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FMH606 Master's Thesis 2021

Energy and Environmental Technology (EET)

Chemometric analysis of CO_2 capture solvent

(Novel functionalized nanomaterials for CO2 capture)

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Course: FMH606 Master's Thesis, 2021

Title: Chemometric analysis of CO_2 capture solvent

Number of pages: 82

Keywords: Multivariate data analysis, MEA, FTIR, CO_2 capture, Partial Least Squares Regression, Technology Centre Mongstad (TCM)

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Summary:

This study is the next step of ongoing research at University of South-eastern Norway (USN) to enable multivariate analysis for industrial scale CO_2 capture process.

This study has been done in collaboration with Technology Centre Mongstad (TCM) as one of the largest post-combustion CO_2 capture test centers in the world. In 2015 and 2017, TCM operated two comprehensive test campaigns using the benchmark aqueous 30 wt% Monoethanolamine (MEA) solvent.

Through collaboration with TCM, USN has been provided with the laboratory test results of the collected samples and analytical data including Fourier Transform Infrared (FTIR) spectra from these two campaigns.

The received FTIR spectra as a multivariate data source contains the plenty of important chemical information of the samples. To extract these information, partial least square regression (PLSR) method has been used in this study.

The PLSR models of Total Inorganic Carbon (TIC) and Total Alkalinity (Tot-Alk) which have been prepared by using FTIR spectra from these campaigns are presented. From this study, it is evident that online monitoring integrated with spectroscopic analysis is an appropriate method for CO_2 capture plant online monitoring. Through this, it is possible to reduce the time consuming and expensive conventional laboratory analyses of samples from CO_2 capture plants.

Finally, the predictability of PLSR models for preparation of two campaigns was is tested and error of predictions were studied.

Preface

The world is suffering from increasing greenhouse gas emissions. Carbon dioxide (CO_2) is the most influential gas for increasing global warming on earth. Monoethanolamine (MEA) is one of the preferred solvent for CO_2 capture process. Due to degradation during this process a part of the MEA is destroyed and need to be compensated. This study deals with Chemometric analysis of CO_2 capture solvent for a real data set from Technology Center Mongstad (TCM) to prepare PLSR model to be used for the process online monitoring.

This thesis shows how to use multivariate data analysis alongside FTIR spectra received from a real industrial campaign, to prepare Partial Least Square Regression (PLSR) model to predict the concentration of different components mainly TIC and Tot-Alk during the CO_2 capture process.

My special thanks goes to my supervisors prof. Klaus J Jens, prof. Maths Halstensen, prof. Zulkifli Idris and PhD fellow Jayangi Wagaarachchige for giving me the opportunity to know about the Chemometric analysis of CO_2 capture solvent and helped me to have a broad knowledge of the role of a Raman spectroscopy and Multivariate analysis in online monitoring of MEA speciation during the CO_2 capture process. I am grateful to be a part of this research and would like to thank my teachers and the University of South-Eastern Norway (USN), Porsgrunn campus for providing me support and effective guidelines during this research.

Furthermore, my love goes to my family especially to my beautiful love, Fahimeh, who stood by me through all difficulties during my study, and my brother, Nima and my mother, Masoumeh. They kept me going and encouraged me to do my best and without their support this study would not be possible.

It is worth mentioning; this thesis has been conducted in critical situation where I was far from the supervisors due to Covid-19 restrictions. I tried to do my best to be confident and give a satisfactory and reasonable output of the work.

Porsgrunn, May 2021

Ayandeh Khatibzadeh

Contents

Nomenclature/List of abbreviations

CHP	Combined heat and power
FTIR	Fourier transform infrared
HSS	Heat stable salt
IR	Infrared radiation
MEA	Monoethanolamine
PCA	Principal component analysis
PLS	Partial least squares
PAT	Process analytical technology
RFCC	Residue fluidized catalytic cracker
RMSEC	Root mean square of cross-validation
RMSEP	Root mean square error of prediction
TCM	Technology center Mongstad
TIC	Total inorganic carbon/content
TOT-ALK	Total alkalinity

1 Introduction

Global warming has numerous adverse effects on the environment and poses a threat to human beings and wildlife habitats. Hence, a vast number of governments alongside enforcing strict laws to the pollutant industries, support advancement in science to find applicable solutions to reduce the amount of released influential gas that cause global warming on earth. Carbon dioxide (CO_2) is considered to be the most influential gas for increasing global warming on earth. Different approaches have already been applied to reduce the production of greenhouse gases in the industrial sector. Scientist have launched different CO_2 capture plants all around the globe which is based on the solvent to absorb CO_2. Researcher are more focused on absorbent and their properties to ensure well and efficient compound for the absorption process.

Using the chemical adhesives like aqueous amine is common method in industries to CO_2 capture and reduce the emission to the atmosphere. The current interest is to reduce energy demand and prices using alternative amine absorbent.

From July to October in 2015, and from June 2017 to July 2018, Technology Centre Mongstad (TCM) operated two comprehensive test campaigns using the benchmark aqueous 30 wt% Monoethanolamine (MEA) solvent.

Results from this campaigns have been published[1-4] giving insight into MEA behaviors including process conditions, degradation and chemical injections.

Through collaboration with TCM, University of South-eastern Norway (USN) has received relevant analytical data including Fourier Transform Infrared (FTIR) spectra, and laboratory test results of the collected samples from the 1960-hour campaign in 2015 and from June to August of 2017 campaign [2]. FTIR spectra are the multivariate data source containing plenty of important chemical information of the samples. Partial least squares regression (PLS-R) is an advanced statistical method that can be used to extract the chemical information by calibrating models for specific chemical species [5, 6] PLS-R models can be used for online-monitoring of dynamic systems [7]. In this study it has also demonstrated that the online solvent monitoring is possible for CO_2 capture plants.

In this study I present the PLS-R models of Total Inorganic content (TIC) and Total Alkalinity (Tot-Alk) which are prepared by using FTIR spectra from TCM two campaigns. Furthermore, by using the prepared PLSR models from 2015 campaign, the concentration of TIC and Total Alkalinity of 2017 campaign have been predicted and vice versa.

2 CO_2 Capture

The main reason of the greenhouse effect which increase the global warming is CO_2 emissions in atmosphere. Industrial exhaust gases and the fossil fuels are the major reason for greenhouse effect and global warming respectively.

According to the report issued by the united state Environmental Protection Agency (EPA), more than 70% of greenhouse gas emissions is due to CO_2 emissions into the atmosphere. (Figure 2-1)[8]

There are two main reasons to motivate researcher to find new methods in order to clean the CO_2:

- Increased greenhouse effect that leads to climate change
- Political obligations and commitments like Kyoto agreement and follow up relevant protocols

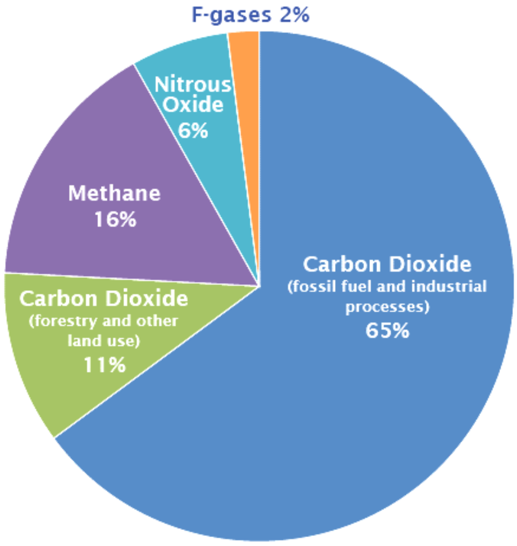


Figure 2-1: Global Greenhouse Gas Emissions by gas [8]

2.1 CO_2 capture methods

Currently large number of methods are being used around the world to do CO_2 capture and clean the exhaust gasses to reduce the emissions to the atmosphere. These methods can be categorized in three main different processes:

- Pre-combustion capture
- Oxygen combustion
- Post combustion capture

2.1.1 Pre-combustion capture method

The focus in pre-combustion method is on fuel reforming. In this approach, the fuel is changing from the hydrocarbon into a mixture of hydrogen and a carbon containing specious mainly CO

(Equation 2.1) and then these two will be separated from each other and the hydrogen will burn instead of the fuel. The fuel is changed one type to another or reformed. The CO which is produced in this process will be converted to $CO_2$by water shift reaction (Equation 2.2). In this reaction more steam is added to convert CO to CO_2 and hydrogen.

$$C_mH_n + mH_2O \Rightarrow mCO + (m + n/2)H_2 \quad (2.1)$$

The water shift equation:

$$CO + H_2O \Rightarrow CO_2 + H_2 \quad (2.2)$$

2.1.2 **Oxygen combustion approach (oxy-fuel combustion)**

This approach is one of the main concept that can be applied to the combustion system. The important point is to generate oxygen in the process. Typically, it could be the separation of air into oxygen and nitrogen maybe by cryogenic separation. Then, the oxygen will be used to oxidize the fuel in the combustion process. That will generate the mixture of CO_2 and water. The water can be condensed and that means CO_2 is left. Since using more oxygen cause high temperature in the combustion chamber, some of the products rout back to the combustion chamber inlet to control the too high temperature in the combustion chamber. The disadvantage of this method is oxygen production which is an expensive process.

2.1.3 **Post-combustion capture or flue gas approach**.

In this approach a CO_2 capture plant is used after combustion phase to remove CO_2 from the exhaust gases. As it can be seen in Figure 2-2, the exhaust gasses scrubbed in an absorption column with a suitable absorbent. The absorbent (solvent) will react with the CO_2 and CO_2will be transferred from gas phase to the solvent that is a chemical & physical absorption. The solvent will be regenerated in a separate stripper. The lean solvent (without CO_2) pumped back to the top of the absorber for a new cycle.

Although CO_2 capture plant are commonly expensive, solvent-based absorption is one of the well-known method in post-combustion capture approach around the word.

This approach is basic of the subject of this study. Since, solvent regeneration or solvent degradation reduction is interesting for doing research in this area. In article 2.2 using solvents mainly amines in this method is discussed.

2.2 CO_2 capture using Amines

Using the aqueous amine solution is the most common approach in CO_2 chemical absorption. As a result of high capacity in CO_2 removal, they are widely used in industries. [9]

Amines are one of the most applicable solvent for CO_2 capture purpose. These are an organic compound that contains a nitrogen atom. Ammonia is basis of them that hydrogen atoms are replaced by alkyl group. However, MEA solutions are corrosive specially if the amine concentration exceeds 20%. [10]

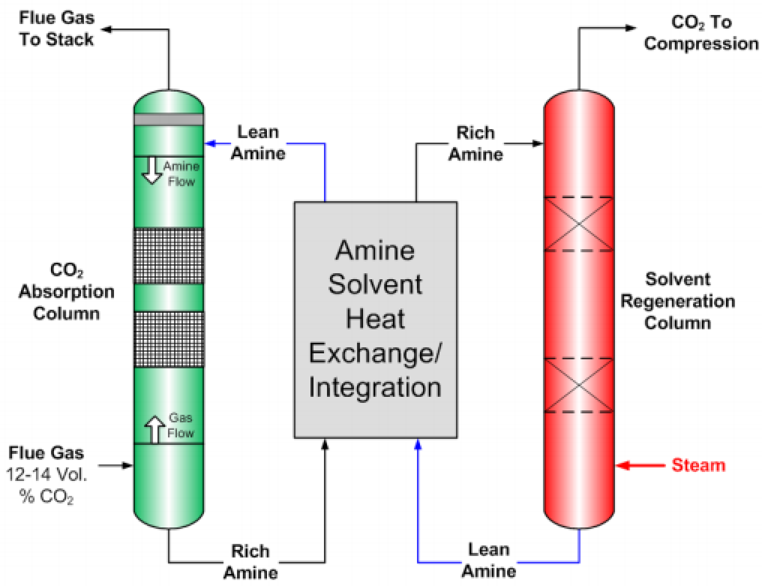


Figure 2-2: CO2 capture general process [13]

Monoethanolamine MEA (C_2H_7NO is one of the most common solvent used in post-combustion CO_2 capture chemical absorption process. One of the main reason of that is it has a good loading capacity compare with the other amines like MDEA & DEA. The loading capacity of the MEA is 0.5 moles CO_2 per mole of MEA.[11] The most common percentage of aqueous Monoethanolamine (MEA) is 15-30 wt. %. [12]

MEA is usually kept in around 30 wt % to avoid thermal degradation and also corrosion in the process plant.[2]

During the CO_2 capture process, two molecules of amine in aqueous solutions will react with CO_2 and remove it from the exhaust gas.[13]

As a result of this interact with CO_2, carbamate ion ($MEACOO^-$) and protonated amine ($MEAH^+$) are formed. (Equation 2-3)

$$2MEA + CO_2 \rightarrow MEACOO^- + MEAH^+ \tag{2.3}$$

Overall mass balance for MEA (protonates amine, carbamate & free amine) and CO_2 (bicarbonate, carbonate & CO_2) are as follow:

$$C_{MEA,total} = C_{MEAH^+} + C_{MEACOO^-} + C_{free,MEA} \tag{2.4}$$

$$C_{CO_2,total} = C_{HCO_3^-} + C_{MEACOO^-} + C_{CO_3^{2-}} + C_{CO_2} \tag{2.5}$$

2.2.1 General CO_2 capture process

As it illustrated in Figure 2-2, the flue gas (exhaust gas from industrial plants) contains CO_2 enters at the bottom of CO_2 absorber or absorption column as a feed flow and flows upward through the packing or trays inside of this column. At the same time, fresh or lean amine is fed at the top of the absorber column and falls down through the packing or trays. Flue gas and amine solutions move through each other and some reactions between solvent and flue gas molecules are happened, Equation 2-3 to 2-5. A huge amount of CO_2 molecules will be absorbed by amine molecules (the lean amine which is converted to CO_2 rich amine). The mixture of CO_2 and amine which is called rich amine flows toward the mid-heat exchanger and solvent regeneration column (Stripper) respectively. There are 2 stripper columns in TCM CO_2 capture plant with 30 meters height and 1.3 & 2.2 m diameter. These two column are designed to work with different types of feed fluid gases i.e. CHP and RFCC.[14]

In the stripper column, hot steam enters at the bottom of column and reacts with rich solvent. In this phase, CO_2 is removed from the rich amine by heat and moves out the process for further action mainly disposal or storage. The regenerated amine or lean amine leaves the stripper column and flow toward the heat exchanger and then enter the absorption cycle again.

It should be taken into consideration that the temperature is an important issue in this process either in absorber column or stripper to have the high amount of CO_2 absorbing and also to avoid destroying amine molecules in stripper.[9, 15]

Solvent exposure to oxygen and flue gas contaminants in the absorber and operation at elevated temperature (above 100 °C) in the stripper section as main cause for degradation.[1]

The common temperature and pressure in absorber column is around 55 °C and 1 atm. To regenerate rich solvent the temperature and pressure inside the stripper column are 100-120°C and 1.5-2 atm. Moreover, high temperature of the stripper helps destroying absorption as well.[16]

Generally, a part of amine molecules which take up the CO_2 are destroyed by heat (stripper column) and oxygen (absorber column). Due to high temperature or high pressure the amine no longer absorbs CO_2. Maybe as a result of degradation of the solvent.[17] Hence, fresh solvent should be entered the process continuously which is around 10% of the operational cost of the capture plant.[15]

Oxygen will destroy the molecule which reacts with CO_2. The effective capacity of the scrubbing solvent is being reduced as well (oxidative). Oxidative degradation needs oxygen which mainly exist in absorber due to high amount of oxygen. Degradation is based on radical reactions between oxygen and Monoethanolamine.

$$MEA + O_2 \rightarrow \text{Organic acids} \tag{2.6}$$

$$\text{Organic acids} + MEA + CO_2 \rightarrow HSS \tag{2.7}$$

Oxidative degradation is an issue in this process. Organic acids are the main product of the reaction between MEA and oxygen. The organic acids react with MEA and form HSS (heat stable salts), Equations 2-6 and 2-7. It is difficult to regenerate HSS and they are not affected by heat easily. Hence, they remain and accumulate at the system.[1]

3 Spectroscopy

Spectroscopy is the study of the interaction between substance and radiant energy/light. This is the measurement of electromagnetic radiation in order to obtain information about the system under study. In fact, spectroscopy is a method of obtaining quantitative information from the electromagnetic spectrum and absorption or emission of radiation at different wavelengths are measured.

Some lights transmit through the material, some is reflected, some are absorbed and some are scattered.

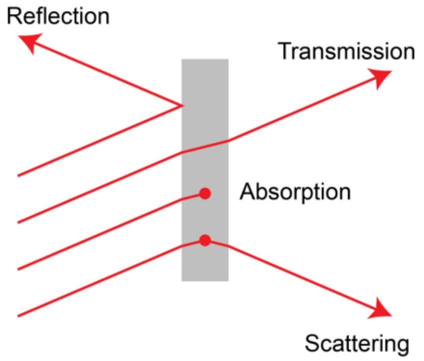


Figure 3-1: Light behaviors while interacting with material

During the interaction of electromagnetic radiation with substance, electromagnetic radiation can be considered as a set of separate energy packets called photons. Electromagnetic radiation also has wave properties in addition to particle properties.

Spectroscopy is based on changing in vibration of Raman scattered electromagnetic radiation. Research findings confirm that the Raman signal are rich in chemical information specially for CO_2 and amines.[18]

3.1 Electromagnetic radiation

The range of all types of electromagnetic radiation is electromagnetic spectrum.

