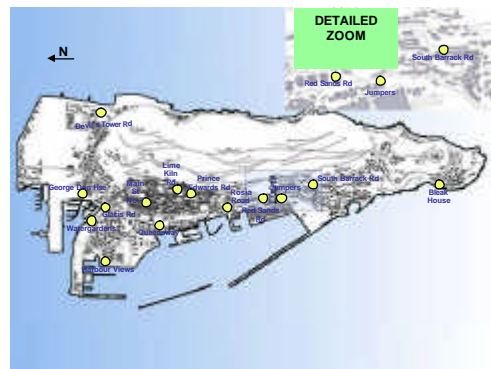


8



DIFFUSION TUBES NETWORK

DIFFUSION TUBES IN 2005



9



NO₂ Diffusion Tube Monitoring at Jumper's in 2005

Start	End	NO ₂	Units
02/02/2005	02/03/2005	66.4	µgm-3
02/03/2005	29/03/2005	64.9	µgm-3
29/03/2005	26/04/2005	58.8	µgm-3
26/04/2005	24/05/2005	56.5	µgm-3
24/05/2005	20/06/2005	68.1	µgm-3
21/06/2005	18/07/2005	No Data	µgm-3
19/07/2005	15/08/2005	63.7	µgm-3
16/08/2005	12/09/2005	67	µgm-3
13/09/2005	10/10/2005	84.6	µgm-3
11/10/2005	07/11/2005	57.6	µgm-3
08/11/2005	05/12/2005	60.2	µgm-3
06/12/2005	02/01/2006	58.4	µgm-3

11



NO₂ Diffusion Tube Monitoring at Red Sands Road in 2005

Start	End	NO ₂	Units
02/02/2005	02/03/2005	49	µgm-3
02/03/2005	29/03/2005	50.7	µgm-3
29/03/2005	26/04/2005	39	µgm-3
26/04/2005	24/05/2005	41.2	µgm-3
24/05/2005	20/06/2005	42.6	µgm-3
21/06/2005	18/07/2005	No Data	µgm-3
19/07/2005	15/08/2005	42.9	µgm-3
16/08/2005	12/09/2005	44.3	µgm-3
13/09/2005	10/10/2005	52.4	µgm-3
11/10/2005	07/11/2005	40	µgm-3
08/11/2005	05/12/2005	47.8	µgm-3
06/12/2005	02/01/2006	50.7	µgm-3

12



NO₂ Diffusion Tube Monitoring at South Barrack Road in 2005

Start	End	NO ₂	Units
02/02/2005	02/03/2005	55.4	µgm-3
02/03/2005	29/03/2005	55.8	µgm-3
29/03/2005	26/04/2005	61.1	µgm-3
26/04/2005	24/05/2005	56	µgm-3
24/05/2005	20/06/2005	65.8	µgm-3
21/06/2005	18/07/2005	No Data	µgm-3
19/07/2005	15/08/2005	59.2	µgm-3
16/08/2005	12/09/2005	56.5	µgm-3
13/09/2005	10/10/2005	77.6	µgm-3
11/10/2005	07/11/2005	56.5	µgm-3
08/11/2005	05/12/2005	53.5	µgm-3
06/12/2005	02/01/2006	55.7	µgm-3

13



DIFFUSION TUBES NETWORK 2005

ANNUAL MEAN CONCENTRATION OF DIFFUSION TUBES READINGS AT JUMPERS AND SOUTH BARRACK ROAD WAS GREATER THAN 50 µgm-3.



14

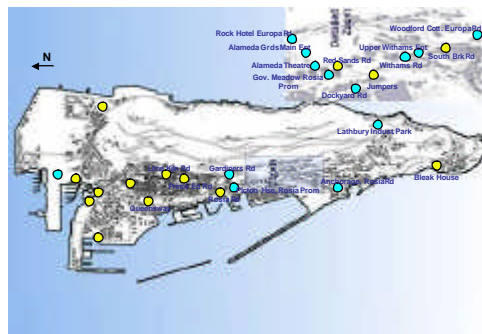


IN DECEMBER 2006 THE NUMBER OF DIFFUSION TUBES IN THE SOUTH DISTRICT WAS EXTENDED TO GIVE A BETTER UNDERSTANDING OF THE LEVELS OF NO₂ IN THE AREA.

