Australian Government
Bureau of Meteorology

Tropical Cyclone *Willy*

9 – 14 March 2005

Perth Tropical Cyclone Warning Centre
Bureau of Meteorology

A. Summary

A cyclone rapidly developed north of the state on 10 March reaching category three intensity early the following day as it tracked steadily to the southwest before weakening rapidly on 13-14 March west northwest of the Northwest Cape. Although some offshore oil and gas activities were interrupted, at no stage were warnings issued for coastal communities.

B. Meteorological Description

Intensity
A low developed within the monsoon trough on 9 March over very warm water of about 31°C. Initial classification was estimated at 0600 UTC 9 March. The low then developed very quickly in a highly favourable environment of low shear and strong upper level outflow.

The development rate was at the upper limit of the Dvorak model with cyclone intensity being estimated at 1800 UTC 9 March with gales most prominent in western quadrants. The environment remained favourable for the next three days. An eye became apparent on microwave imagery later on 10 March indicating ongoing rapid development.

Willy reached an estimated maximum intensity of 75 knot sustained winds at 1200 UTC 11 March and remained at that intensity for the following 30 hours. The Quickscat passes at 1011 UTC and 2237 UTC 12 March (see Fig. 4) both show a significant area of storm-force winds and maximum winds at about 80 knots (in the RSS solution). Microwave imagery during 12 March showed the weakening of the inner eye and the replacement by an outer eye wall (see Figs 2 and 3). While the actual maximum winds would have changed during this cyclone, convectional IR imagery did not resolve such detail and T4.5 estimates were sustained during this time.

During 13 March *Willy* encountered increasing shear, cooler water (<26°C) and dry air from the south thus ensuring a rapid weakening phase. The low level centre became exposed during the day and *Willy* was eventually rated at below cyclone intensity at 0000 UTC 14 March. A small area of gales was evident in the SW quadrant on the 1100 UTC 14 March pass, but winds surrounding the centre had abated significantly.

Motion
A strong and persisting mid-level anticyclone over continental Australia steered Willy steadily to the southwest during its lifetime. During its final weakening phase Willy took a more westerly track as the centre became more influenced by a lower-level steering flow.

Structure
Initially a tight inner circulation developed with an eye quickly becoming evident, being well defined on 11 March (see Fig. 2). The inner eye wall weakened and was replaced by an outer wall during 12 March (see Fig. 3) although this failed to contract and succumbed to weakening forces during 13 March.

C. Impact

Although some offshore oil and gas activities were interrupted, *Willy* had no direct impact upon coastal communities.

D. Observations
Nil.

Table 1 Best track summary for Tropical Cyclone *Willy* 8 – 15 March 2005.
Note: Add 8 hours to convert to WST. Refer to best track database for complete track details.

Year	Month	Day	Hour (UTC)	Position Latitude S	Position Longitude E	Max Wind Speed	Central Pressure hPa	Rad. of Gales nm	Rad. of Hurricane force winds	Radius Max. Wind (RMW)
2005	3	8	0600	118	1202	10	1008			55
2005	3	8	1200	121	1201	10	1006			55
2005	3	8	1800	124	1199	10	1005			55
2005	3	8	0000	127	1197	13	1002			55
2005	3	9	0600	131	1192	15	1000			55
2005	3	9	1200	135	1186	15	998			55
2005	3	9	1800	139	1177	21	995	20		55
2005	3	9	0000	141	1167	23	992	20		55
2005	3	10	0600	145	1159	26	985	22		55
2005	3	10	1200	150	1153	28	980	24		55
2005	3	10	1800	156	1145	33	970	24	5	55
2005	3	10	0000	161	1136	36	965	25	5	55
2005	3	11	0600	165	1127	36	960	25	7	55
2005	3	11	1200	173	1121	39	960	25	7	55
2005	3	11	1800	179	1115	39	960	25	7	55
2005	3	11	0000	186	1109	39	960	27	7	55
2005	3	12	0600	194	1104	39	960	29	7	55
2005	3	12	1200	201	1100	39	960	29	7	55
2005	3	12	1800	206	1093	39	965	27	7	55
2005	3	12	0000	209	1090	36	970	25	7	46
2005	3	13	0600	212	1086	31	975	20		46
2005	3	13	1200	213	1081	26	982	16		37
2005	3	13	1800	214	1076	21	990	11		33
2005	3	13	0000	212	1072	15	995			33
2005	3	14	0600	213	1066	13	998			33
2005	3	14	1200	211	1060	13	1000			33
2005	3	14	1800	118	1202	10	1008			55

