

3.4 PS18 Ft. Ransom Pump Station

The long-term noise monitoring was conducted at two receptor locations, R1 and R2. R1 is identified as the critical noise receptor while R2 is not. Keystone agreed to conduct noise monitoring at R2 upon the request from the resident, who was concerned about the noise impact at his new house. An aerial map in Figure 16 shows the pump station location, the receptor locations, the noise monitoring locations (M1 and M2) and other area features.

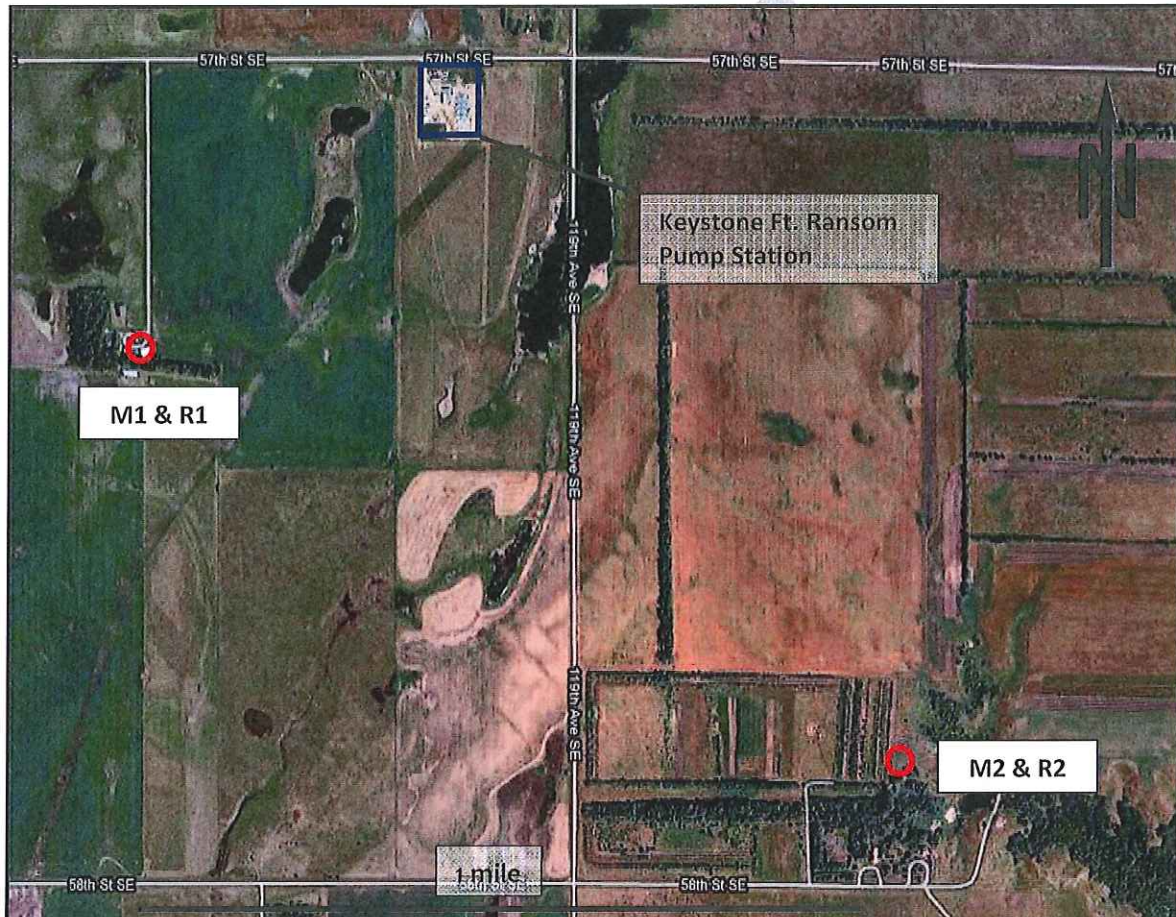


Figure 16: Aerial Map – PS18 Ft. Ransom Pump Station

1) Noise Monitoring at R1

The recorded data of the L_{eq} of each 1-minute logging period at the receptor location R1 of the Ft. Ransom pump station from 12:00 pm July 31, 2011 to 9:24 am August 1, 2011 is presented in Figure 17.