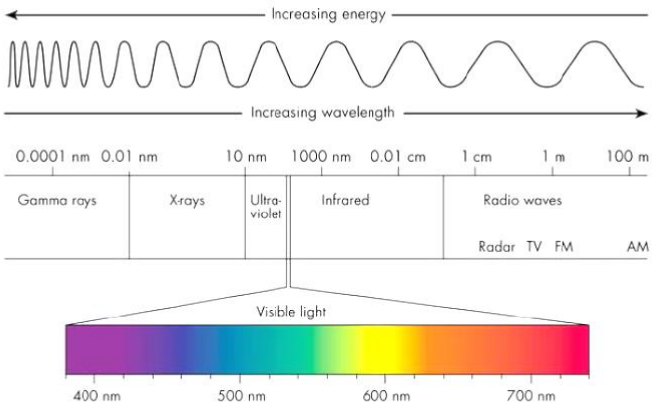


Figure 3-2: Electromagnetic spectrum [19]

As it indicated in Figure 3-2, based on the frequency/wave length, the spectrum is divided to different area. Also, infrared area is before radio waves and after ultra violet region. However, the visible light is in the vicinity of the infrared region that is between 400 nm to around 700 nm. [19]

3.2 Raman Spectrometer

Spectroscopy is a strong Process Analytical Technology (PAT) and as a result of fast responding ability it is a good and reliable equipment for online applications in CO_2 capture process compare with the other available equipment like IR spectroscopy or NMR spectroscopy. [18]

By using the Raman spectrometer, the scattered light is used to measure the energy of the samples and the results of the measurements are described as Raman spectra. The intensity of scattered light (Y-axis) for each frequency of light (X-axis) can be plotted. This frequencies are measured in a unit called the reciprocal centimeter (cm^{-1}) which is the number of wave per centimeter. (Figure 3-2) [20]

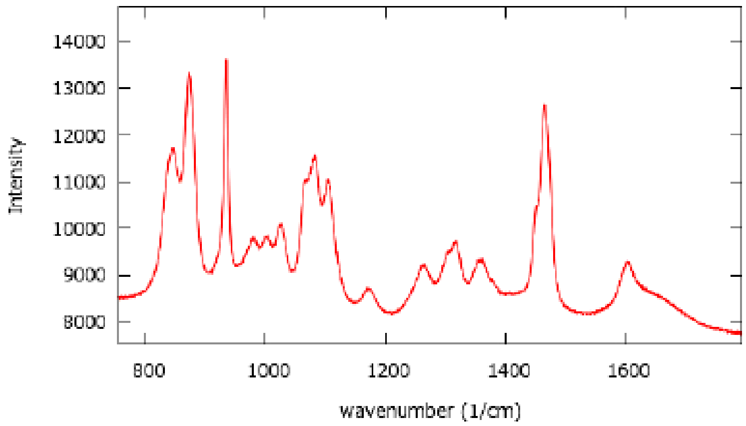


Figure 3-3: Reference Raman spectra for MEA [20]

3.2.1 The Raman spectrometer & CO_2 rig at USN

University of South-eastern Norway (USN) has an RXN2 portable multichannel Raman spectrometer (Kaiser Optical System Inc.). This equipment has an NIR diode laser with wavelength of 785 nm spanning in the spectral range 100-3425 cm-1. The Raman spectra is obtained using a short-focus probe optic (200 µm) that is in a direct contact with the solution.[18]

Furthermore, there is a CO_2 rig at USN that includes an absorption column with 2.5 m high and 0.1 m inner diameter. The rig can circulate 250 kg/h liquid and 40 Nm^3/h gas flow in its maximum loading capacity. These rig and Raman spectrometer are widely used in different researches. (Figure 3-4)

Figure 3-4: Available CO_2 rig at University of South-eastern Norway (USN) – Porsgrunn campus [18]

3.3 Fourier Transform Infrared Spectroscopy (FTIR)

Fourier Transform Infrared Spectroscopy (FTIR) is an analytical device for obtaining the absorption or emission infrared spectrum of a solid, liquid or gas for molecular species identification. A FTIR device is capable of simultaneously separating and aggregating separable light spectrum data from a wide spectrum of light. By infrared radiation (IR) detection which are absorbed by chemical bands in each species. As a result of vibration and absorbed IR radiation at different wavenumbers, the chemical bonds can be detected.

The advantage of FTIR is at the same time, several compounds can be detected in a continues monitoring. FTIR alongside with the multivariate data analysis approaches like partial least square regression (PLSR) are powerful techniques for scientific purposes.[6]

To identify unknown materials and substance, the FTIR is useful. A schematic of a typical FTIR including source, sample, detector etc. is shown in Figure 3-5. [21]

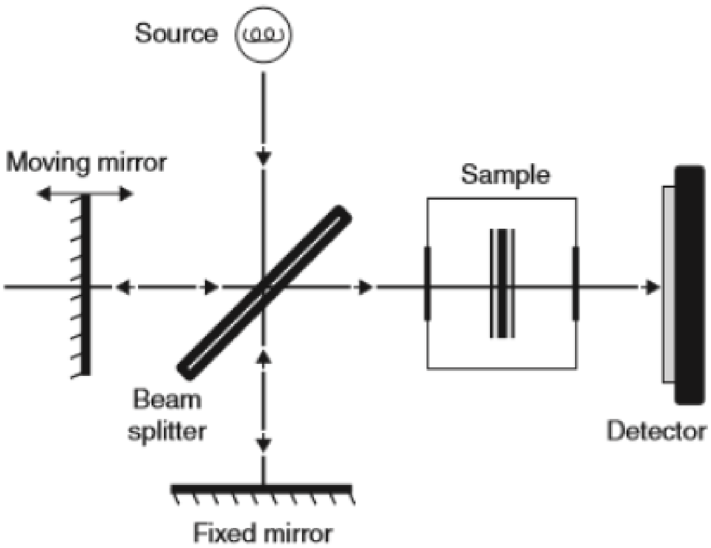


Figure 3-5: Schematic of FTIR [21]

4 Multivariate Data Analysis

Multivariate data analysis is widely used to analyze data containing numerable variables. Extracting required information would be challenging when there is a large dataset. Chemometric that is kind of a multivariate analysis method is a well-suited method for extracting required information from a huge amount of datasets like Spectroscopy. In chemometric knowledge, information, data and measurements are combined together using a set of mathematical tools to describe science based on the experimental results. A calibration model in chemometric deviates far more than traditional modelling which are based on assumptions or theories because it is built on an experimental investigation.

As it mentioned above, spectroscopy is a very good example for having a large dataset. In order to convert the Raman spectra to chemical information, data pre-processing before interpretation is needed.[18]

In this project for doing chemometric, Unscrambler X 10.3 Client version and partial least squares regression (PLSR) as the common approaches in chemometric are used to process the received laboratory results and FTIR spectra from two MEA campaigns in 2015 and 2017 in Technology Centre Mongstad (TCM).

4.1 Data pre-processing

The received data from instrumental equipment usually contains noise or scattering which has a negative effect on extracting the required information. So, to have a reliable dataset and using the multivariate calibration models, doing pre-processing sounds important.

One of the more common data pre-processing method is the baseline correction. A proper correction of the baseline reduces the number of variables and make the data interpretation easier. However, it should be considered that removing too much data may affect the accuracy of the results. In this work, the baseline correction has been done by the supervisors and in article 5.4.1, the applied correlation method is discussed.

4.2 Principal Component Analysis

Principal Component Analysis (PCA) is a technique which by using mathematical principles, transforms correlated variables into a few number of variables or principal components.

PCA is a common to be used at first step to analyze huge datasets. Simplifies analysis of multivariate data by reducing the multi-dimensional dataset into a new dataset of lower dimensions which are orthogonal (independent). The most powerful feature of PCA is the simultaneous interpretation of score plot and loading plots. Generally, PCA is a method to visualize the information in the data to find hidden information. PCA output is graphs which are easy to interpret but having much information.

$$X = TP' + E \tag{4.1}$$

$$X = T_1P_1^T + T_2P_2^T + ... + T_nP_n^T + E \tag{4.2}$$

X: indicates the multivariate data matrix (variables)

P_i (i=1, 2, 3, …, n) indicates number of components containing the orthogonal loadings.

E: indicates noise (residual matrix) containing the information not explained by **T** & **P**.

T: transposition matrix containing orthogonal score vectors t.

The first principal component (PC1) and second principal component (PC2) are orthogonal. Also PC1 & PC3, PC1 & PC4, … are orthogonal.

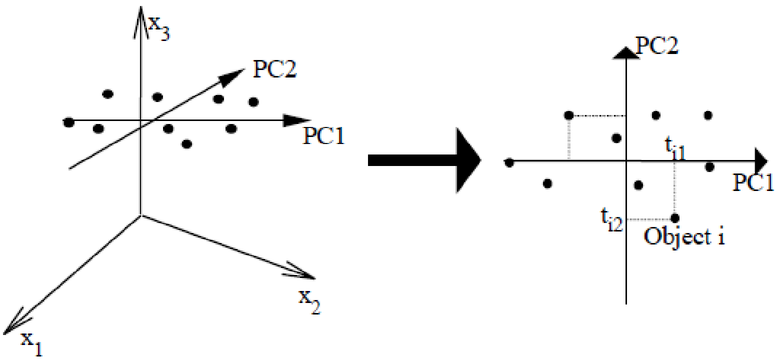


Figure 4-1: Scores as PC-coordinates [22]

4.2.1 Scores and loading

In the score plot for PC1 and PC2, scores are related to the samples and loadings are related to variables.

In order to interpret the score and loading plots and extract the required information, the angle between PCs and variables in these plots are important. Small angle between PC1 & variable 1 vector (Figure 4-1)[22] shows the variable number 1 has relatively high loading valued or influence for PC1 direction.

A big angle between PC1 and variable number 3 shows the variable 3 does not have strong influence on the distribution of the samples on PC1 direction. It means small loading value for PC1.

Loadings are cosine (angle between a variable and a PC direction)

Angle 0 (same direction): $COS(0) = 1 \rightarrow Loading = 1$ High loading value

Angle 1 (orthogonal): $COS(90) = 0 \rightarrow Loading = 0$ Small loading value

To do principal component analysis flawlessly, it is required to check the all plots i.e. PC1-PC2, PC1-PC3, ….

Meanwhile, it should be considered that it is required to check the same score & loading plot simultaneously.

Figures 4-2 to 4-5 are some examples of these types of plots i.e. score plot and loading plot which should be checked at the same time.

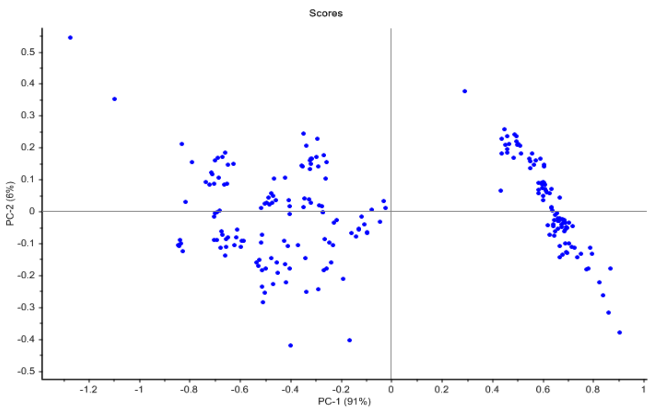


Figure 4-3: Score plot PC1-PC2 (t1-t2)

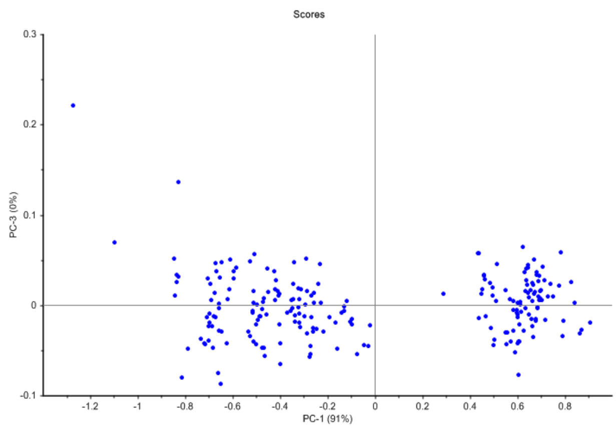


Figure 4-2: Score plot PC1-PC3 (t1-t3)

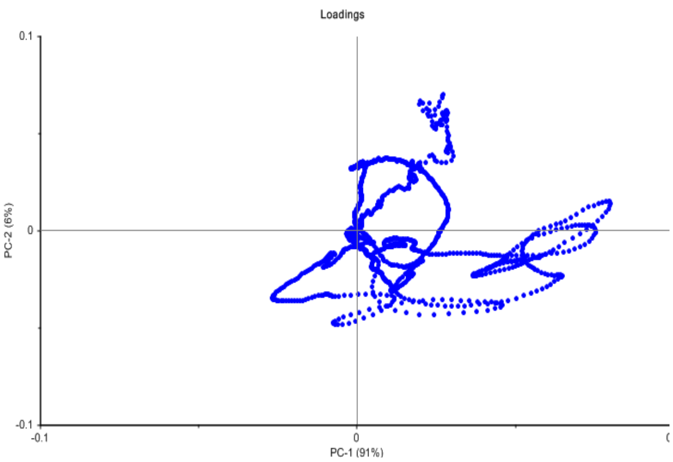


Figure 4-4: Loading plot PC1-PC2 (P1-P2)

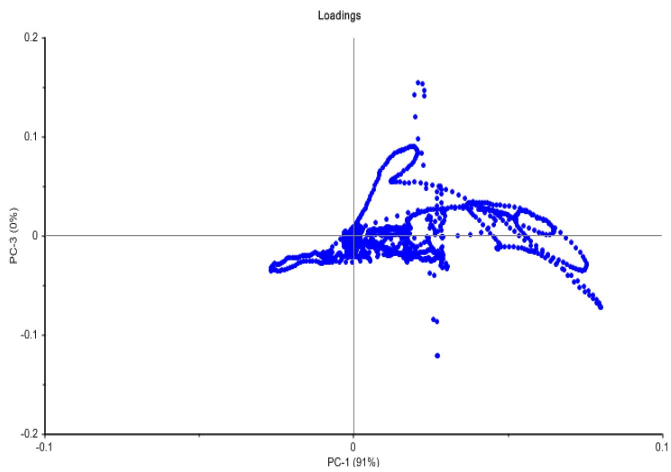


Figure 4-5: Loading plot PC1-PC3 (P1-P3)

4.2.2 Outliers

Outliers are the samples or objects which for some reasons are very different from the rest of the samples or objects (Figure 4-6). The reason why they behave differently cannot be found out simply. They can be noise in the used instrument, operator mistake, wrong measurement etc. For any reasons, the outliers have an adverse effect on our models, result and extracted required information accordingly. To solve this problem, the possible outliers should be identified and then be corrected or even removed. In PCA, the outliers can be seen in the score plots.

As it shown in Figure 4-6, the samples usually can be seen in a cluster. The outliers (e.g. samples number 21916, 21990, 21431 and 20991 in this figure) are out of the cluster.

It is important to check the influence of the detected outlier on the data. If the detected outlier has strong influence on the data, removing it gives rise to a wrong and unreliable model.

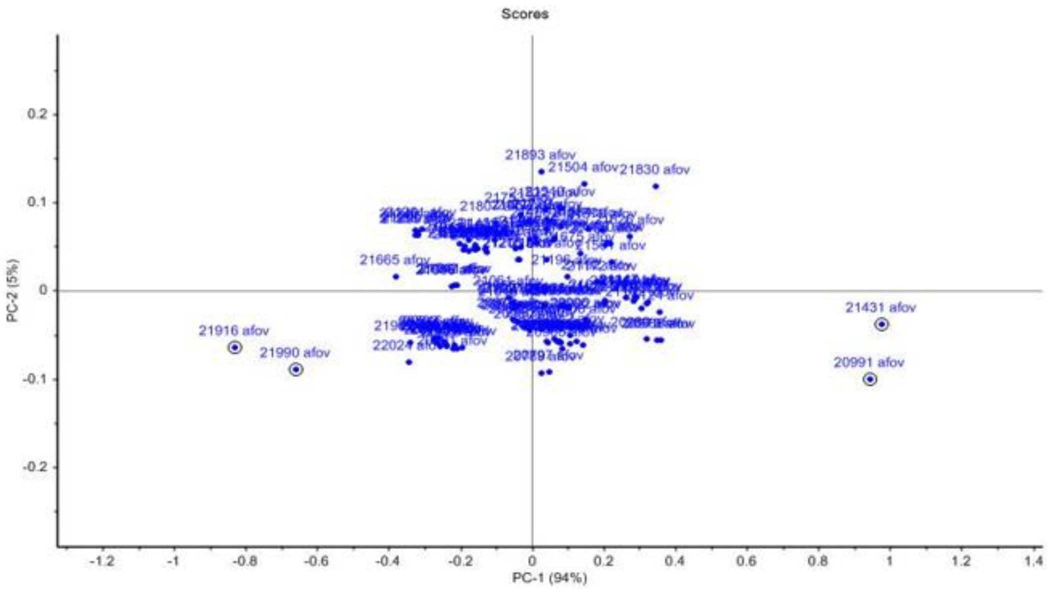


Figure 4-6: Example of outliers identification in models

After removing the identified outliers, a new score plot should be made and the plots should be checked for more probable outliers.

4.3 Partial Least Squares

Partial least squares (PLS) is one of the regression method which is used to find the best possible model for prediction of **Y** (the parameter/s of interest) from multiple **X** measurements or raw data. The model translates the multivariate **X** measurements into **Y** parameters.

$X_{nxp} \rightarrow$ Prediction model $\rightarrow Y$ (predicted parameter)

$$\hat{Y} = X.b + a \tag{4.3}$$

$\hat{Y} =$ predicted value

X= multivariate measurement

b = regression coefficient that we need to find

a = constant

4.3.1 Average prediction errors in the model

To assess the accuracy of the model, root mean square error of prediction (RMSEP) should be checked. The RMSEP shows the estimation of the average prediction error in the prepared model, with same measurement units. For instance, if the measurement has been done in meter, the RMSEP estimates the prediction error in meter.[22]

The definition of the root mean square error of prediction (RMSEP) is given in equation 4.4. This is the average of squared differences between measured and predicted values. RMSEP is usually shown in Predicted vs. measured plot, Figure 4-7.

$$RMSEP = \sqrt{\frac{\sum_{i=1}^{I}(y_{predicted} - y_{reference})^2}{I}} \tag{4.4}$$

$y_{predicted}$ = the predicted values

$y_{reference}$= the measured values

I = total number of samples.