Figure 1. Track of Tropical Cyclone *Willy,* 8 – 15 March 2005.
All times in WST.

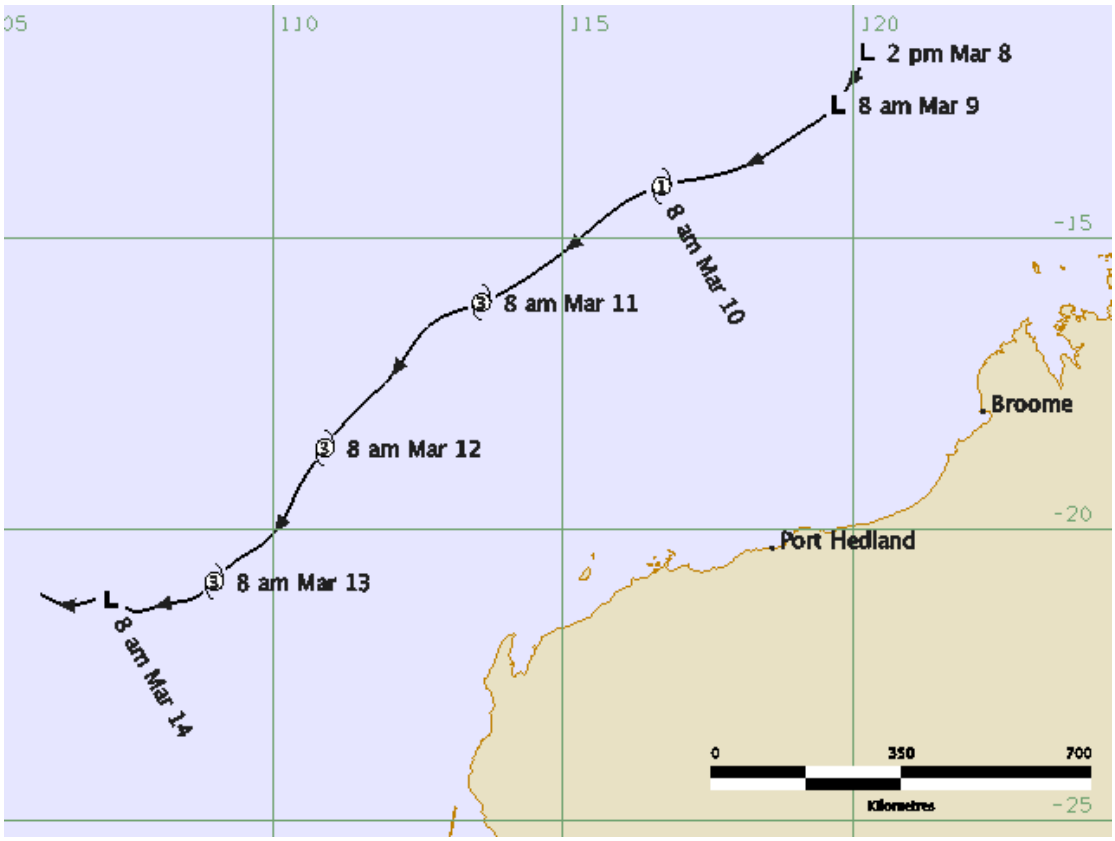

Figure 2. TRMM 85 GHz microwave image of Tropical Cyclone *Willy* close to maximum intensity, 1736 UTC 11 March 2004. (image courtesy of US NRL: http://www.nrlmry.navy.mil/)