The obviously contaminated data by natural sounds, tree noise, local traffic noise, aircraft flyover, intrusive highway noise or human activities nearby the sound level meter have been excluded. Also excluded is data in the periods the weather condition was unfavorable. During the noise monitoring, operating condition of the pump station changed over time, from no units in operation to the maximum three units running. For consistency in data analysis, sound level measurements collected when three units were in operation are kept as valid data; sound data of other operating conditions is excluded. The published weather data and the pump station load log are shown in Figure 18, Figure 19 and Table 15.

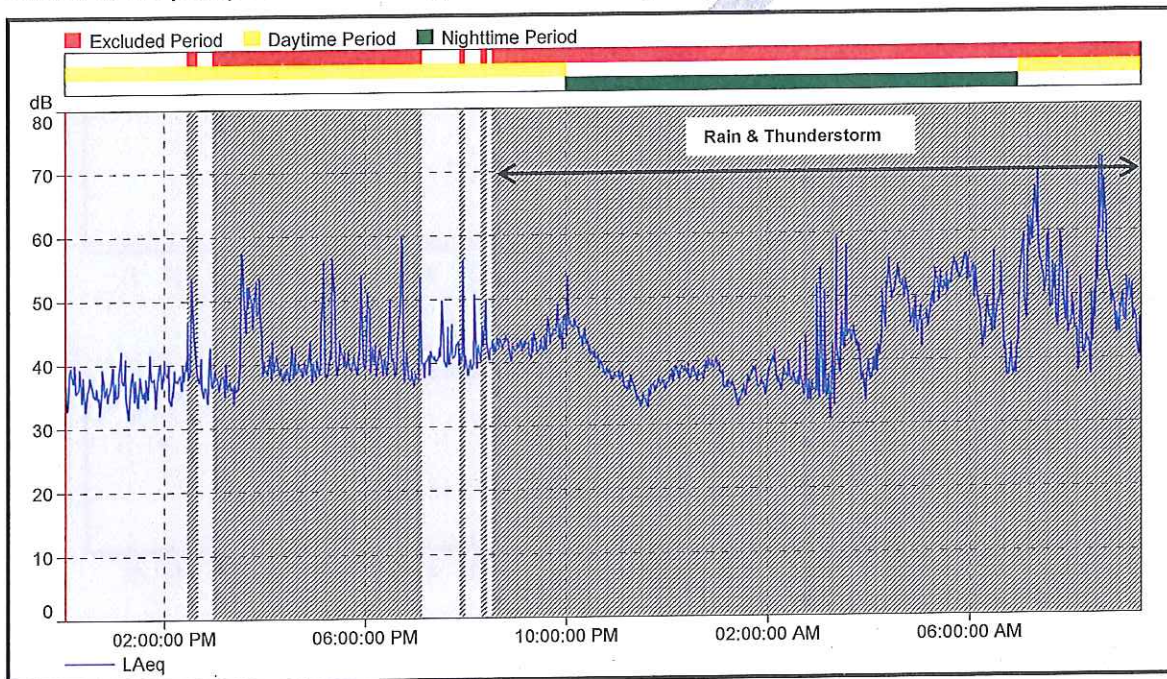


Figure 17: Time History Logged L_{eq} Sound Data at R1 – PS18 Ft. Ransom Pump Station