On the top left corner of the Prediction vs reference plot some statistical parameters can be seen. These parameters are Elements, Slope, Offset, Correlation, R^2 and RMSEP.

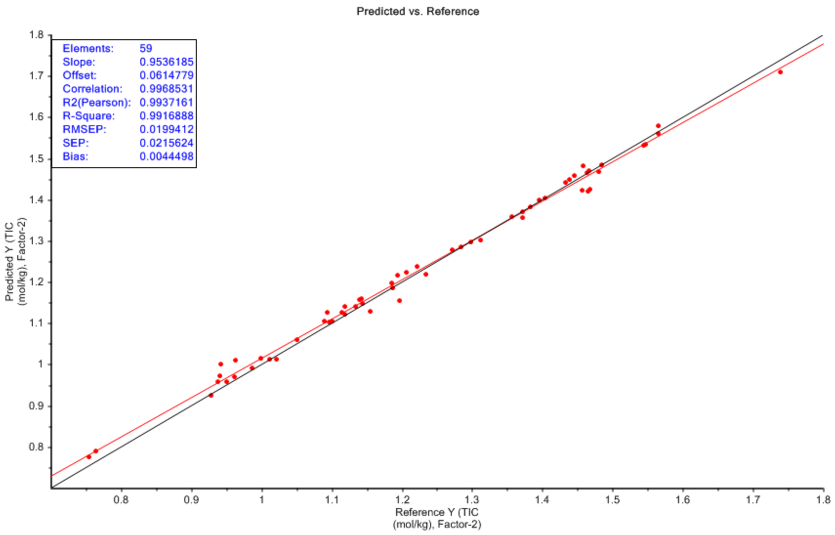


Figure 4-7: Predicted vs reference plot

The definition of these important parameters are as follow:

Elements: The number of used samples at model

Slope: Slope of regression line (the red line), the perfect slope is 1

Offset: Distance between origin and regression line, a perfect model has a slope close to zero

Correlation: The correction between predicted and reference values, 1 is a perfect model

R^2: Squared version of correlation

RMSEP: Root mean square error of prediction or average prediction error

4.3.2 Partial least squares-regression (PLSR)

As it has been discussed before, **X** is considered as the training data or calibration data which is a matrix. **Y** is either matrix or a vector. PLSR is a method to find linear model of both **X** and **Y** simultaneously. Except from the parameters which we could get from PCA like **T** scores and **P** loading for **X**, from PLS we also get something called **W** which is loading weights.

Loading weights contain the effective loading value for prediction of **Y** which is different from **P** which only describes the important variables for the maximum variance directions in **X**.

So, **P** only describes **X** while **W** describes **X** and **Y**.

Since PLSR also models the **Y** data we get scores and loadings for **Y** as well. The score for **Y** are called **U** and the loading for **Y** are called **Q**.

$$X = \sum_{A} T.P^{T} + E \tag{4.5}$$

$$Y = \sum_{A} U.Q^{T} + F \tag{4.6}$$

T = X-scores ; U = Y-scores

P = X-loadings ; Q = Y-loading

E = X-residual ; F = Y-residual

W = loading weights

W explains important variables for prediction of **Y** from **X**.

The decomposition is finalized as to maximize the covariance between **T** and **U**. So we maximize the covariance between the scores for **X** part and the score in the **Y** part.

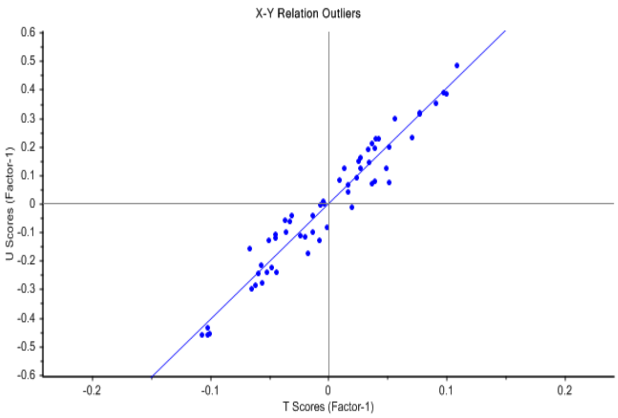


Figure 4-9: Example for T-U plot

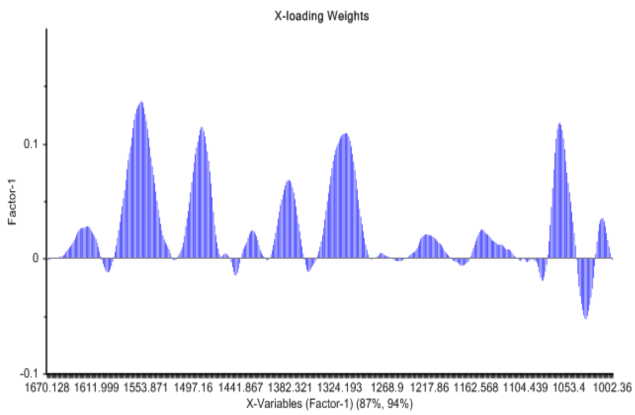


Figure 4-8: Example for loading weight plot

5 PLSR models for MEA campaigns in TCM

From July to October in 2015 and from July 2017 to July 2018, TCM operated two comprehensive test campaigns using the benchmark aqueous 30 wt% Monoethanolamine (MEA) solvent.

Through collaboration with TCM, University of South-eastern Norway (USN) was provided with relevant analytical data including Fourier Transform Infrared (FTIR) spectra, and other laboratory test results of the collected samples from these two campaigns.

In this chapter I present the PLS-R models of Total Inorganic carbon (TIC) and Total Alkalinity (Tot-Alk) which were prepared by using FTIR spectra from TCM campaigns. Furthermore, by using the prepared PLSR model from 2015 campaign, the concentration of TIC and Total Alkalinity of 2017 campaign is predicted and vice versa.

5.1 Technology Centre Mongstad (TCM)

Technology Centre Mongstad (TCM) located in Mongstad, Norway. TCM is the one of the largest post-combustion CO_2 capture test plant in the world which is collaborating in CO_2 capture technologies development. TCM is a joint venture set up by the Norwegian government through Gassnova, Equinor, Shell and Sasol. The center receives flue gas both from nearby refinery and a gas powered heat and power plants. Schematic Process Flow Diagram (PFD) of the TCM CO_2 capture test plant is shown in Figure 5-1 [1].

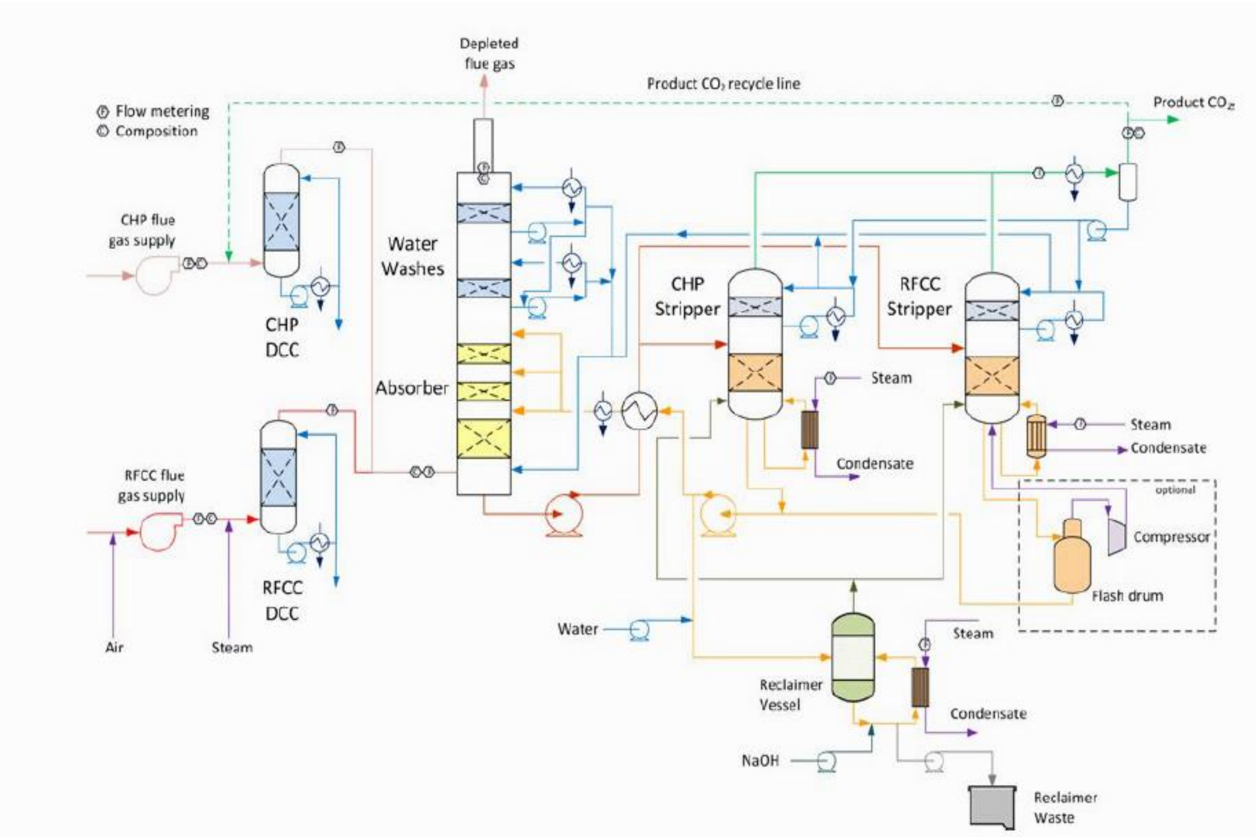


Figure 5-1: Schematic Process Flow Diagram (PFD) of the TCM CO_2 capture test plant [1]

5.2 Provided data from collected samples by TCM

Technology Centre Mongstad provided USN with dataset and FTIR spectra for the 227 samples consisting of lean and rich amine samples. Also, the laboratory measured values/concentration of different species during the campaign were received. The FTIR measurement by TCM are made in the range from 399 to 3996 cm^{-1}.

It can be seen in Figures 5-2 and 5-3, the region from 1800 to 2500 cm^{-1} and 400 to 700 cm^{-1} probably contain noise. These regions have not been considered during the model preparation.

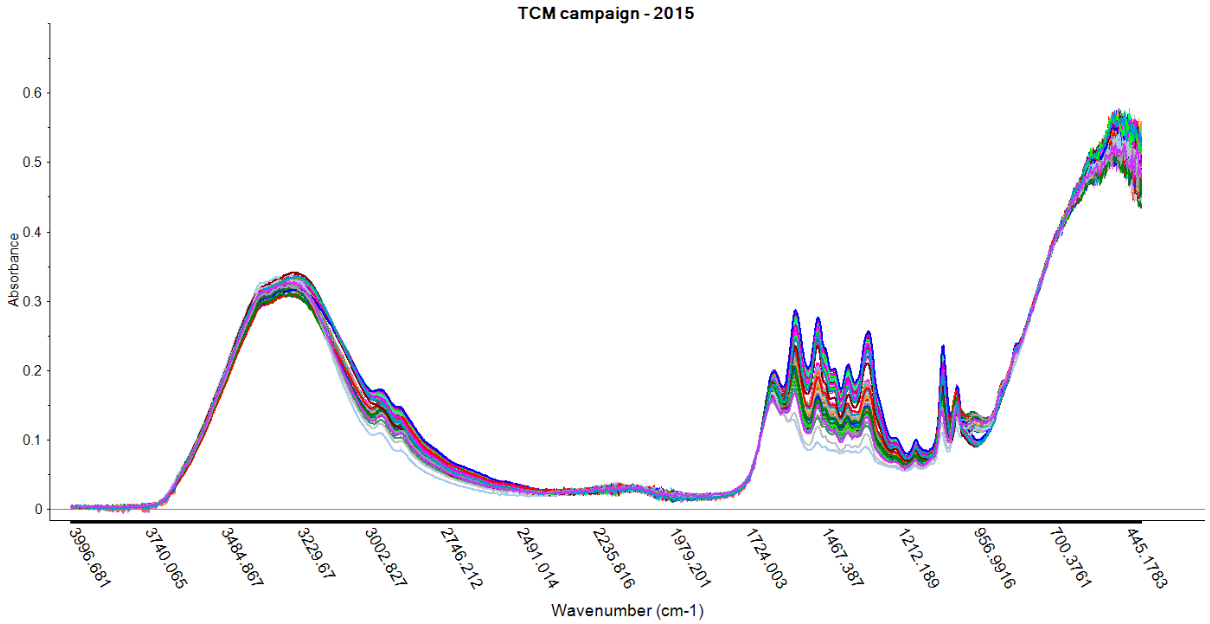


Figure 5-2: Spectrum of all samples (lean and rich)

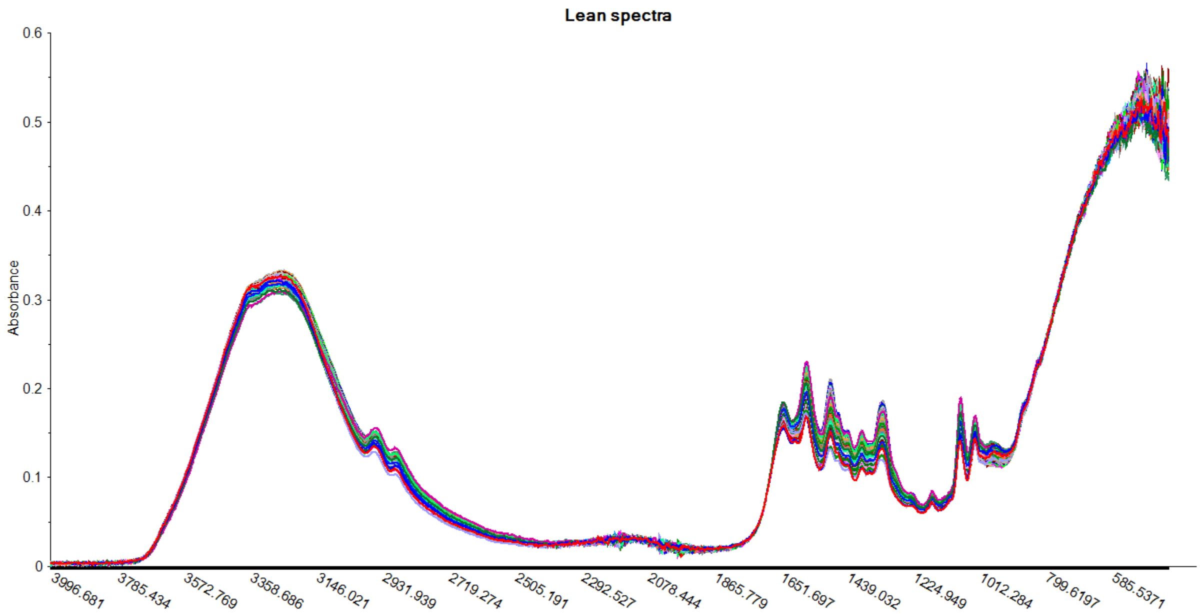


Figure 5-3: spectrum of lean samples

5.2.1 Total Inorganic Carbon/content (TIC)

To determine the CO_2 concentration in the capture process, the summation of carbon species (molecular CO_2, carbonate, bicarbonate) are considered and called Total Inorganic Carbon/Content (TIC).
The spectral region which has been used for modeling in this study which inorganic carbons have high intensity in the spectrum is from 1000 to 1670 cm^{-1} [23, 24]. (Figure 5-4)

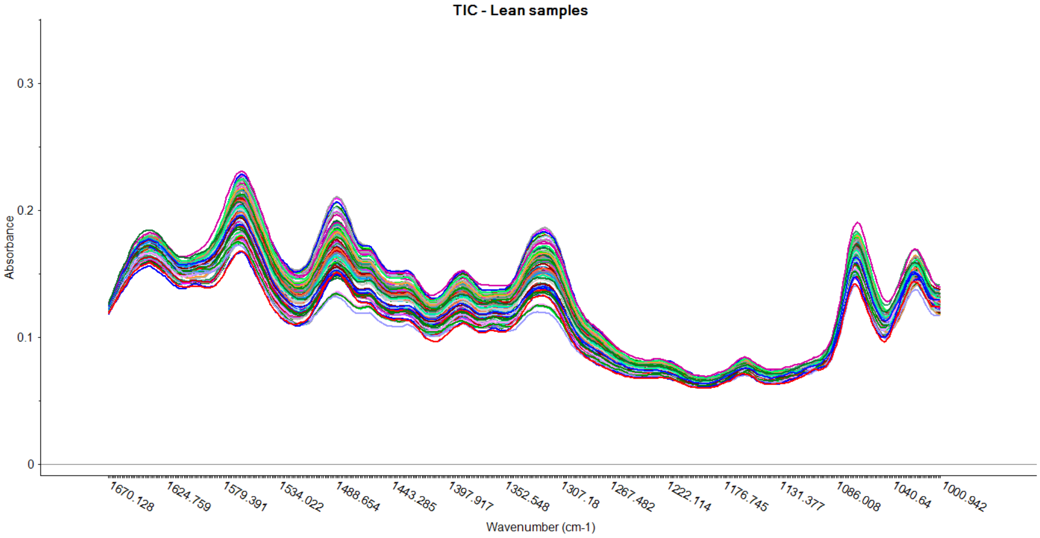


Figure 5-4: Selected wavenumbers/region to TIC model preparation

5.2.2 Total Alkalinity (TOT-ALK)

To determine the amines' concentration in the solution, Total Alkalinity is used.
As it is indicated in Figure 5-5, the spectral region which has been used for PLSR model preparation in this work are 2800 to 3000, 1280 to 1680 and 1000 to 1100 cm^{-1}. [24, 25]

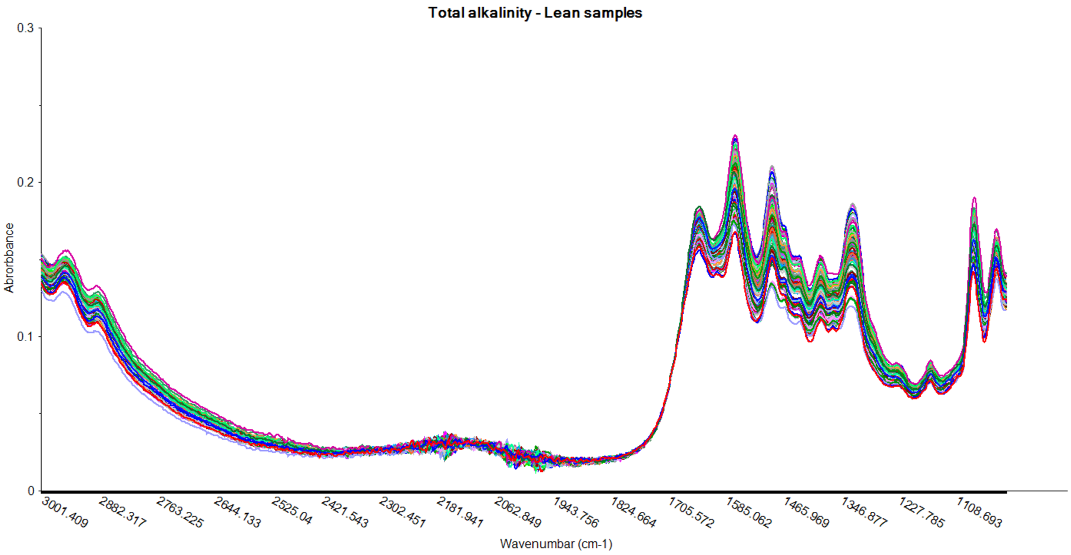


Figure 5-5: Selected wavenumbers/region to total alkalinity model preparation

5.3 Prepared models based on received original data set

To simplify working on the received dataset (laboratory test results) containing measured values for two MEA campaigns i.e. 2015 & 2017, the data dump provided by Technology Centre Mongstad has been tabulated.

