
[שם של ספק]

Report for
Noble Energy Mediterranean LTD
on
Flare Measurement
[מידע אודות ציוד על האסדה] Flare
Meter

[שם של ספק]

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Introduction

Noble Energy Mediterranean LTD (Noble) commissioned [שם של ספק] to perform an analysis on the flare measurement system for the Leviathan Production Platform Project. Noble was observing significant flow readings from the [ציוד על האסדה] when there were no other signs of gas being sent to the flare. The Flare Meter consists of [ציוד על האסדה]

System Setup

The High Pressure (HP) Flare measurement system on the Leviathan Production Platform consists of [שם של ספק, מערכות וציוד על האסדה]

as described in Operating Principles below. The reported volume flowrate [שם של ספק וציוד על האסדה]. The setup is shown below in Figure 1.

[מערכות וציוד על האסדה]

[שם של ספק]

Figure 2 and Figure 3 show the

[מידע אודות ציוד ומערכות על האסדה]

[שם של ספק]

is referred to [שם של ספק, מידע על ציוד ותיוג] and is serial number
is referred to and is serial
number . As can be seen in Figure 3,

[שם של ספק, מידע על ציוד ומערכות ותיוג]

The upstream lengths were reviewed and appear to be sufficient to allow for the flow profile to fully develop before the fluid is measured.

[שם של ספק, מידע על ציוד ומערכות ותיוג]

Operating Principles

[מידע על ציוד ומערכות באסדה. המידע הינו של ספק הציוד]

[שם של ספק]

[מידע על ציוד ומערכות באסדה. המידע הינו של ספק הציוד]

The [מידע על ציוד] sensors in question [מידע על ציוד] . Therefore, under flowing conditions, the transit time is approximately [מידע על ציוד] even the slightest variation can cause a significant misreading. [מידע על ציוד ותהליכים]

[מידע על ציוד]
If the values do not match up, there may be something wrong with the meter.

[שם של ספק]

Identification of Issue with Reported Volumes

A typical flaring event has a signature flowrate pattern. An example of this is shown below in Figure 5. On May 23rd, 2020, at approximately 20:30, the platform experienced an upset condition, and vented a significant amount of gas to the HP Flare.

[מידע על תהליכים וספיקות]

[שם של ספק]

Noble observed what was thought to be “noise” when there should not have been any flow through the meter. Operationally at the platform level, there was nothing occurring that would indicate there should be flow through the meter, but the meter would intermittently indicate flow. Noble reported no change in the size of the flame at the flare during these times. The flows were much lower than the upset condition flow in Figure 5, but over time add up to very significant volumes. A one-hour period of these flows is shown below in Figure 6. Over this one-hour period on July 9th, 2020, the meters reported _____ of flow to the flare. These intermittent lower flow readings have been occurring since the flare measurement system has come online. It is important to note that in Figure 6, the pressure remains at zero psig for the entire hour. If there was truly flow, the pressure should increase at least slightly during periods of flow.

[מידע על תהליכים וספיקות]

[שם של ספק]

Determination of Source of Erroneous Readings

[מידע על ציוד, תהליכים וספיקות]

It is very apparent from Figure 7

[מידע על ציוד ומערכות]

Comparison

During the one-hour period on July 9th, Noble believed the flare piping was purged with

[מידע על ציוד, שיטות עבודה ותהליכים על האסדה]

[שם של ספק]

Temperature Gradient within Pipe

[מידע אודות ציוד ומערכות על האסדה]

Findings and Root Cause of Erroneous Readings

Based on the reported [שם של ספק ומידע על ציוד ומערכות על האסדה]

In communications with the manufacturer to help determine the cause of the problem,
The manufacturer noted that there appeared to be

[מידע על תיג, ציוד ומערכות על האסדה]

Further investigation revealed that

[שם של ספק]

[מידע על ספק, תיג, ציוד ומערכות על האסדה]

[מידע על ספק, ציוד, שיטות עבודה ומערכות על
האסדה]

[שם של ספק]

[מידע על ציוד ומערכות על האסדה]

The red and green lines

indicating better Receive Parameters.

[מידע על ציוד ומערכות על האסדה]

[שם של ספקן]

[שם של ספק, תהליכים ושיטות עבודה]

System Performance Change

Following the changing of the parameters, additional
. Figure 14 shows the velocities of over a one-hour time period.

[ציוד, מערכות ותהליכים על האסדה]

Figure 15 below
much better than previously.

Here it is readily apparent that
[ציוד ומערכות]

, and Figure 16 shows
is functioning

[שם של ספק]

[ציוד ותהליכים]

Conclusions and Recommendations

What initially appeared as “noise” in the reported flowrate from the [ציוד] meters was determined to be caused by incorrect settings [ציוד]. The incorrect Receive Parameter settings caused reported volumes that were not flowing through the meter.

A temporary solution was implemented to [ציוד] properly field calibrated. This solution eliminated the erroneous readings from [ציוד]

The following recommendations, if implemented, will significantly improve the performance of the HP Flare Measurement system.

1. Perform a field calibration of [ציוד] determine the correct [ציוד]. This is currently being planned by Noble and should occur.
2. Ensure that the planned annual maintenance program for this meter [ציוד] ומערכות
3. Work with the manufacturer or local manufacturer representative to ensure that all parameters are correctly applied for the application. A quality control system should be utilized to ensure that all parameters that affect final reported volumes are correctly applied. This quality control system should be utilized whenever there is a change to any parameter or to any system equipment.
4. Work with the manufacturer or local manufacturer representative to determine a methodology to monitor the performance [ציוד] ומערכות.
5. If possible false low flow readings reappear,

[ציוד, תהליכים ומערכות]

This report is respectfully submitted by _____, Professional Engineer on August 4th, 2020.

[שם של ספק, עובדים אצל הספק וחתימה]