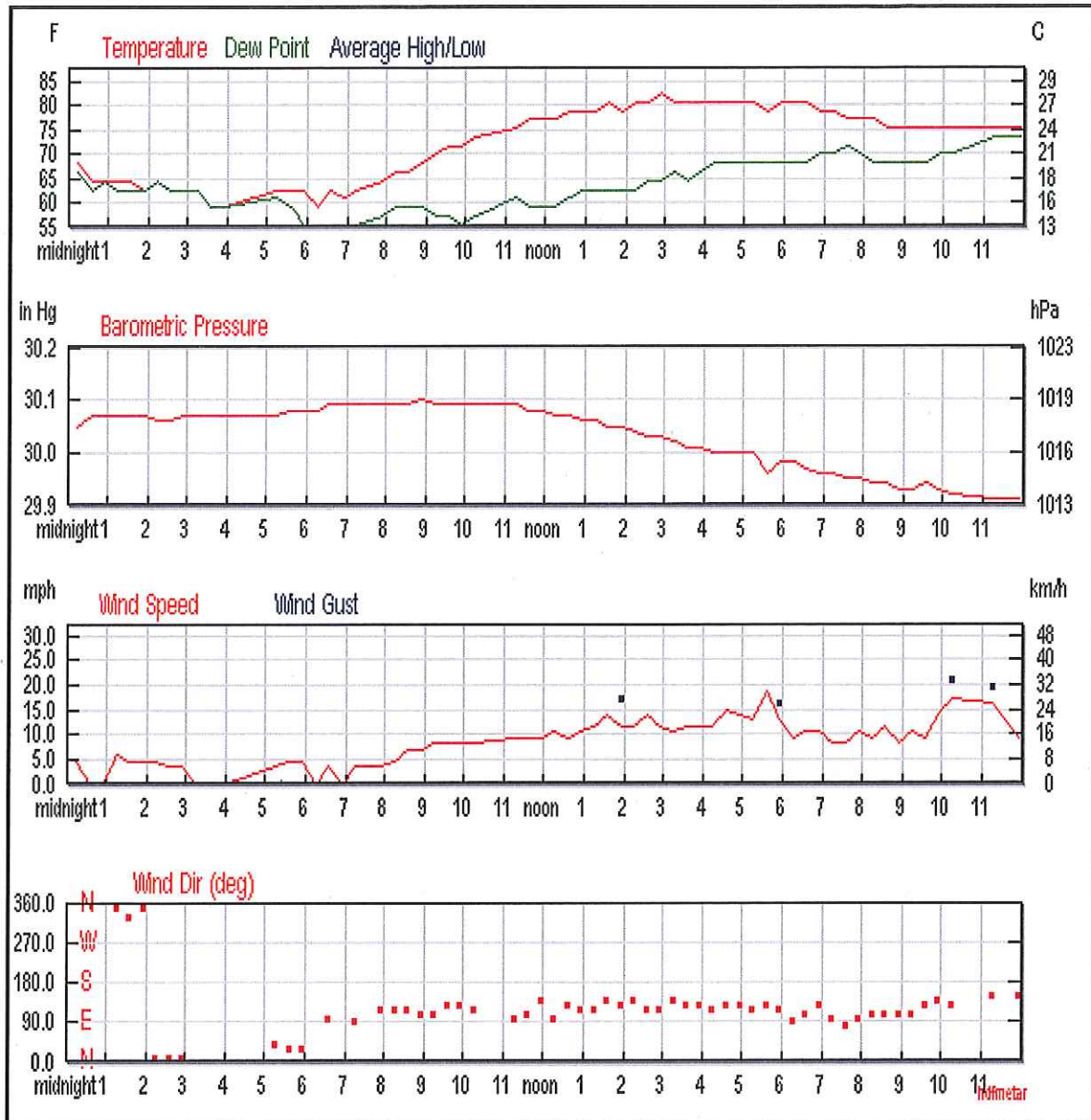


Figure 18: Published Weather Data July 31, 2011 – PS18 Ft. Ransom Pump Station

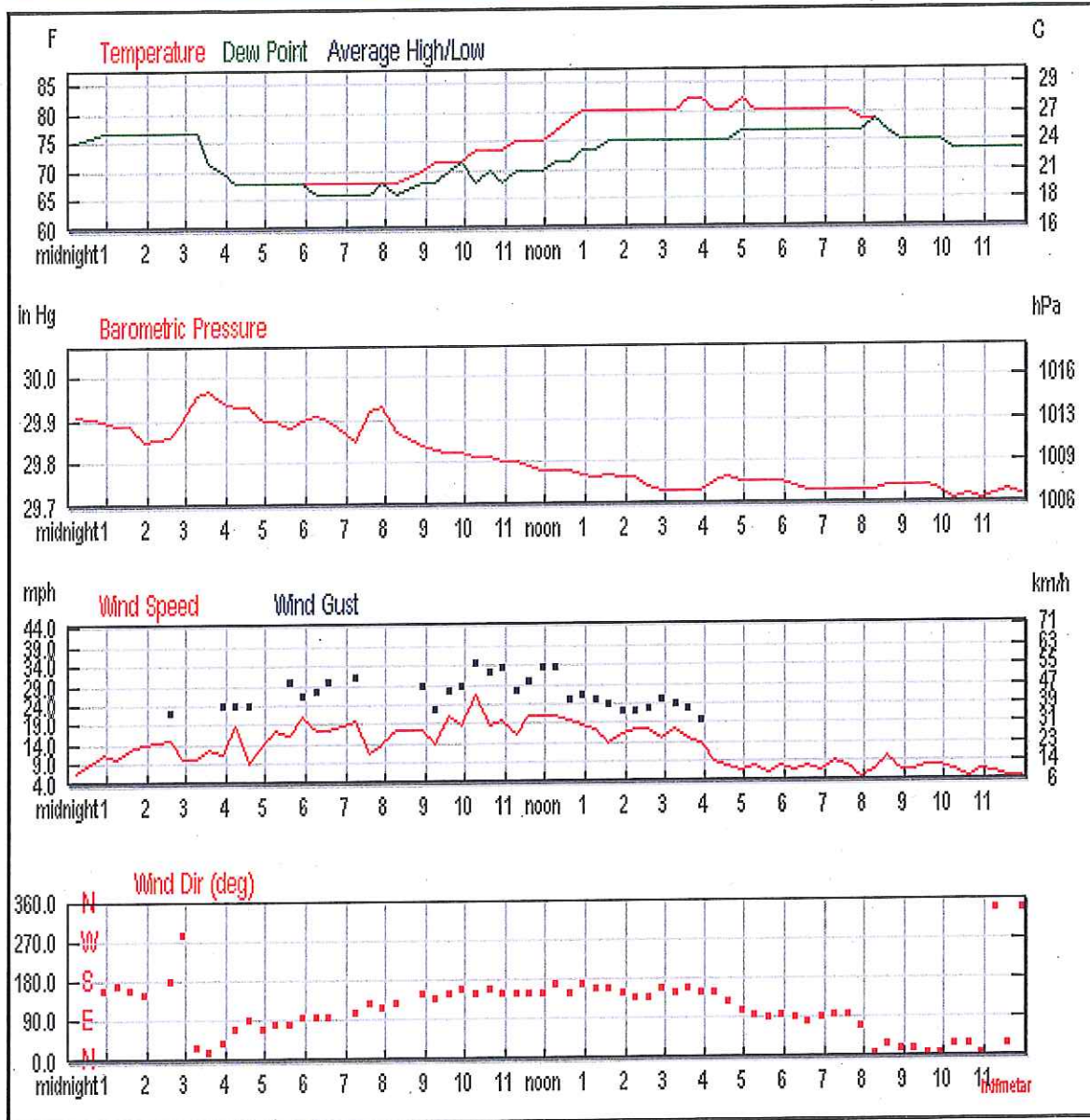


Figure 19: Published Weather Data August 1, 2011 – PS18 Ft. Ransom Pump Station

Table 15: Facility Load Log – PS18 Ft. Ransom Pump Station

Date (MM/DD/YY CDT)	Actual Oil Flow (m ³ /h)	Unit 1	Unit 2	Unit 3	Unit 4
07/31/11 12:00	3562	On	On	Off	On
07/31/11 13:00	3594	On	On	Off	On
07/31/11 14:00	3569	On	On	Off	On
07/31/11 15:00	3516	On	On	Off	On
07/31/11 16:00	3478	On	On	Off	On
07/31/11 17:00	3524	On	On	Off	On
07/31/11 18:00	3533	On	On	Off	On
07/31/11 19:00	3187	On	On	Off	On
07/31/11 20:00	3450	On	On	Off	On
07/31/11 21:00	3078	Off	On	Off	On
07/31/11 22:00	2952	Off	On	Off	On
07/31/11 23:00	3378	On	On	Off	On
08/01/11 00:00	3460	On	On	Off	On
08/01/11 01:00	3441	On	On	Off	On
08/01/11 02:00	2806	On	On	Off	On
08/01/11 03:00	1809	On	On	Off	Off
08/01/11 04:00	1477	On	Off	Off	Off
08/01/11 05:00	2390	On	On	Off	Off
08/01/11 06:00	2509	On	On	Off	Off
08/01/11 07:00	0	Off	Off	Off	Off
08/01/11 08:00	0	Off	Off	Off	Off
08/01/11 09:00	0	Off	Off	Off	Off

There was 3 hours and 56 minutes of daytime valid data after isolation analysis. The measurement results are presented in Table 16.

Table 16: Noise Monitoring Result at R1 – PS20 Ft. Ransom Pump Station

Receptor	Measurement Result L _{eq} (3 Units), dBA	L _{dn} (3 Units), dBA	Calculated L _{dn} of Max. Load Operation (4 Units), dBA	Noise Criterion, dBA	Compliance
R1	40	46	47	L _{dn} =55	Yes

The results indicate that the Ft. Ransom pump station is in compliance with the noise criterion at R1.

2) Noise Monitoring at R2

The recorded data of the L_{eq} of each 1-minute logging period at the receptor location R2 of the Ft. Ransom pump station from 12:00 pm July 31, 2011 to 9:28 am August 1, 2011 is presented in Figure 20.

The obviously contaminated data by natural sounds, tree noise, local traffic noise, aircraft flyover, intrusive highway noise or human activities nearby the sound level meter have been excluded. Also excluded is data in the periods the weather condition was unfavorable. During the noise monitoring, operating condition of the pump station changed over time, from no units in operation to the maximum three units running. For consistency in data analysis, sound level measurements collected when three units were in operation are kept as valid data; sound data of other operating conditions is excluded. The published weather data and the pump station load log are shown in Figure 21, Figure 22 and Table 17.