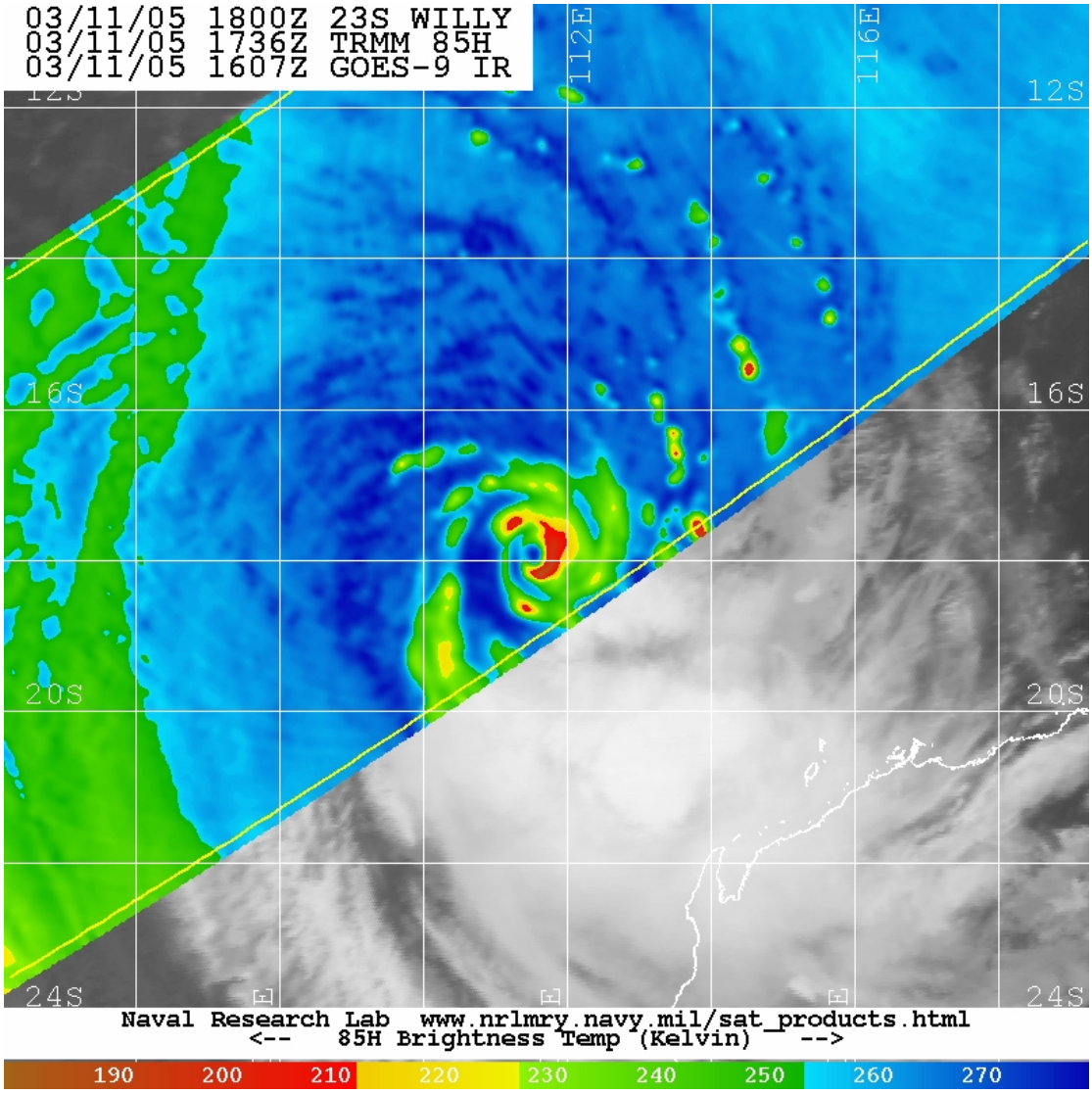

Figure 3. Aqua 85 GHz microwave image of Tropical Cyclone *Willy*, 1745 UTC 12 March 2005. (image courtesy of US NRL: http://www.nrlmry.navy.mil/)