1	Sample No.	Id numeric	Sampled date	Sampling point	Description	Analysis	Component name	Result text	Units	Date result entered	Project id	TIC	TOT-ALK	HSS	ICP-OES	PH	Store	LC-MS	IC
32	2	20423	7/14/2015 4:07	S-8611-2013	Lean amine - absorber inlet	IC	FA	110	mg/L	7/21/2015 12:58	TCM MEA 2015								x
33			7/14/2015 4:07	S-8611-2013	Lean amine - absorber inlet	IC	NO2-	<110	mg/L	7/20/2015 15:22	TCM MEA 2015								x
34			7/14/2015 4:07	S-8611-2013	Lean amine - absorber inlet	IC	OA	<55	mg/L	7/21/2015 12:58	TCM MEA 2015								x
35			7/14/2015 4:07	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	<55	mg/L	7/20/2015 15:22	TCM MEA 2015								x
36			7/14/2015 4:07	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.5		7/14/2015 9:57	TCM MEA 2015					x			
37			7/14/2015 4:07	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		7/14/2015 11:55	TCM MEA 2015						x		
38	3	20439	7/14/2015 17:50	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.129	mol/kg	7/15/2015 15:10	TCM MEA 2015	x							
39			7/14/2015 17:50	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		7/15/2015 13:10	TCM MEA 2015						x		
40	4	20443	7/15/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.12	mol/kg	7/15/2015 13:12	TCM MEA 2015		x						
41			7/15/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.142	mol/kg	7/15/2015 14:50	TCM MEA 2015	x							
42			7/15/2015 4:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.5		7/15/2015 12:23	TCM MEA 2015					x			
43			7/15/2015 4:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		7/15/2015 13:10	TCM MEA 2015						x		
44			7/15/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	364145	mg/L	7/20/2015 8:01	TCM MEA 2015							x	
45	5	20461	7/15/2015 18:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.196	mol/kg	7/16/2015 13:33	TCM MEA 2015	x							
46			7/15/2015 18:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		7/16/2015 10:54	TCM MEA 2015						x		
47	6	20465	7/16/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.03	mol/kg	7/16/2015 10:51	TCM MEA 2015		x						
48			7/16/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.176	mol/kg	7/16/2015 13:46	TCM MEA 2015	x							
49			7/16/2015 4:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.4		7/16/2015 10:55	TCM MEA 2015					x			
50			7/16/2015 4:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		7/16/2015 10:54	TCM MEA 2015						x		
51	7	20484	7/16/2015 18:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.119	mol/kg	7/17/2015 14:30	TCM MEA 2015	x							
52			7/16/2015 18:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		7/17/2015 10:25	TCM MEA 2015						x		
53	8	20488	7/17/2015 3:30	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.97	mol/kg	7/17/2015 11:08	TCM MEA 2015		x						
54			7/17/2015 3:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.116	mol/kg	7/17/2015 14:26	TCM MEA 2015	x							
55			7/17/2015 3:30	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.5		7/17/2015 11:08	TCM MEA 2015					x			
56			7/17/2015 3:30	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		7/17/2015 10:25	TCM MEA 2015						x		
57			7/17/2015 3:30	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	343144	mg/L	7/20/2015 8:02	TCM MEA 2015							x	

Figure 5-6: Tabulated data dump received from TCM

By this method it was easy to find which sample has a measured value of Total Inorganic Carbon (TIC) and Total Alkalinity (Tot-Alk) during the campaign. The available laboratory measured concentrations have been imported to the main data set in Unscrambler software as **Y** variable (the parameters of interest).

The tabulated measured concentrations during the 2015 MEA campaign is available in appendix B.

5.3.1 TIC values prediction in lean amine samples – 2015 campaign

At first step and to start working on the received data and getting familiar with model preparation, the principal component analysis (PCA) approach was followed to realize how to deal with data and also find the samples which can be possible outliers. By PCA modeling, four samples have been identified as possible outliers which for some reasons behave differently than other samples. (Figure 5-7 and Table 5-1).

The identified outliers have been removed from the original baseline dataset to further PLSR modeling.

Table 5-1: Identified outliers by using the PCA model

Identified Outliers
21916, 21990, 21431, 20991

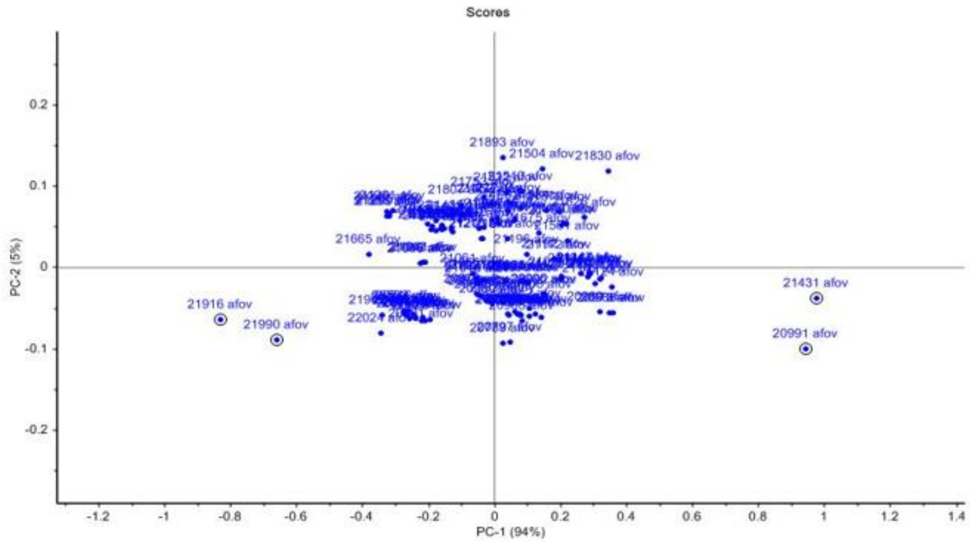


Figure 5-7: possible outliers

In the next step and in order to PLSR modeling, three samples i.e. 20423, 20511 and 20849 have been kept away from the main baseline dataset to test the predictability of TIC value for these three samples. The model with acceptable accuracy was prepared (Figure 5-8) and the predictability for TIC concentration of these three samples was tested. The result is shown in Table 5-2.

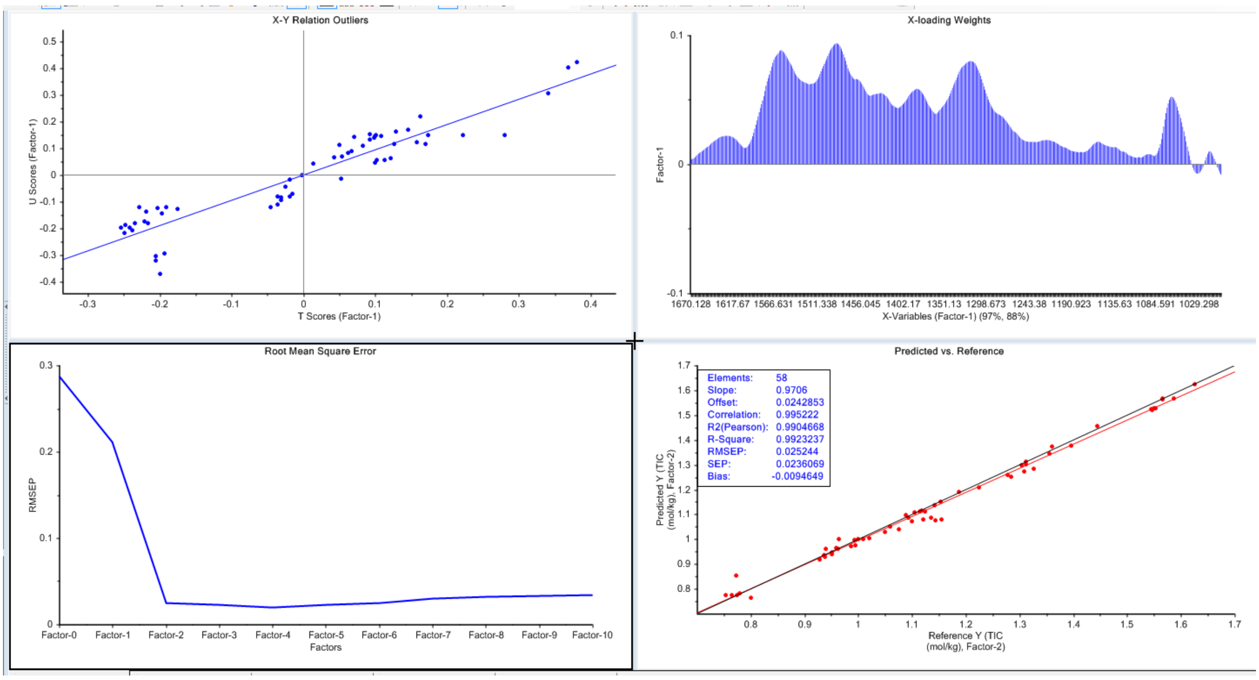
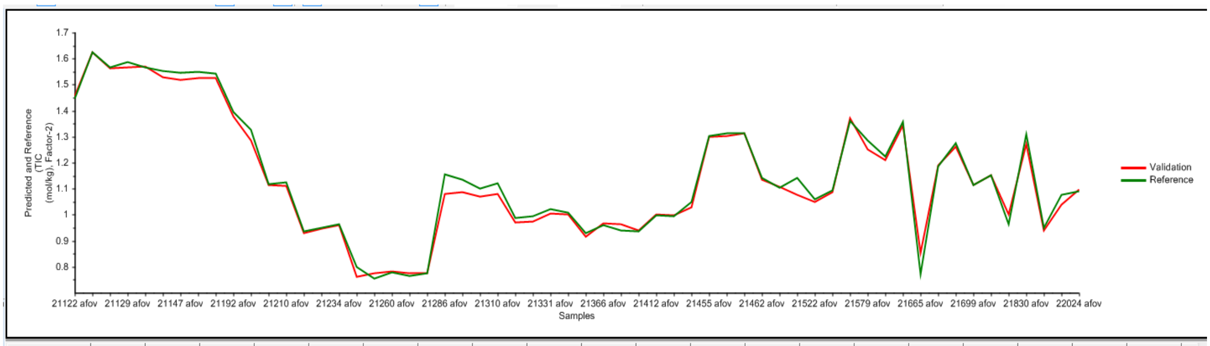


Figure 5-8: PLSR model to predict TIC value for three samples

Table 5-2: Predicted TIC concentration for three samples

Sample	Measured TIC values by TCM (mole/kg)	Predicted TIC values by model (mole/kg)
20423	1.19	1.20
20511	1.13	1.13
20849	1.29	1.28

Then, the other ability of the PLSR model which is prediction of TIC concentrations for all samples without keeping away some samples was tested. This is one of the advantages of using PLSR modeling. Figure 5-9 confirms that the predicted TIC values by model are almost compatible with the measured ones during the campaign. The PLSR model can predict the values with an acceptable accuracy.



	Measured	Predicted	Pred STDE	1670.128	1668.71	1667.292	1665.874	1664.457	1663.039
20401 afov;Lea	1.1920	1.1718	0.0228	0.1187	0.1214	0.1239	0.1262	0.1285	0.1311
20423 afov;Lea	1.1930	1.1855	0.0228	0.1181	0.1212	0.1241	0.1265	0.1288	0.1311
20439 afov;Lea	1.1290	1.1142	0.0229	0.1182	0.1209	0.1237	0.1262	0.1285	0.1311
20461 afov;Lea	1.1960	1.1319	0.0228	0.1187	0.1218	0.1248	0.1275	0.1299	0.1322
20465 afov;Lea	1.1760	1.1505	0.0228	0.1185	0.1216	0.1245	0.1271	0.1295	0.1321
20484 afov;Lea	1.1190	1.1053	0.0229	0.1186	0.1214	0.1243	0.1269	0.1296	0.1323
20488 afov;Lea	1.1160	1.1221	0.0229	0.1188	0.1217	0.1243	0.1266	0.1290	0.1319
20502 afov;Lea	1.0970	1.1018	0.0229	0.1201	0.1231	0.1257	0.1277	0.1296	0.1319
20506 afov;Lea	1.1720	1.1742	0.0228	0.1193	0.1227	0.1256	0.1278	0.1300	0.1325
20511 afov;Lea	1.1340	1.1410	0.0229	0.1198	0.1232	0.1262	0.1286	0.1307	0.1330
20516 afov;Lea	1.1080	1.1146	0.0228	0.1200	0.1229	0.1259	0.1285	0.1310	0.1336
20697 afov;Lea	1.1860	1.2002	0.0228	0.1195	0.1228	0.1257	0.1281	0.1305	0.1333
20713 afov;Lea	1.1340	1.1570	0.0229	0.1197	0.1227	0.1256	0.1280	0.1304	0.1330
20717 afov;Lea	1.1400	1.1489	0.0228	0.1202	0.1232	0.1259	0.1283	0.1306	0.1330
20789 afov;Lea	1.4300	1.4862	0.0233	0.1210	0.1237	0.1264	0.1291	0.1321	0.1353
20797 afov;Lea	1.4580	1.5016	0.0233	0.1214	0.1243	0.1269	0.1293	0.1318	0.1346
20822 afov;Lea	1.3860	1.3492	0.0225	0.1204	0.1233	0.1260	0.1285	0.1311	0.1339
20827 afov;Lea	1.3830	1.3559	0.0224	0.1205	0.1237	0.1267	0.1292	0.1316	0.1344
20845 afov;Lea	1.3160	1.3030	0.0224	0.1198	0.1228	0.1258	0.1287	0.1316	0.1347

	1661.621	1660.203	1658.786	1657.368	1655.95	1654.532	1653.115	1651.697	1650.279	1648.861	1647.443	16
20401 afov;Lea	0.1337	0.1361	0.1381	0.1400	0.1419	0.1441	0.1469	0.1494	0.1511	0.1524	0.1539	0.1
20423 afov;Lea	0.1335	0.1360	0.1384	0.1405	0.1424	0.1444	0.1471	0.1496	0.1513	0.1525	0.1537	0.1
20439 afov;Lea	0.1337	0.1362	0.1385	0.1406	0.1424	0.1446	0.1475	0.1502	0.1518	0.1528	0.1538	0.1
20461 afov;Lea	0.1346	0.1370	0.1393	0.1413	0.1432	0.1454	0.1483	0.1509	0.1524	0.1534	0.1546	0.1
20465 afov;Lea	0.1348	0.1373	0.1397	0.1419	0.1441	0.1465	0.1493	0.1516	0.1530	0.1542	0.1557	0.1
20484 afov;Lea	0.1350	0.1374	0.1397	0.1418	0.1437	0.1456	0.1481	0.1505	0.1523	0.1539	0.1555	0.1
20488 afov;Lea	0.1349	0.1377	0.1402	0.1424	0.1443	0.1464	0.1491	0.1517	0.1535	0.1548	0.1562	0.1
20502 afov;Lea	0.1347	0.1373	0.1396	0.1417	0.1437	0.1459	0.1487	0.1514	0.1533	0.1549	0.1568	0.1
20506 afov;Lea	0.1353	0.1381	0.1407	0.1429	0.1449	0.1471	0.1498	0.1523	0.1540	0.1556	0.1573	0.1
20511 afov;Lea	0.1356	0.1383	0.1409	0.1430	0.1448	0.1468	0.1494	0.1521	0.1541	0.1556	0.1572	0.1
20516 afov;Lea	0.1364	0.1391	0.1415	0.1434	0.1452	0.1474	0.1504	0.1535	0.1555	0.1568	0.1581	0.1
20697 afov;Lea	0.1363	0.1390	0.1412	0.1433	0.1454	0.1479	0.1510	0.1536	0.1552	0.1565	0.1580	0.1
20713 afov;Lea	0.1357	0.1384	0.1408	0.1429	0.1449	0.1473	0.1502	0.1529	0.1548	0.1563	0.1580	0.1
20717 afov;Lea	0.1357	0.1383	0.1408	0.1430	0.1451	0.1475	0.1505	0.1531	0.1549	0.1563	0.1580	0.1
20789 afov;Lea	0.1385	0.1412	0.1435	0.1456	0.1476	0.1501	0.1534	0.1564	0.1586	0.1604	0.1625	0.1
20797 afov;Lea	0.1377	0.1406	0.1432	0.1457	0.1480	0.1506	0.1538	0.1567	0.1587	0.1602	0.1618	0.1
20822 afov;Lea	0.1369	0.1397	0.1422	0.1444	0.1465	0.1489	0.1521	0.1549	0.1566	0.1578	0.1592	0.1
20827 afov;Lea	0.1372	0.1399	0.1423	0.1448	0.1472	0.1498	0.1527	0.1552	0.1570	0.1585	0.1603	0.1
20845 afov;Lea	0.1378	0.1405	0.1427	0.1446	0.1465	0.1487	0.1517	0.1546	0.1566	0.1582	0.1600	0.1

Figure 5-9: Predicted TIC values for all lean samples

Although the PLSR model's predictability seems accurate, this approach cannot be realistic. Because, to prepare this model, the samples were just divided into two groups (sample 1 to 61 and 62 to 122) without considering the date and time of samples collecting.