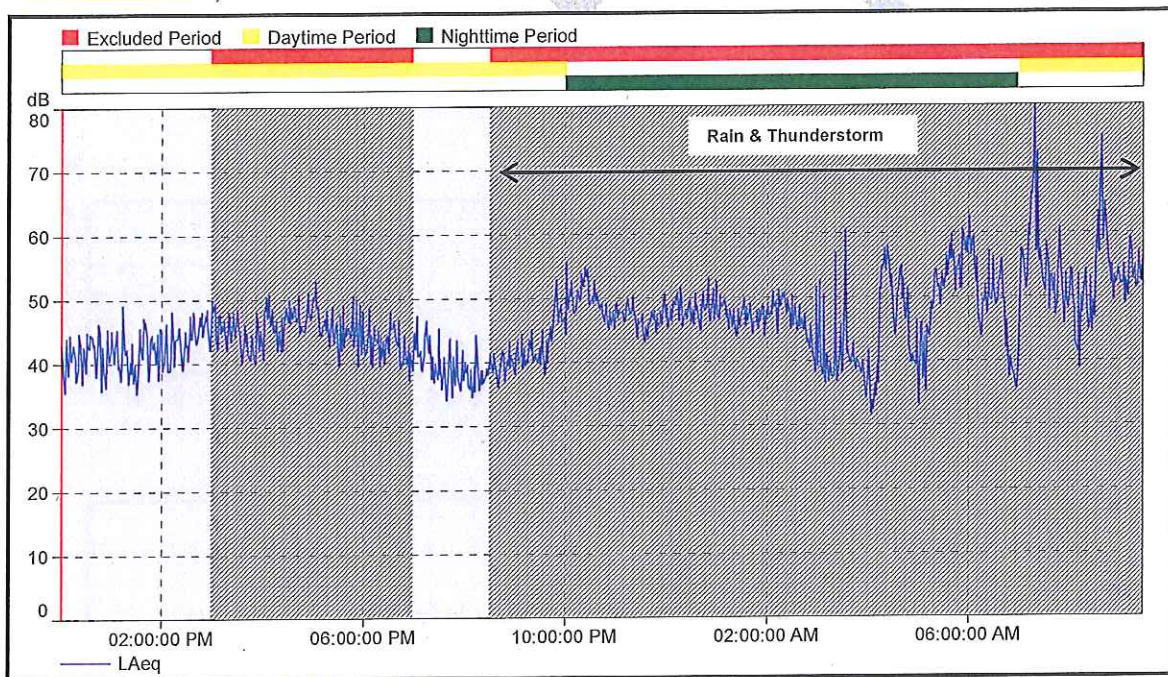


Figure 20: Time History Logged L_{eq} Sound Data at R2 – PS18 Ft. Ransom Pump Station