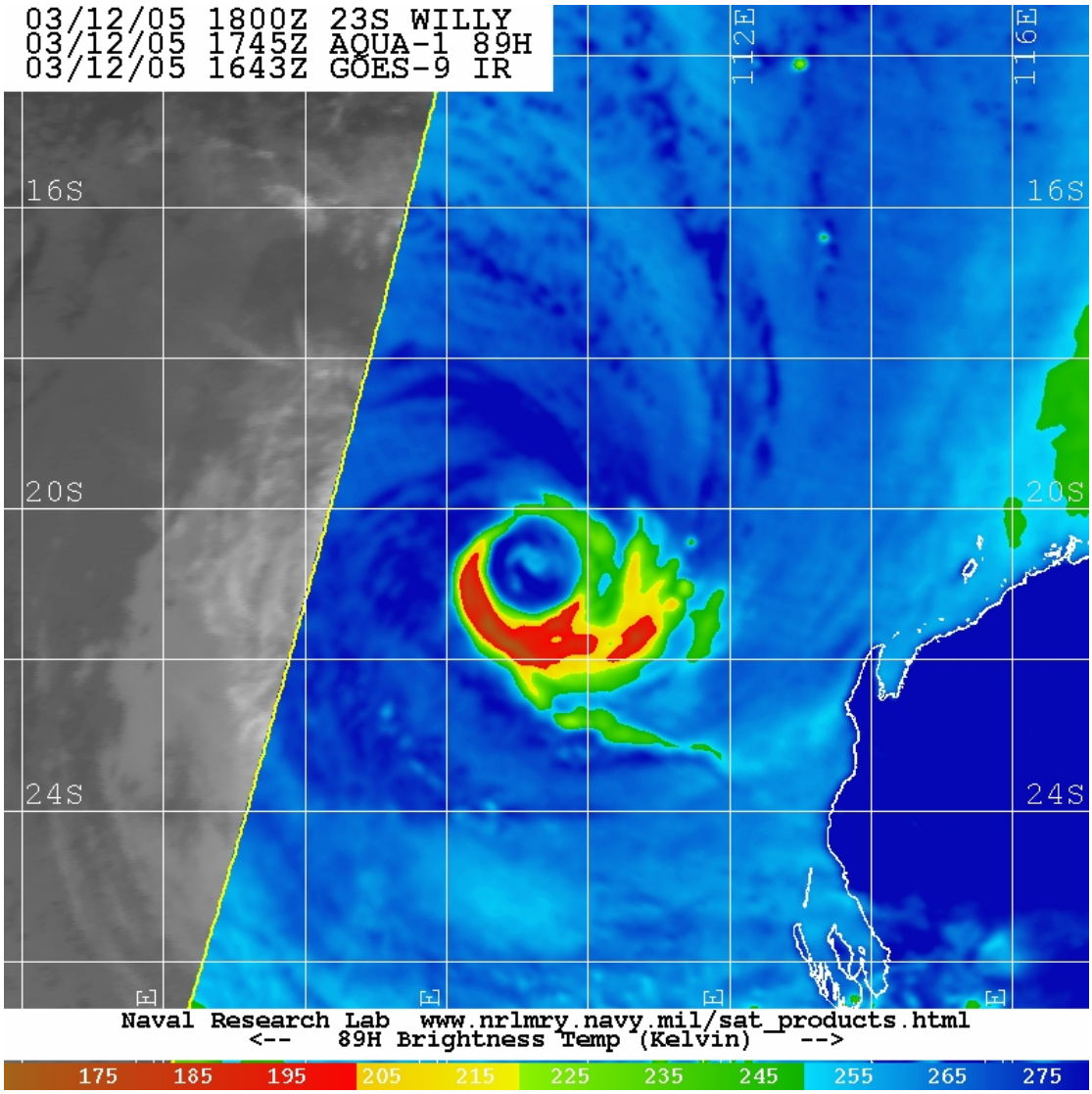

Figure 4. RSS Quickscat image for TC *Willy*, 1011 UTC 12 March 2005.
Image sourced through www.rss.com.