Hence, to have an accurate PLSR model, the amine samples in baseline dataset have been divided into two groups by selecting every other samples for calibration and validation of the PLSR model. By applying this method, we could have a realistic model which is prepared based on the all collected samples that covers the entire campaign.

To do that, I defined ranges for model calibration and validation as follow:

Number of selected samples for calibration of model: 1, 3, 5, 7, …

Number of selected samples for validation of model: 2, 4, 6, 8, …

In next step, as it can be seen in Figure 5-10, an accurate model (slope: 0.97, offset: 0.03, RMSEP: 0.02) has been prepared and the predictability of the model to predict TIC concentration for all lean samples has been tested. (Figure 5-11).

It is observed that the predicted TIC values with the second samples dividing method is slightly more accurate than the previous one.

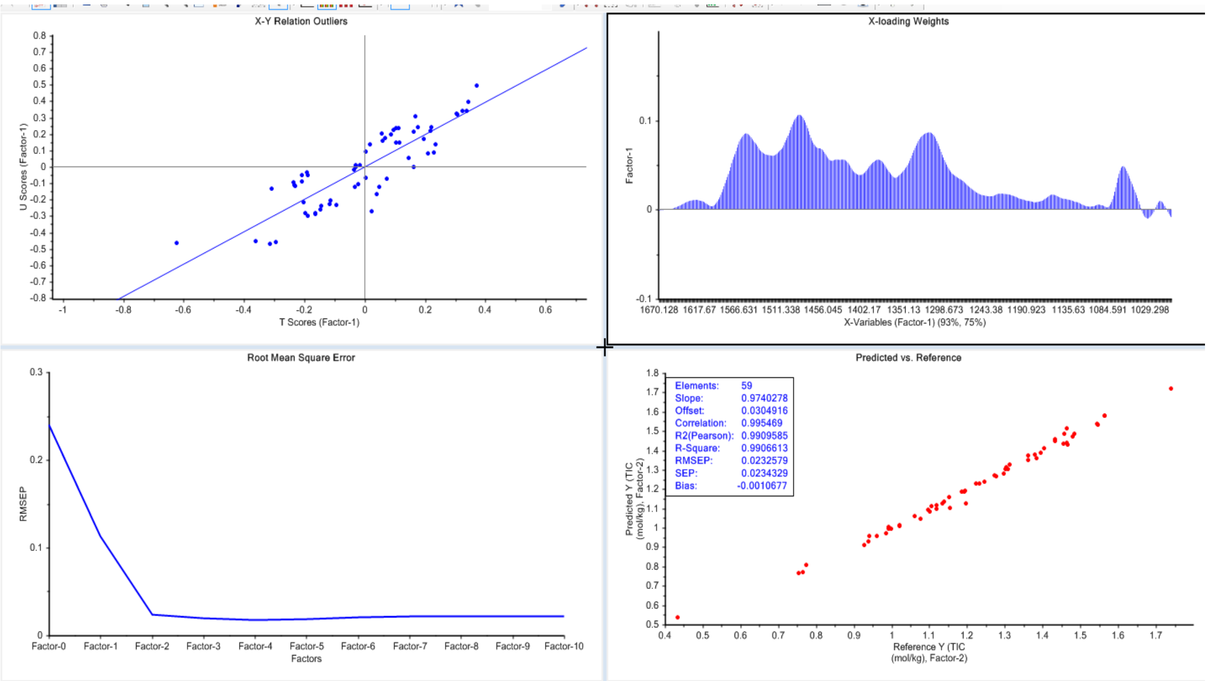
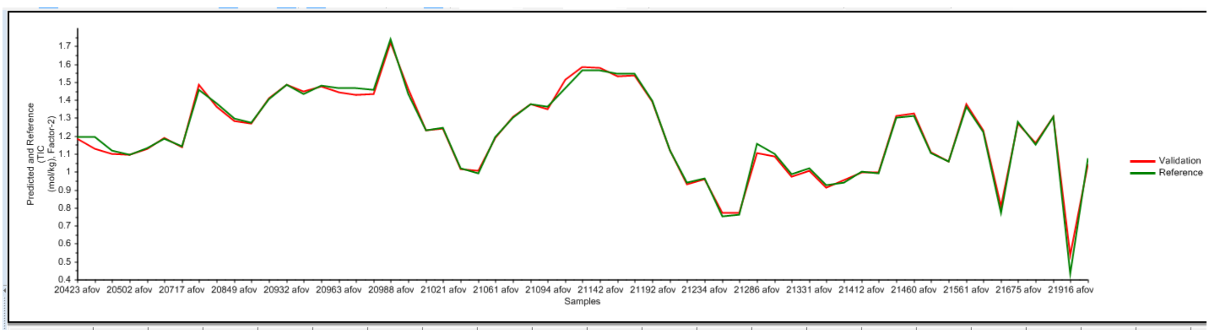


Figure 5-10: PLSR model for TIC concentration by considering the new dividing method



	Measured	Predicted	Pred STDE	1670.128	1668.71	1667.292	1665.874	1664.457	1663.039	1661.621
20401 afov;Lea	1.1920	1.1749	0.0200	0.1187	0.1214	0.1239	0.1262	0.1285	0.1311	0.1337
20439 afov;Lea	1.1290	1.1129	0.0200	0.1182	0.1209	0.1237	0.1262	0.1285	0.1311	0.1337
20465 afov;Lea	1.1760	1.1449	0.0200	0.1185	0.1216	0.1245	0.1271	0.1295	0.1321	0.1348
20488 afov;Lea	1.1160	1.1141	0.0200	0.1188	0.1217	0.1243	0.1266	0.1290	0.1319	0.1349
20506 afov;Lea	1.1720	1.1646	0.0200	0.1193	0.1227	0.1256	0.1278	0.1300	0.1325	0.1353
20516 afov;Lea	1.1080	1.0998	0.0200	0.1200	0.1229	0.1259	0.1285	0.1310	0.1336	0.1364
20713 afov;Lea	1.1340	1.1435	0.0200	0.1197	0.1227	0.1256	0.1280	0.1304	0.1330	0.1357
20789 afov;Lea	1.4300	1.4703	0.0201	0.1210	0.1237	0.1264	0.1291	0.1321	0.1353	0.1385
20822 afov;Lea	1.3860	1.3601	0.0197	0.1204	0.1233	0.1260	0.1285	0.1311	0.1339	0.1369
20845 afov;Lea	1.3160	1.3069	0.0197	0.1198	0.1228	0.1258	0.1287	0.1316	0.1347	0.1378
20870 afov;Lea	1.2360	1.2581	0.0197	0.1205	0.1235	0.1265	0.1293	0.1322	0.1351	0.1380
20910 afov;Lea	1.4240	1.4163	0.0198	0.1219	0.1251	0.1281	0.1309	0.1338	0.1370	0.1400
20915 afov;Lea	1.3980	1.4023	0.0198	0.1214	0.1246	0.1274	0.1298	0.1323	0.1351	0.1382
20937 afov;Lea	1.4630	1.4393	0.0198	0.1217	0.1249	0.1280	0.1309	0.1336	0.1365	0.1394
20960 afov;Lea	1.3590	1.3290	0.0197	0.1213	0.1243	0.1269	0.1293	0.1319	0.1350	0.1384
20962 afov;Lea	1.5350	1.5100	0.0199	0.1217	0.1251	0.1282	0.1309	0.1336	0.1365	0.1397

	1660.203	1658.786	1657.368	1655.95	1654.532	1653.115	1651.697	1650.279	1648.861	1647.443	16
20401 afov;Lea	0.1361	0.1381	0.1400	0.1419	0.1441	0.1469	0.1494	0.1511	0.1524	0.1539	0.1
20439 afov;Lea	0.1362	0.1385	0.1406	0.1424	0.1446	0.1475	0.1502	0.1518	0.1528	0.1538	0.1
20465 afov;Lea	0.1373	0.1397	0.1419	0.1441	0.1465	0.1493	0.1516	0.1530	0.1542	0.1557	0.1
20488 afov;Lea	0.1377	0.1402	0.1424	0.1443	0.1464	0.1491	0.1517	0.1535	0.1548	0.1562	0.1
20506 afov;Lea	0.1381	0.1407	0.1429	0.1449	0.1471	0.1498	0.1523	0.1540	0.1556	0.1573	0.1
20516 afov;Lea	0.1391	0.1415	0.1434	0.1452	0.1474	0.1504	0.1535	0.1555	0.1568	0.1581	0.1
20713 afov;Lea	0.1384	0.1408	0.1429	0.1449	0.1473	0.1502	0.1529	0.1548	0.1563	0.1580	0.1
20789 afov;Lea	0.1412	0.1435	0.1456	0.1476	0.1501	0.1534	0.1564	0.1586	0.1604	0.1625	0.1
20822 afov;Lea	0.1397	0.1422	0.1444	0.1465	0.1489	0.1521	0.1549	0.1566	0.1578	0.1592	0.1
20845 afov;Lea	0.1405	0.1427	0.1446	0.1465	0.1487	0.1517	0.1546	0.1566	0.1582	0.1600	0.1
20870 afov;Lea	0.1406	0.1429	0.1452	0.1474	0.1501	0.1533	0.1561	0.1579	0.1595	0.1613	0.1
20910 afov;Lea	0.1426	0.1448	0.1470	0.1494	0.1525	0.1562	0.1592	0.1610	0.1625	0.1644	0.1
20915 afov;Lea	0.1411	0.1438	0.1463	0.1487	0.1515	0.1550	0.1579	0.1597	0.1610	0.1625	0.1
20937 afov;Lea	0.1422	0.1448	0.1473	0.1496	0.1523	0.1556	0.1586	0.1606	0.1624	0.1644	0.1
20960 afov;Lea	0.1415	0.1444	0.1471	0.1496	0.1521	0.1547	0.1570	0.1590	0.1608	0.1628	0.1
20962 afov;Lea	0.1426	0.1454	0.1478	0.1500	0.1524	0.1555	0.1587	0.1613	0.1634	0.1654	0.1

Figure 5-11: Prediction of TIC concentration fir all lean samples by considering the new dividing method

The TIC concentration for all lean amine samples were calculated and the results confirm the predicted values are compatible (almost the same) with the measured ones during the campaign/laboratory. The average predicted concentration of Total Inorganic Carbon (TIC) by prepared PLSR model is 1.223 mole/kg and the average of measured TIC concentration during the 2015 campaign (concentration of the samples which have been used for this model) is 1.223 mole/kg. (Table 5-3)

Table 5-3: Average TIC concentrations in lean amine samples

Average measured TIC values (mole/kg)	Average predicted TIC values by model (mole/kg)
1.2238	1.2237

Figure 5-12 illustrate how the predicted TIC concentrations by PLSR model are close to the measured ones.

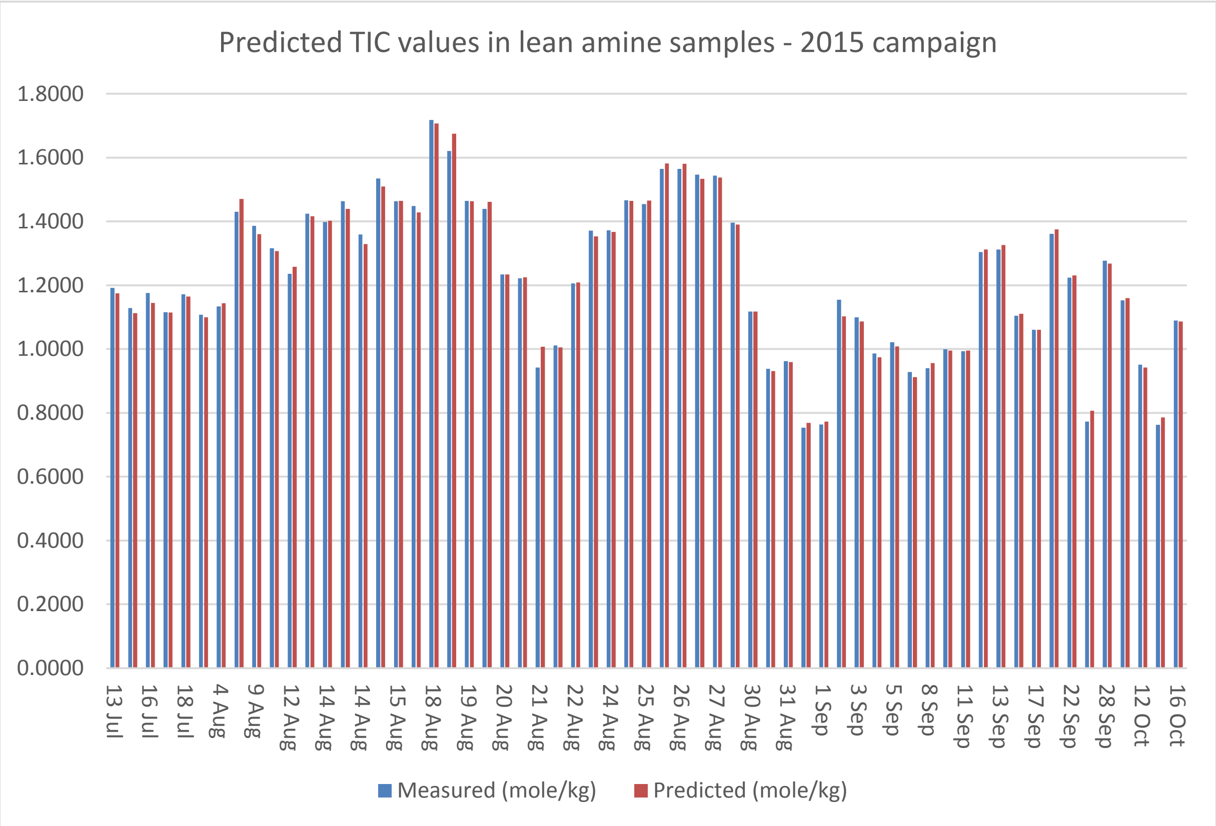


Figure 5-12: TIC concentration in lean samples, predicted & measured – 2015 campaign

5.3.2 TIC values prediction in rich amine samples – 2015 campaign

The measured concentration for TIC in rich samples were not available during this study. Since, the FTIR spectra for rich amine samples were available, it was a good challenge to check the ability of the prepared PLSR model to predict concentration of TIC in all rich amine samples of 2015 campaign by using these relevant FTIR spectra.

The value prediction has been done for all rich amine samples. The average predicted TIC concentration in rich samples was 2.03 mole/kg.

To realize how much accurate are the predicted values, the normal TIC concentration in rich amine was calculated.

For TIC concentration calculation, CO_2 loading value is used and for rich 30%MEA it may vary around 0.3-0.6 mol CO_2/mol amine. [26]

So, the average rich CO_2 loading is 0.45 CO_2 mol/mol amine.

Meanwhile, 1 Kg of solvent of 30% MEA have 4.91 mol of amine (is calculated in article 5.3.4).

CO_2 loading value can be converted into CO_2 mol in 1 kg of solvent by multiplying by 4.91.

$$0.45 \frac{CO_2\ mole}{amine\ mole} \times 4.91 \frac{amine\ mole}{kg} = 2.209\ CO_2 \frac{mole}{1\ kg} \text{ of solvent}$$

Hence, the average of the predicted TIC concentration by PLSR model (2.03 mole/kg) is very close to the calculated concentration of TIC (2.209 mol/kg). (Figure 5-13)

Since, the laboratory test results/measurement for rich sample were not available for this study, the samples collection date were not clear. Thus, the chart was prepared based on samples number.

The two deviations in prediction possibly because of noise in FTIR spectra.