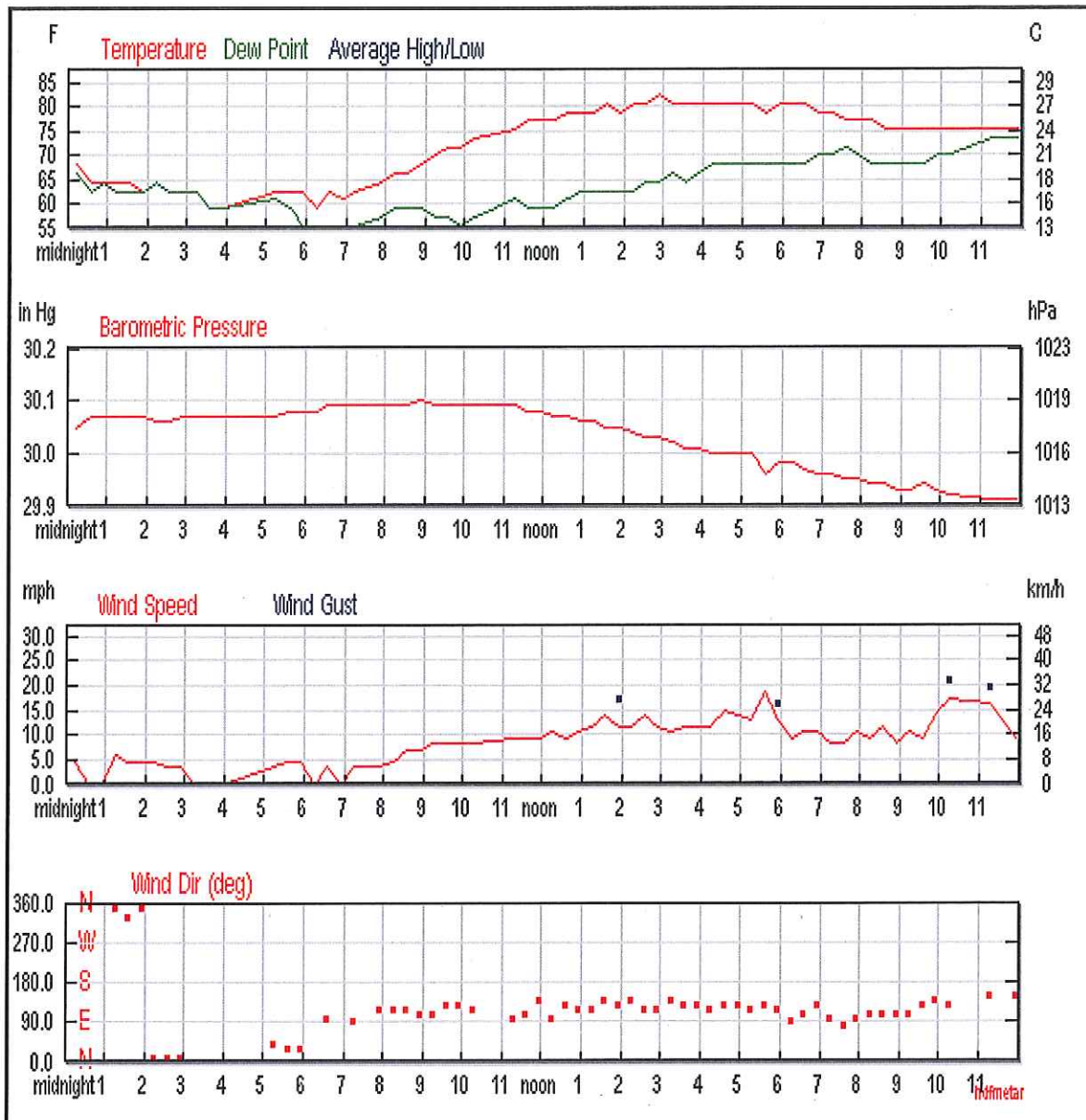


Figure 21: Published Weather Data July 31, 2011 – PS18 Ft. Ransom Pump Station

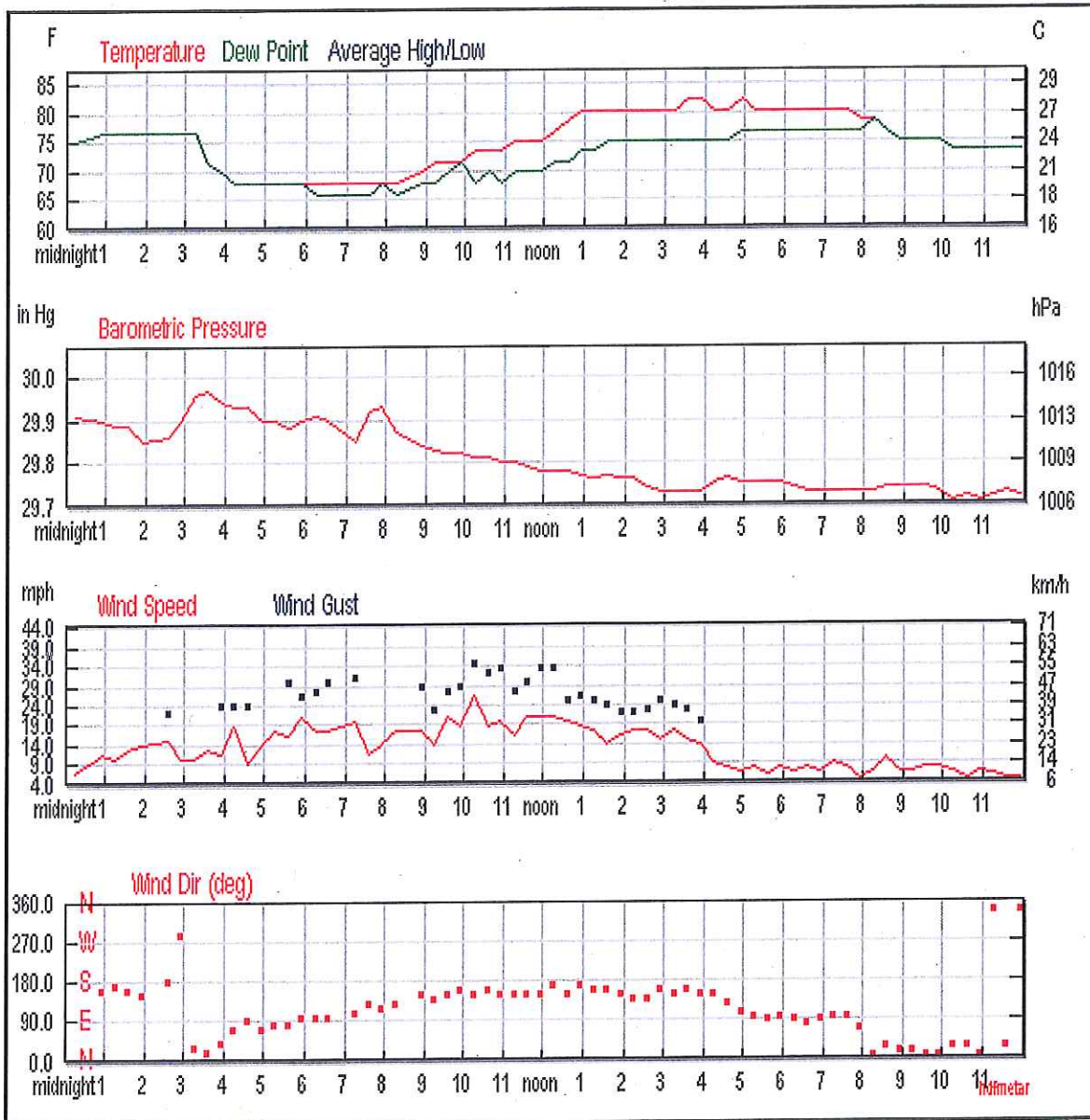


Figure 22: Published Weather Data August 1, 2011 – PS18 Ft. Ransom Pump Station

Table 17: Facility Load Log – PS18 Ft. Ransom Pump Station

Date (MM/DD/YY CDT)	Actual Oil Flow (m ³ /h)	Unit 1	Unit 2	Unit 3	Unit 4
07/31/11 12:00	3562	On	On	Off	On
07/31/11 13:00	3594	On	On	Off	On
07/31/11 14:00	3569	On	On	Off	On
07/31/11 15:00	3516	On	On	Off	On
07/31/11 16:00	3478	On	On	Off	On
07/31/11 17:00	3524	On	On	Off	On
07/31/11 18:00	3533	On	On	Off	On
07/31/11 19:00	3187	On	On	Off	On
07/31/11 20:00	3450	On	On	Off	On
07/31/11 21:00	3078	Off	On	Off	On
07/31/11 22:00	2952	Off	On	Off	On
07/31/11 23:00	3378	On	On	Off	On
08/01/11 00:00	3460	On	On	Off	On
08/01/11 01:00	3441	On	On	Off	On
08/01/11 02:00	2806	On	On	Off	On
08/01/11 03:00	1809	On	On	Off	Off
08/01/11 04:00	1477	On	Off	Off	Off
08/01/11 05:00	2390	On	On	Off	Off
08/01/11 06:00	2509	On	On	Off	Off