15



DIFFUSION TUBES IN 2005 AND 2007



16



DIFFUSION TUBES READING FOR NEWLY INSERTED TUBES IN 2007 (µgm-3)

SITE	LOWEST	HIGHEST	AVERAGE
WOODFORD COTTAGE	40	61.3	49.1
UPPER WITHAMS ENTRANCE	41.9	61.8	51.9
WITHAMS ROAD	40.6	71.2	56.2
DOCKYARD ROAD	37.6	60.9	50.7
GOVERNOR 'S MEADOW, ROSIA PROMENADE	42	63.3	49.3
ALAMEDA GARDENS THEATRE	31.3	49.2	37.4
ALAMEDA GARDENS, MAIN ACCESS	30.8	45	34.9
ROCK HOTEL EUROPA ROAD	43.2	58.2	49.4

17



NO₂ ANNUAL & HOURLY MEANS FROM AIR QUALITY MONITORING STATIONS

NO₂ ANNUAL MEAN µgm-3

	2005	2006	2007
Rosia Road Monitoring St.	42	42	44
Bleak House Monitoring St.	23	24	25
	Margin of tolerance 10	Margin of tolerance 8	Margin of tolerance 6

40 µgm-3 objective to be achieved by 1st January 2010

MAX NO₂ HOURLY MEANS µgm-3

	2005	2006	2007
Rosia Road	180	189	172
Bleak House	122	132	175

200 µgm-3 objective to be achieved by 1st January 2010 (18 exceedances permitted per year)

18

REASONS FOR HIGH NO₂ READINGS IN SOUTH DISTRICT

- MAINLY DUE TO POWER GENERATION FROM OESCO AND MOD POWER STATIONS.
- CONTRIBUTION FROM TRAFFIC.



19

OESCO POWER STATION



20

MOD POWER STATION

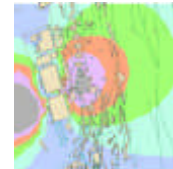


21

MODELLING OF POWER STATION EMISSIONS

- 1) MODELLING CARRIED OUT IN 2007.
- 2) COMPLEX TERRAIN IN THE REGION OF BOTH POWER STATIONS PRESENTS A SERIOUS CHALLENGE TO DISPERSION MODELLING.
- 3) MODEL PREDICTED THAT BOTH ANNUAL AND HOURLY MEAN WOULD BE EXCEEDED IN THE JUMPERS AREA.

Annual mean nitrogen dioxide, ug/m³



22

HEALTH CONCERNS WHAT SHALL WE DO?

- 1) CONCERNS ABOUT POSSIBLE HEALTH EFFECTS FROM NO₂ LEVELS.
- 2) CAN WE GET MORE PRECISE INFORMATION.
- 3) DR KUMAR DECIDES TO CONTACT CHEMICAL HAZARDS AND POISONS (CHAP) DIVISION OF THE HPA IN LONDON.



23

CHAPS ADVICE

- 1) NO₂ REPRESENTS A DILEMMA WITH RESPECT TO GUIDELINES.
- 2) NO EVIDENCE FOR A CLEARLY DEFINED CONCENTRATION RESPONSE RELATIONSHIP FOR NO₂.
- 3) ACUTE EXPOSURES OF 1880 ug/m³ NECESSARY TO AFFECT HEALTHY PEOPLE.
- 4) EFFECTS OF NO₂ HAVE BEEN FOCUSED ON PEOPLE WITH RESPIRATORY ILLNESS.
- 5) 375 - 565 ug/m³ HAVE BEEN IDENTIFIED AS THE LOWEST EFFECT LEVEL IN SEVERAL STUDIES.
- 6) THERE IS NO CLEAR STUDY TO SUPPORT AN ANNUAL GUIDELINE VALUE.

24



CONCLUSION/CURRENT POSITION

- 1) NEW AUTOMATIC MONITORING STATION WAS INSTALLED AT WITHAM'S ROAD IN MAY 2008 TO MONITOR NO₂.
- 2) MEASURED DATA FROM NEW MONITORING STATION GIVES REASSURANCE THAT HOURLY NO₂ LEVELS ARE BELOW 200 ug/m³.
- 3) 200 ug/m³ IS CONSIDERED LOW ACCORDING TO THE AIR POLLUTION BANDINGS AND INDEX.
- 4) NO CLEAR STUDY TO SUPPORT AN ANNUAL GUIDELINE VALUE.
- 5) ALL EXISTING POWER STATIONS ARE TO BE REPLACED BY A MODERN DIESEL POWERED POWER STATION.

25