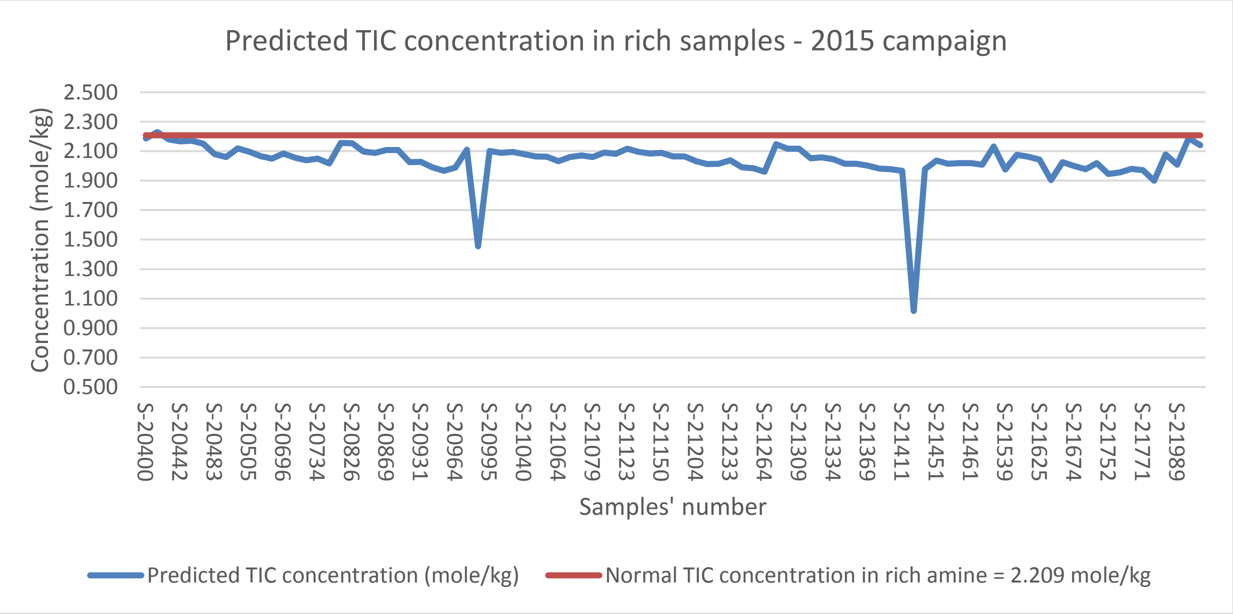


Figure 5-13: Predicted TIC concentration in rich amine samples - 2015 campaign

This prediction confirms that multivariate analysis in conjunction with spectroscopy and also the prepared PLSR model are also able to predict the TIC concentration in rich amines when the relevant FTIR spectra are available and the measurement in a process plant is not possible

Table 5-4: Average TIC concentrations in rich amine

Common TIC concentration in rich amine (mole/kg)	Average predicted TIC concentrations by model (mole/kg)
2.209	2.037

5.3.3 Total alkalinity values prediction in lean amine samples – 2015 campaign

In order to make a correct prediction of concentrations for total alkalinity in lean samples of 2015 campaign, the relevant PLSR model was required.

Several PLSR models have been prepared based on the received FTIR spectra and measured concentration during the 2015 campaign. Then, their predictability was tested accordingly to reach the maximum accuracy and predictability. The PLSR model with the best accuracy and predictability is shown in Figure 5-14.

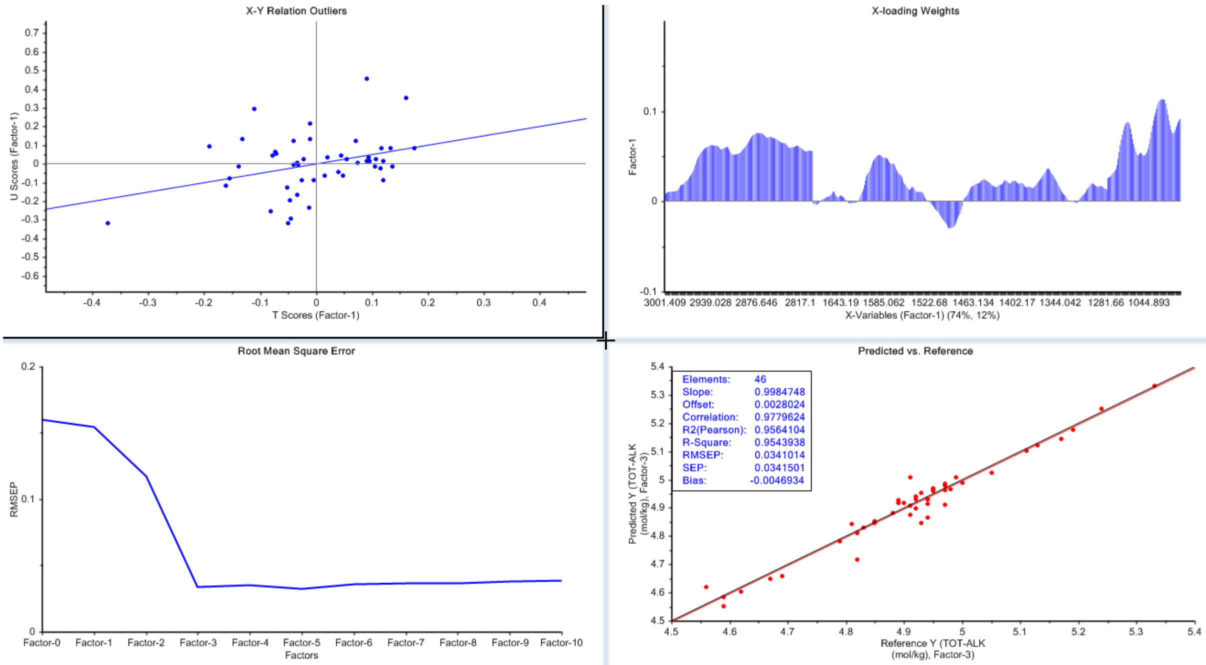


Figure 5-14: PLSR model for Total Alkalinity – 2015 campaign

By this model (Figure 5-14), I made prediction for Tot-Alk concentration in lean samples of 2015 campaign. The model could predict the Tot-Alk concentration accurately. The average of predicted Tot-Alk concentration is exactly as same as the average of measured Tot-Alk values during the 2015 campaign. (Figure 5-15 and Table 5-5).

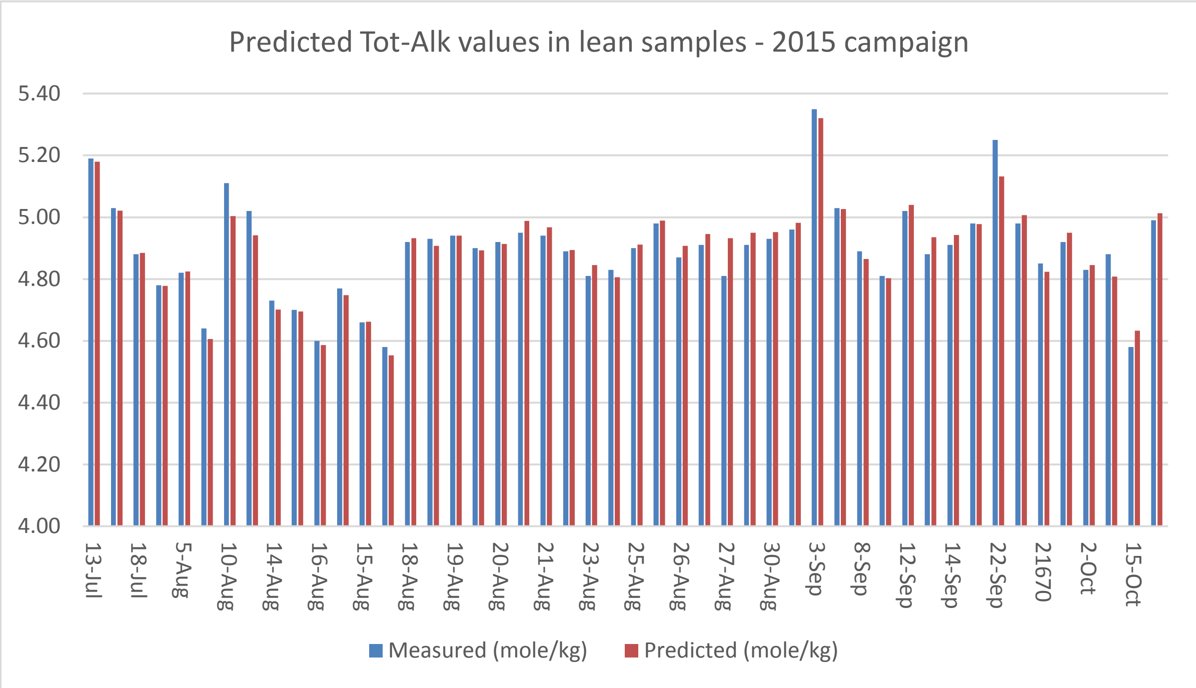


Figure 5-15: Total alkalinity concentration in lean samples, predicted & measured – 2015 campaign

Table 5-5: Average Tot-Alk values in lean samples

Average measured Tot-Alk values (mole/kg)	Average predicted Tot-Alk values by model (mole/kg)
4.895	4.895

5.3.4 Total alkalinity values prediction in rich amine samples – 2015 campaign

Likewise, TIC prediction for rich samples in article 5.3.2, I followed same approach and made prediction for Total Alkalinity concentration of rich samples by using the prepared PLSR model, Figure 5-14.

The average predicted Tot-Alk concentration of rich samples was 4.66 mole/kg.

To realize how much accurate, the predicted values are, I calculated the normal concentration of Tot-Alk in rich samples as follow:

Molecular weight of MEA= 61.08 g/mol

30 wt% Monoethanolamine (MEA) solvent means in 30 grams of MEA in 100 grams of Solvent.

$$\frac{30_{gr,MEA}}{100_{gr,Solvent}} = 30_{gr} \times \frac{1_{mole}}{61.08_{gr}} = 0.491\ mole\ MEA\ in\ solvent$$

$$\frac{0.491\ mole}{100\ gr_{solvent}} = \frac{0.491\ mole}{0.1\ kg} = 4.91\ mole/kg$$

The calculated normal concentration of Tot-Alk in rich amine is 4.91 mole/kg. This calculation shows that the average predicted concentration of Tot-Alk which is 4.66 mole/kg is very close to the normal concentration.

Since the time of collecting rich samples were not available, the number of samples are used as a reference.

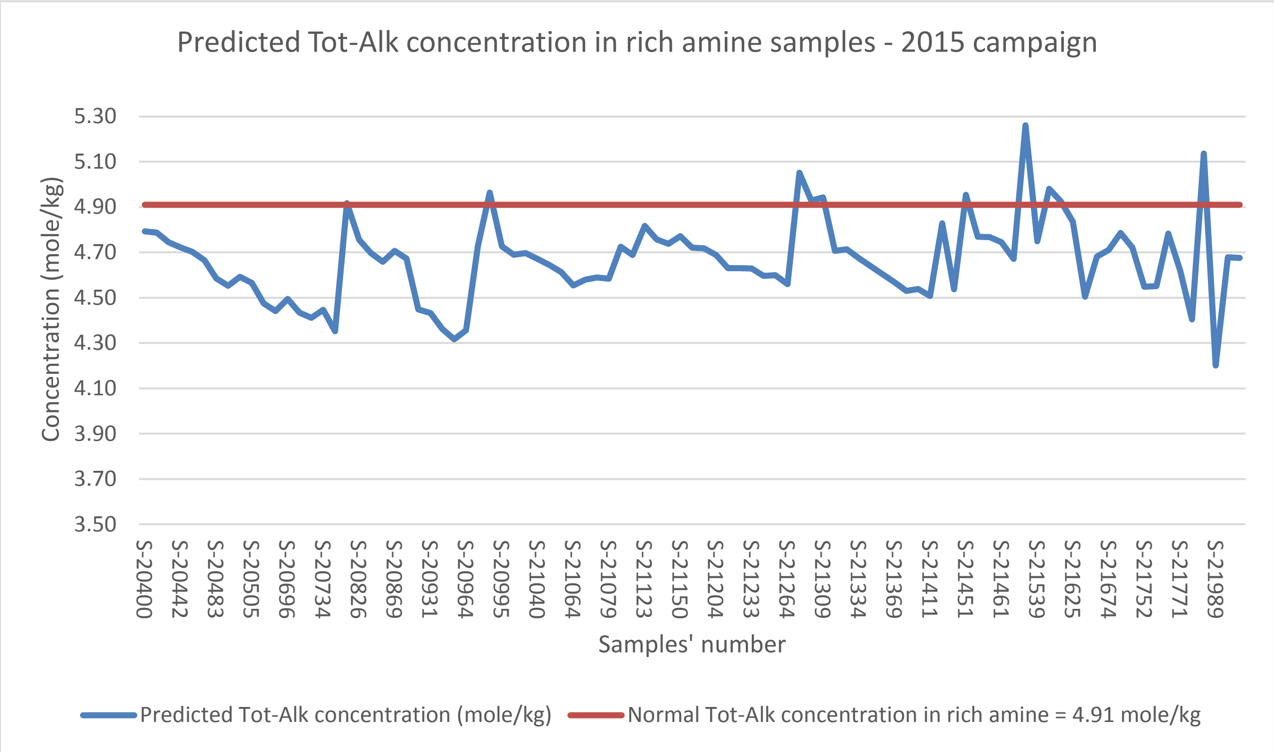


Figure 5-16: Predicted Total alkalinity concentration in rich amines samples – 2015 campaign

Table 5-6: Average Tot-Alk concentrations in rich amine

Common Tot-Alk concentration in rich amine (mole/kg)	Average predicted Tot-Alk concentrations by model (mole/kg)
4.91	4.66

This prediction confirms that multivariate analysis in conjunction with spectroscopy and also the prepared PLSR model are able to predict the Total Alkalinity concentration in rich amines which are not measured during the campaign or even when the measured ones are not available at the time.

5.4 Evaluation of prepared PLSR models

Since, the purpose of this study is to indicate that the Chemometric analysis can be technically and economically viable for CO_2 capture process monitoring in real industrial plant, I have been asked by TCM that how often the model should be updated in real industrial processes?

Since, we only received FTIR spectra and laboratory test results of MEA campaigns, it was not easy to answer this question. But, we select a special approach to find a logical answer to this question. Calibrating a PLSR model based on the FTIR spectra from the first half of campaign and predict the TIC and Tot-Alk concentrations for the second half of the campaign. Then plot the predictions and references values (measured during the campaign) according to the time and see if the predictions get worse or deviate more at the end than in the beginning.

First tries were not successful and PLSR could not predict the concentrations accurately. So, a baseline correction (data pre-processing) has been applied by the supervisors on the original FTIR spectra (received from TCM) to prepare the required models.

5.4.1 Baseline correction

Sometimes, in spectroscopic methods, the spectra have common and flat offset to each other and baseline correction (pre-processing) is needed prior to start to analyze the data. The baseline correction helps to subtract the common offset and causes data can overlay better. This is normally because of many reasons like measurement system, sample density etc. by baseline correction, these effects are minimized and the output is steady & smooth spectra that gives rise to a reliable result. [22]

Baseline correction can be manual or automatic. There are many automatic baseline correction methods which are being used in research activities. They do some estimations and then remove baseline offsets from the raw data. The two common automatic baseline correction methods are Weighted Least Squares (WLS) and Whittaker Filter method that is commonly used for spectroscopic analysis. These methods automatically consider a baseline reference for each spectrum and determine the position of variables against this baseline (above or below the baseline). Finally, when the baseline references are determined, the common offsets will be removed.

The method which has been used for bassline correction in this study is Automatic Whittaker Filter via Matlab PLS toolbox.

5.4.2 TIC PLSR model for last lean samples – 2015 campaign

Following the selected approach for model preparation and after receiving the corrected baseline, I defined a range for calibration and validation of the model similar the definition I have done in 5.3.1.

Some PLSR models have been prepared. The best ones with maximum accuracy and predictability is shown in Figures 5-17 and 5-18. As it can be seen in these figures, the predicted values for oldest data (first half of campaign) are very compatible with measured values during the campaign.

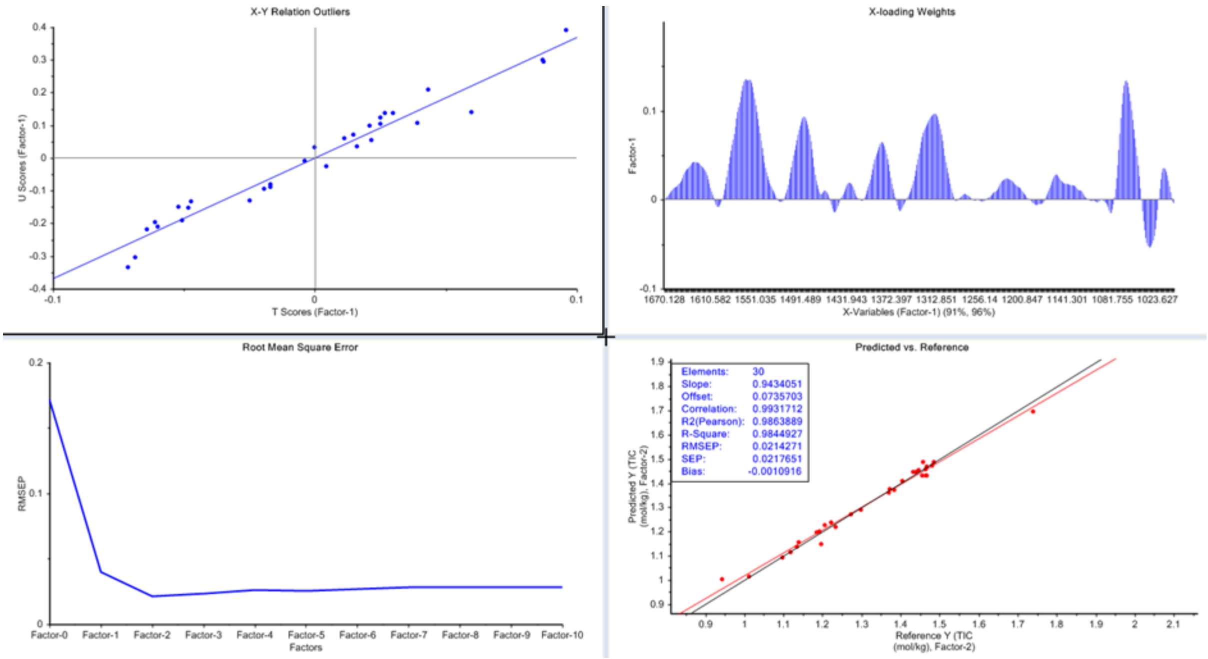
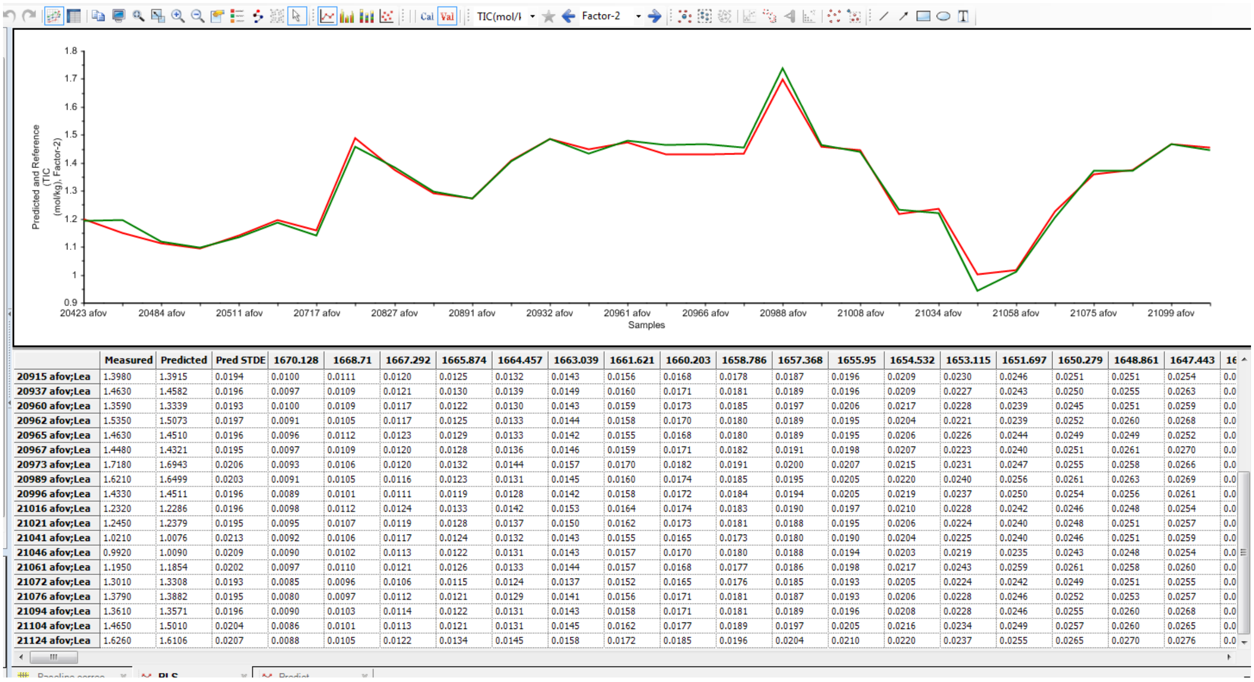