08/01/11 07:00	0	Off	Off	Off	Off
08/01/11 08:00	0	Off	Off	Off	Off
08/01/11 09:00	0	Off	Off	Off	Off

There was 4 hours and 31 minutes of daytime valid data after isolation analysis. The measurement results are presented in Table 18.

Table 18: Noise Monitoring Result at R2 – PS20 Ft. Ransom Pump Station

Receptor	Measurement Result L _{eq} , dBA	L _{dn} , dBA	Noise Criterion, dBA	Compliance
R2	43	49	L _{dn} =55	Yes

The sound level measurement results at R2 overestimate the pump station noise contribution, as the acoustic environment was mostly dominated by other background sources in the environment, e.g. natural sounds. Noise from the pump station is not audible at R2.

At the critical receptor R1, the pump station noise was audible and was its major noise contributor. Therefore, sound levels measured at R1 were used to estimate the actual noise contribution of the pump station at R2, using the following formula:

$$L_{p2} = L_{p1} - 20 \times \log_{10}(r_2 / r_1)$$

Where, L_{p2} is the contributing sound level of the pump station at R2;

L_{p1} is the contributing sound level of the pump station at R1;

r_2 is the distance between the pump station and R2;

r_1 is the distance between the pump station and R1.

This calculation yields a conservative estimate for the pump station noise contribution at the receptor as this calculation doesn't include the attenuation due to air absorption, topographical effects and other miscellaneous factors (such as foliage, barrier effects due to buildings etc.).

The calculated contributing sound levels from the pump station at R2 are shown in Table 19.

Table 19: Contributing Sound Level at R2 – PS20 Ft. Ransom Pump Station

Receptor	Contributing Sound Level L_{eq} (3 Units), dBA	L_{dn} (3 Units), dBA	Calculated L_{dn} of Max. Load Operation (4 Units), dBA	Noise Criterion, dBA	Compliance
R2	34	40	41	$L_{dn}=55$	Yes

The results indicate that the Ft. Ransom pump station is in compliance with the noise criterion at R2.