Figure 5-17: PLSR model based on oldest data – 2015 campaign



	Measured	Predicted	Pred STDE	1670.128	1668.71	1667.292	1665.874	1664.457	1663.039	1661.621
20915 afov;Lea	1.3980	1.3915	0.0194	0.0100	0.0111	0.0120	0.0125	0.0132	0.0143	0.0156
20937 afov;Lea	1.4630	1.4582	0.0196	0.0097	0.0109	0.0121	0.0130	0.0139	0.0149	0.0160
20960 afov;Lea	1.3590	1.3339	0.0193	0.0100	0.0109	0.0117	0.0122	0.0130	0.0143	0.0159
20962 afov;Lea	1.5350	1.5073	0.0197	0.0091	0.0105	0.0117	0.0125	0.0133	0.0144	0.0158
20965 afov;Lea	1.4630	1.4510	0.0196	0.0096	0.0112	0.0123	0.0129	0.0133	0.0142	0.0155
20967 afov;Lea	1.4480	1.4321	0.0195	0.0097	0.0109	0.0120	0.0128	0.0136	0.0146	0.0159
20973 afov;Lea	1.7180	1.6943	0.0206	0.0093	0.0106	0.0120	0.0132	0.0144	0.0157	0.0170
20989 afov;Lea	1.6210	1.6499	0.0203	0.0091	0.0105	0.0116	0.0123	0.0131	0.0145	0.0160
20996 afov;Lea	1.4330	1.4511	0.0196	0.0089	0.0101	0.0111	0.0119	0.0128	0.0142	0.0158
21016 afov;Lea	1.2320	1.2286	0.0196	0.0098	0.0112	0.0124	0.0133	0.0142	0.0153	0.0164
21021 afov;Lea	1.2450	1.2379	0.0195	0.0095	0.0107	0.0119	0.0128	0.0137	0.0150	0.0162
21041 afov;Lea	1.0210	1.0076	0.0213	0.0092	0.0106	0.0117	0.0124	0.0132	0.0143	0.0155
21046 afov;Lea	0.9920	1.0090	0.0209	0.0090	0.0102	0.0113	0.0122	0.0131	0.0143	0.0157
21061 afov;Lea	1.1950	1.1854	0.0202	0.0097	0.0110	0.0121	0.0126	0.0133	0.0144	0.0157
21072 afov;Lea	1.3010	1.3308	0.0193	0.0085	0.0096	0.0106	0.0115	0.0124	0.0137	0.0152
21076 afov;Lea	1.3790	1.3882	0.0195	0.0080	0.0097	0.0112	0.0121	0.0129	0.0141	0.0156
21094 afov;Lea	1.3610	1.3571	0.0196	0.0090	0.0103	0.0114	0.0122	0.0131	0.0143	0.0158
21104 afov;Lea	1.4650	1.5010	0.0204	0.0086	0.0101	0.0113	0.0121	0.0131	0.0145	0.0162
21124 afov;Lea	1.6260	1.6106	0.0207	0.0088	0.0105	0.0122	0.0134	0.0145	0.0158	0.0172

	1660.203	1658.786	1657.368	1655.95	1654.532	1653.115	1651.697	1650.279	1648.861	1647.443	16
20915 afov;Lea	0.0168	0.0178	0.0187	0.0196	0.0209	0.0230	0.0246	0.0251	0.0251	0.0254	0.0
20937 afov;Lea	0.0171	0.0181	0.0189	0.0196	0.0209	0.0227	0.0243	0.0250	0.0255	0.0263	0.0
20960 afov;Lea	0.0173	0.0185	0.0197	0.0206	0.0217	0.0228	0.0239	0.0245	0.0251	0.0259	0.0
20962 afov;Lea	0.0170	0.0180	0.0189	0.0195	0.0204	0.0221	0.0239	0.0252	0.0260	0.0268	0.0
20965 afov;Lea	0.0168	0.0180	0.0189	0.0195	0.0206	0.0226	0.0244	0.0249	0.0249	0.0252	0.0
20967 afov;Lea	0.0171	0.0182	0.0191	0.0198	0.0207	0.0223	0.0240	0.0251	0.0261	0.0270	0.0
20973 afov;Lea	0.0182	0.0191	0.0200	0.0207	0.0215	0.0231	0.0247	0.0255	0.0258	0.0266	0.0
20989 afov;Lea	0.0174	0.0185	0.0195	0.0205	0.0220	0.0240	0.0256	0.0261	0.0263	0.0269	0.0
20996 afov;Lea	0.0172	0.0184	0.0194	0.0205	0.0219	0.0237	0.0250	0.0254	0.0256	0.0261	0.0
21016 afov;Lea	0.0174	0.0183	0.0190	0.0197	0.0210	0.0228	0.0242	0.0246	0.0248	0.0254	0.0
21021 afov;Lea	0.0173	0.0181	0.0188	0.0195	0.0206	0.0224	0.0240	0.0248	0.0251	0.0257	0.0
21041 afov;Lea	0.0165	0.0173	0.0180	0.0190	0.0204	0.0225	0.0240	0.0246	0.0251	0.0259	0.0
21046 afov;Lea	0.0170	0.0180	0.0188	0.0194	0.0203	0.0219	0.0235	0.0243	0.0248	0.0254	0.0
21061 afov;Lea	0.0168	0.0177	0.0186	0.0198	0.0217	0.0243	0.0259	0.0261	0.0258	0.0260	0.0
21072 afov;Lea	0.0165	0.0176	0.0185	0.0193	0.0205	0.0224	0.0242	0.0249	0.0251	0.0255	0.0
21076 afov;Lea	0.0171	0.0181	0.0187	0.0193	0.0206	0.0228	0.0246	0.0252	0.0253	0.0257	0.0
21094 afov;Lea	0.0171	0.0181	0.0189	0.0196	0.0208	0.0228	0.0246	0.0255	0.0260	0.0268	0.0
21104 afov;Lea	0.0177	0.0189	0.0197	0.0205	0.0216	0.0234	0.0249	0.0257	0.0260	0.0265	0.0
21124 afov;Lea	0.0185	0.0196	0.0204	0.0210	0.0220	0.0237	0.0255	0.0265	0.0270	0.0276	0.0

Figure 5-18: Compatible predicted and measured TIC values in last lean samples - 2015 campaign

After preparing a reliable and accurate PLSR model, I tried to predict the TIC concentration for last data (second half of campaign), Figures 5-19 & 5-20 and results are available in Table 5-7.

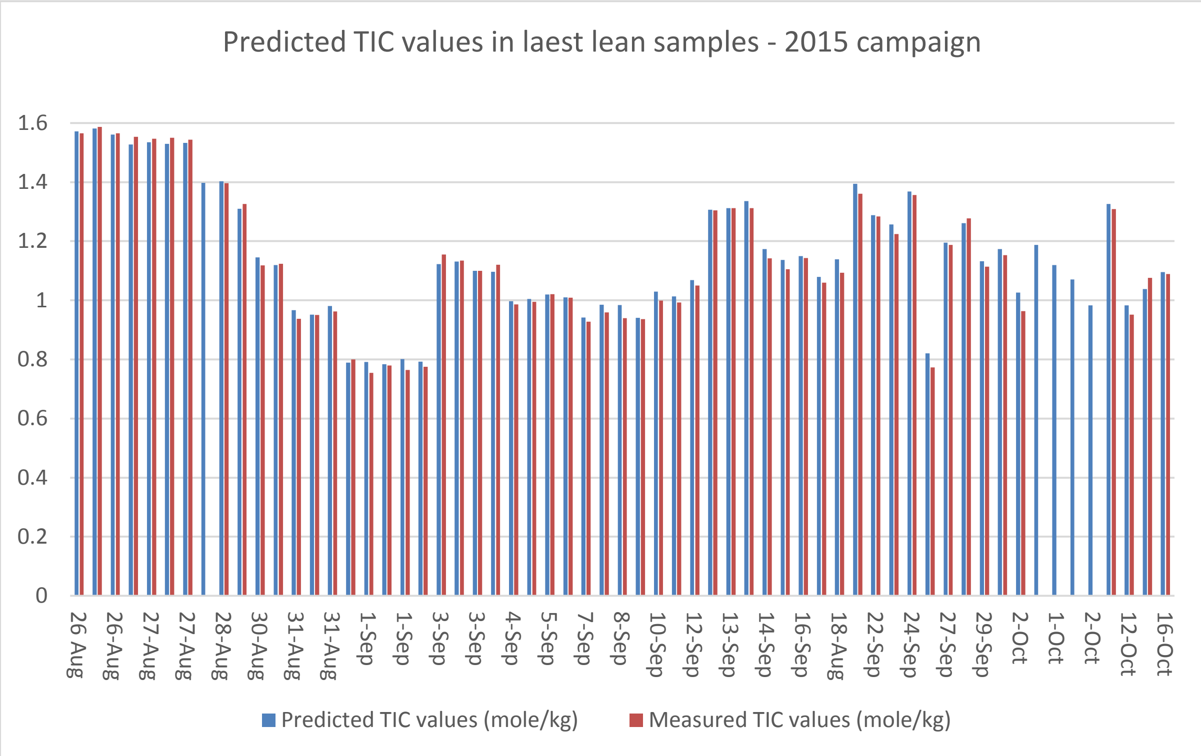


Figure 5-19: Predicted TIC values in last lean samples - 2015 campaign

The average of predicted TIC concentration in last data (last lean samples) was 1.145 mole/kg which was almost similar to the average TIC values during the campaign, 1.134 mole/kg. (Table 5-7)

Table 5-7: Average TIC values (Measured & Predicted)

Average measured TIC values (mole/kg)	Average predicted TIC values by model (mole/kg)
1.134	1.145

According to the predicted concentrations, the prepared PLSR model is able to make the prediction precisely and does not need to be updated. Moreover, to support my claim, I calculated the root mean square error of prediction (RMSEP) for this PLSR model's prediction to monitor the average prediction error and find out how much deviation can be seen in RMSEP. RMSEP was described at article 4.3.1.

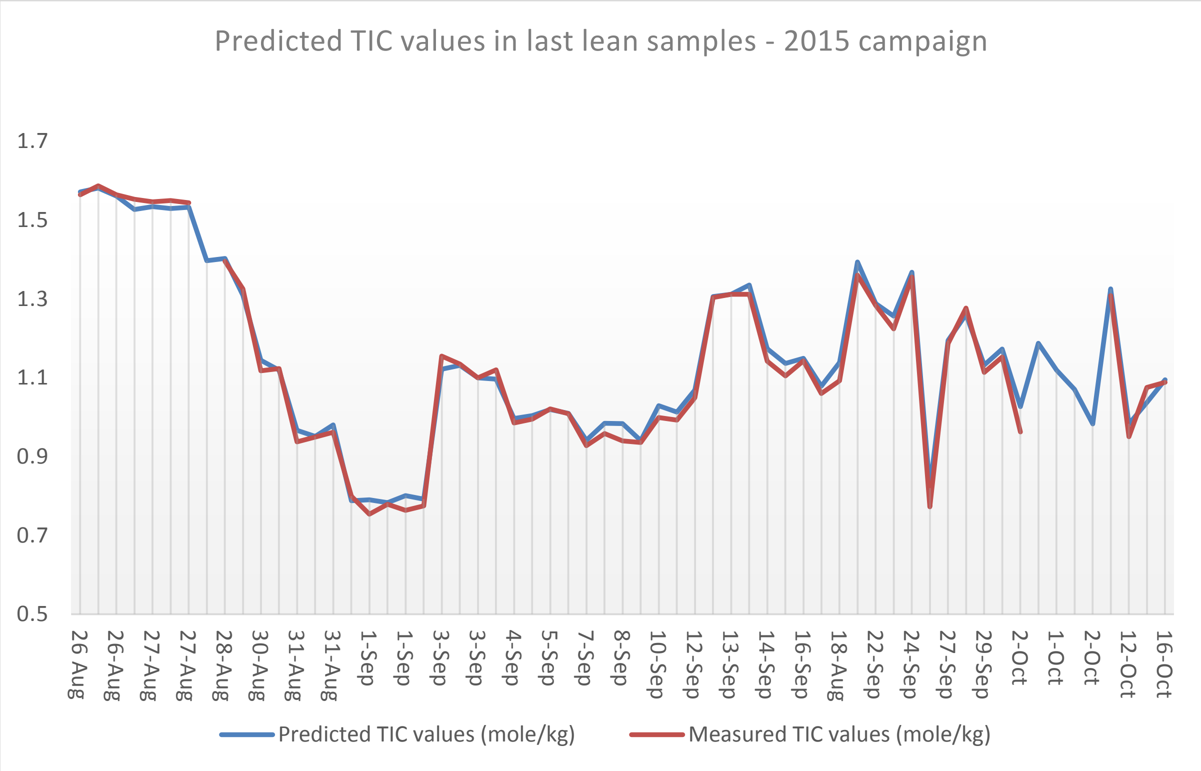


Figure 5-20: Predicted TIC values in last lean samples - 2015 campaign

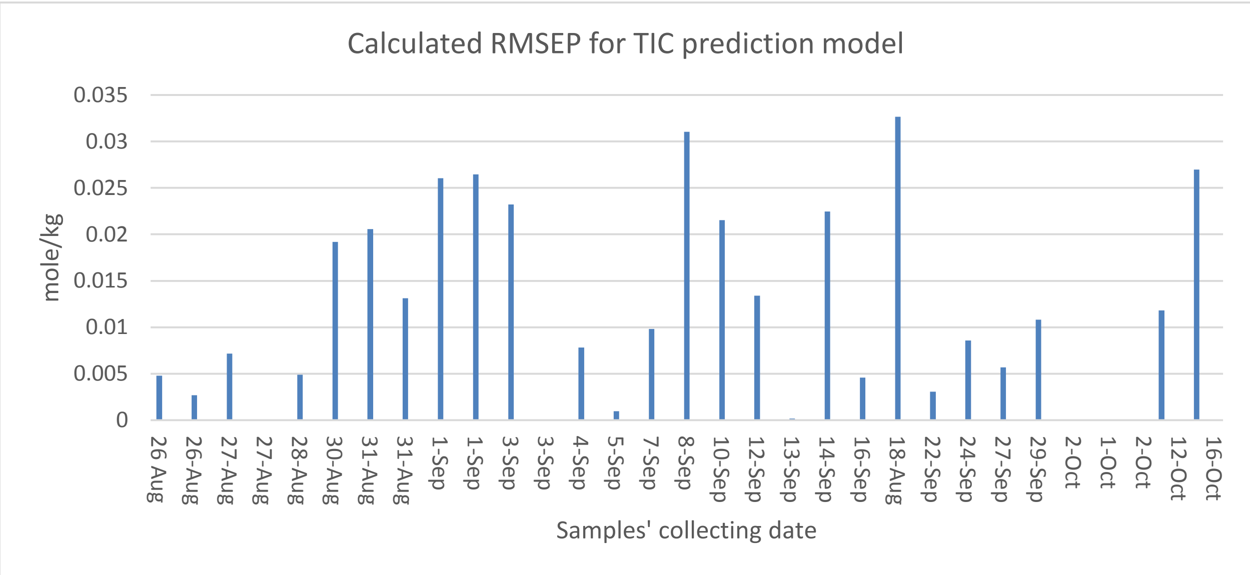


Figure 5-21: Calculated RMSEP for the model prepared for TIC prediction for last lean samples – 2015 campaign

I calculated RMSEP for predicted concentrations for every 2 samples. The average of calculated RMSEP for Figure 5-20 was 0.0138 (mole/kg). Hence, the RMSEP does not show considerable deviation and also has low average, the model is accurate and reliable and is not required to be updated. However, it is recommended to receive more possible measured concentration during the campaign to prepare proper model.

5.4.3 Total Alkalinity PLSR model for last lean samples – 2015 campaign

Similar to TIC values prediction, to predict the concentration of Total Alkalinity of the last lean samples in 2015 campaign, it was required to prepare an accurate PLSR model with the maximum predictability. Thus, several models have been prepared to find the most accurate one and their predictabilities have been tested accordingly. Some possible outliers have been removed from the main baseline dataset and the models' accuracy and their predictability were compared to each other. Even, different windows of wavenumbers have been considered to prepare the perfect model.

After many tries and by observing the results, the best model I could prepare for prediction of total alkalinity concentration was in the wavenumber range of 1280-1680 and 1000-1100 cm^{-1} with the maximum accuracy and predictability (Figure 5-22).

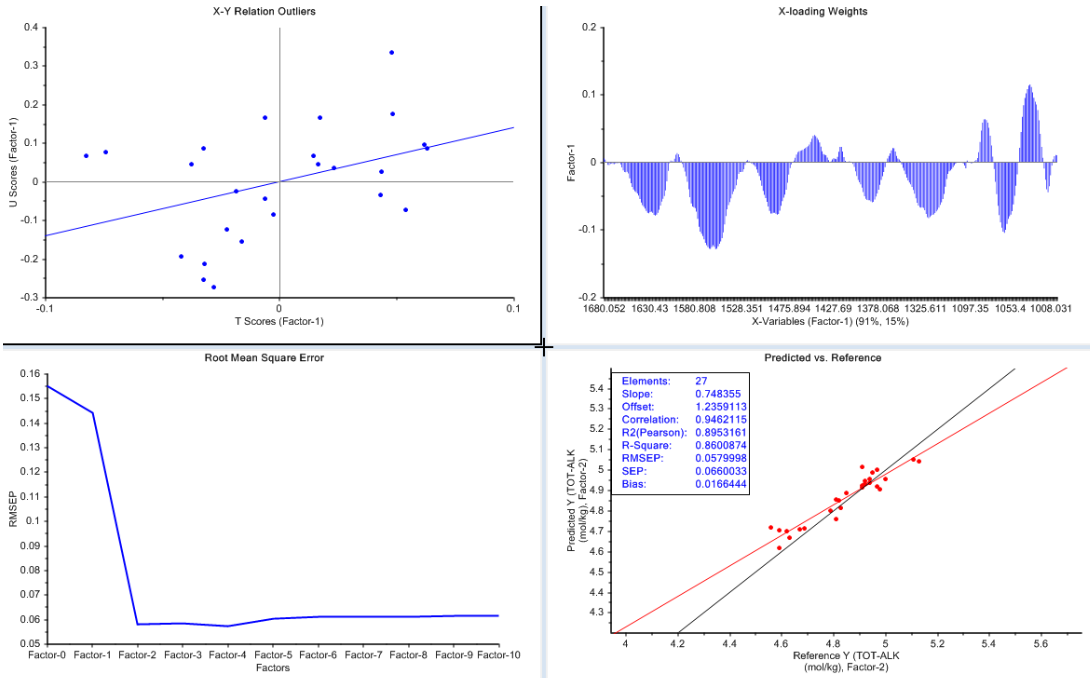


Figure 5-22: PLSR model based on oldest samples to predict Tot-Alk values in the latest lean samples

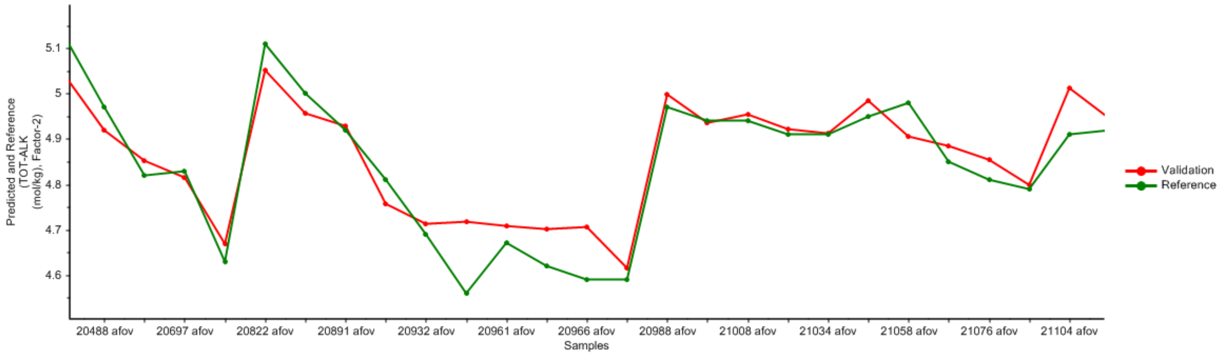
As it can be seen in Figure 5-23, the predicted Tot-Alk for oldest data (first half of campaign) are slightly compatible with the measured values during the campaign. It may have some reasons. The important reason is that few measured (laboratory test results) Tot-Alk have been received. To prepare a good PLSR model, more measured values are required.

In spite of receiving few data, the best possible PLSR model have been prepared and concentration of Total alkalinity in last lean samples have been predicted. The average predicted Tot-Alk concentration was 4.965 mole/kg which is exactly as same as average measured values of Tot-Alk, 4.964 mole/kg.

Table 5-8: Average Tot-Alk values (Measured & Predicted)

Average measured Tot-Alk values (mole/kg)	Average predicted Tot-Alk values by model (mole/kg)
4.964	4.965

The Figure 5-24 indicates that the predicted Tot-Alk concentration for last lean samples are almost equal to the measured values in laboratory. In the next step, the average error of the predictions is checked.



	Measured	Predicted	Pred STDE	1680.052	1678.634	1677.216	1675.799	1674.381	1672.963	1671.545	1670.128	1668.71	1667.292	1665.874	1664.457	1663.039	1661
20401 afov;L	5.1900	5.1748	0.0380	0.0042	0.0047	0.0054	0.0064	0.0075	0.0085	0.0093	0.0101	0.0111	0.0118	0.0124	0.0131	0.0140	0.0151
20465 afov;Lea	5.0300	5.0001	0.0358	0.0046	0.0047	0.0051	0.0058	0.0066	0.0073	0.0078	0.0087	0.0100	0.0111	0.0119	0.0126	0.0135	0.0146
20506 afov;Lea	4.8800	4.9551	0.0355	0.0046	0.0046	0.0048	0.0052	0.0058	0.0065	0.0074	0.0089	0.0105	0.0115	0.0120	0.0124	0.0132	0.0144
20516 afov;Lea	4.7800	4.8000	0.0364	0.0042	0.0042	0.0045	0.0055	0.0069	0.0079	0.0085	0.0092	0.0103	0.0115	0.0123	0.0130	0.0140	0.0151
20717 afov;Lea	4.8200	4.8400	0.0356	0.0054	0.0059	0.0067	0.0077	0.0085	0.0091	0.0097	0.0106	0.0116	0.0126	0.0132	0.0137	0.0144	0.0154
20797 afov;Lea	4.6400	4.5937	0.0368	0.0031	0.0036	0.0044	0.0055	0.0066	0.0074	0.0082	0.0092	0.0102	0.0110	0.0115	0.0122	0.0133	0.0147
20827 afov;Lea	5.0200	5.0092	0.0357	0.0050	0.0052	0.0056	0.0063	0.0072	0.0080	0.0087	0.0096	0.0109	0.0120	0.0127	0.0133	0.0143	0.0155
20870 afov;Lea	5.0200	4.9857	0.0352	0.0050	0.0052	0.0056	0.0063	0.0072	0.0078	0.0083	0.0091	0.0101	0.0112	0.0122	0.0133	0.0145	0.0157
20910 afov;Lea	4.7300	4.6975	0.0355	0.0046	0.0049	0.0053	0.0059	0.0067	0.0075	0.0083	0.0093	0.0105	0.0116	0.0125	0.0136	0.0149	0.0162
20915 afov;Lea	4.7000	4.7342	0.0351	0.0052	0.0052	0.0056	0.0065	0.0076	0.0084	0.0090	0.0100	0.0111	0.0120	0.0125	0.0132	0.0143	0.0156
20937 afov;Lea	4.6000	4.6012	0.0367	0.0044	0.0047	0.0053	0.0062	0.0072	0.0080	0.0087	0.0097	0.0109	0.0121	0.0130	0.0139	0.0149	0.0160
20960 afov;Lea	4.7700	4.7765	0.0349	0.0050	0.0053	0.0056	0.0063	0.0074	0.0083	0.0091	0.0100	0.0109	0.0117	0.0122	0.0130	0.0143	0.0159
20962 afov;Lea	4.6600	4.7069	0.0356	0.0037	0.0043	0.0051	0.0061	0.0070	0.0076	0.0081	0.0091	0.0105	0.0117	0.0125	0.0133	0.0144	0.0158
20967 afov;Lea	4.5800	4.6143	0.0365	0.0042	0.0047	0.0055	0.0066	0.0076	0.0082	0.0087	0.0097	0.0109	0.0120	0.0128	0.0136	0.0146	0.0159
20973 afov;Lea	4.9200	4.8974	0.0382	0.0043	0.0045	0.0049	0.0057	0.0067	0.0077	0.0084	0.0093	0.0106	0.0120	0.0132	0.0144	0.0157	0.0170
20989 afov;Lea	4.9300	4.9500	0.0383	0.0041	0.0044	0.0048	0.0056	0.0065	0.0073	0.0080	0.0091	0.0105	0.0116	0.0123	0.0131	0.0145	0.0160
20996 afov;Lea	4.9400	4.9428	0.0358	0.0032	0.0035	0.0039	0.0048	0.0060	0.0071	0.0079	0.0089	0.0101	0.0111	0.0119	0.0128	0.0142	0.0158
21016 afov;Lea	4.9000	4.8679	0.0347	0.0047	0.0051	0.0056	0.0066	0.0076	0.0084	0.0089	0.0098	0.0112	0.0124	0.0133	0.0142	0.0153	0.0164
21021 afov;Lea	4.9200	4.8530	0.0347	0.0047	0.0049	0.0053	0.0061	0.0071	0.0079	0.0086	0.0095	0.0107	0.0119	0.0128	0.0137	0.0150	0.0162

Figure 5-23: Predicted (oldest data) and measured Tot-Alk values - 2015 campaign

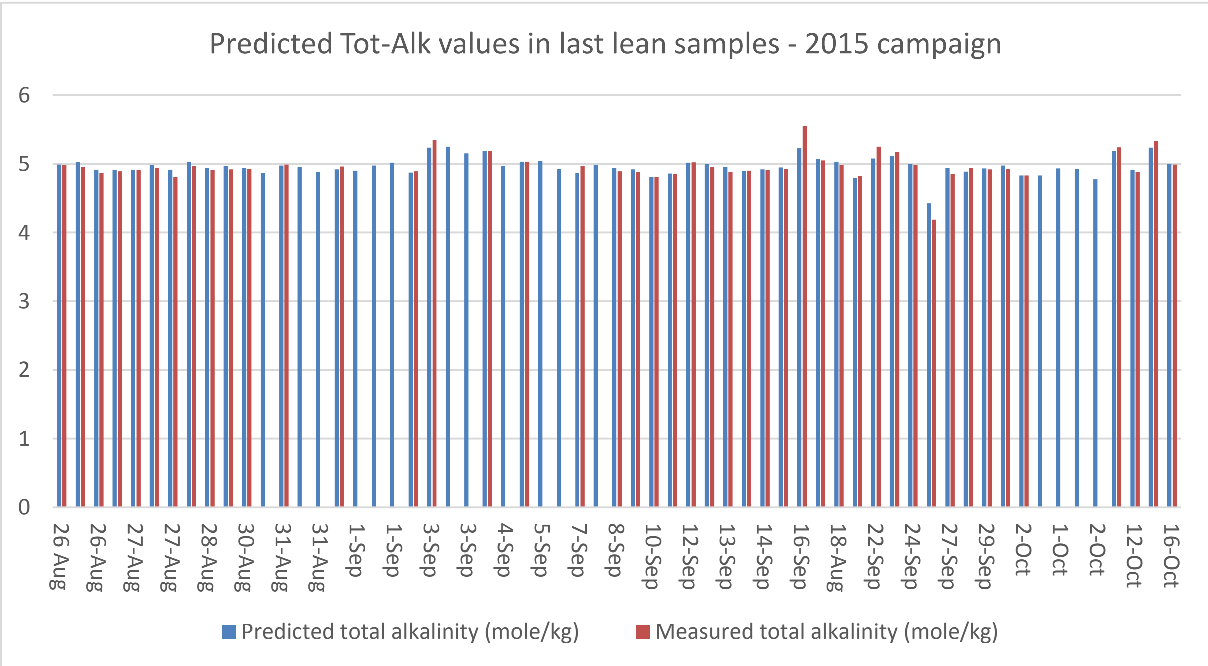


Figure 5-24: Predicted Tot-Alk values in last lean samples in 2015 campaign

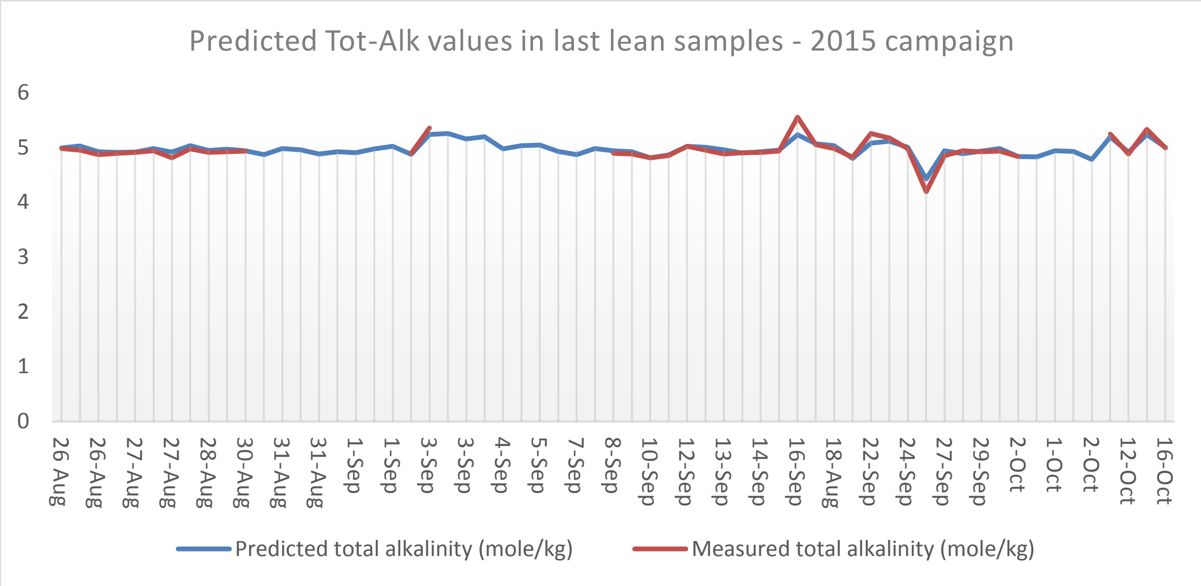


Figure 5-25: Predicted Tot-Alk values in last lean samples in 2015 campaign

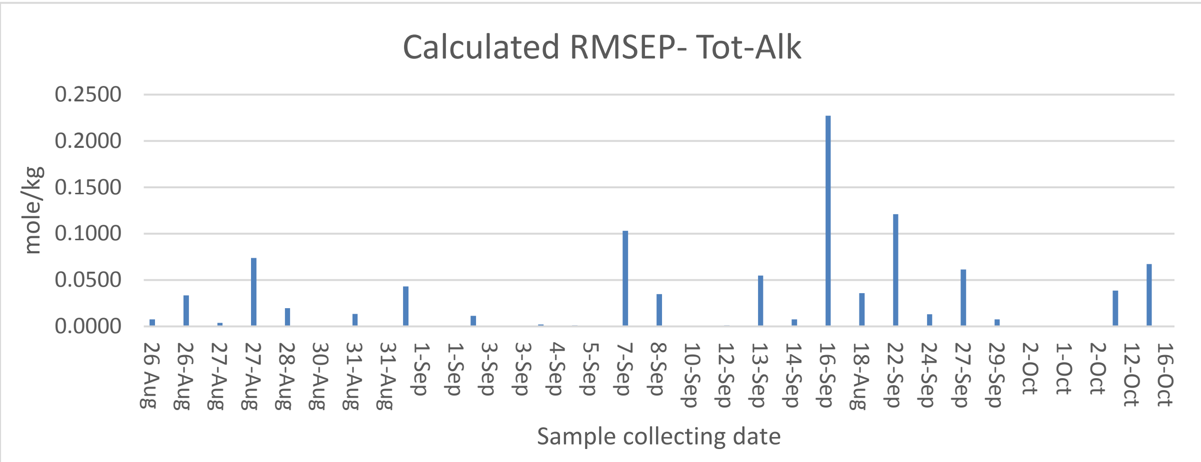


Figure 5-26: Calculated RMSEP for the model prepared for Tot-Alk prediction in last lean samples – 2015 campaign

The average calculated RMSEP for PLSR model prediction in Figure 5-26 was 0.041 mole/kg. The RMSEP calculated for every two samples. As it can be seen in Figure 5-25, there were not measured Tot-Alk values for many days of the 2015 campaign. Since, having deviation in prediction values is inevitable. By having more data, it would be possible to prepare better PLSR model that can be trusted easier.

By considering the few number of received measured Tot-Alk values, precise average of Tot-Alk concentration (4.965 mole/kg) and also with the exception of some deviations in RMSEP, the PLSR model is reliable. However, it is recommended to receive (if possible) more data and prepare a PLSR model and make a prediction. By comparison with the above results, the suitable time for updating the model can be found out. It is also possible that like TIC model in article 5.4.2, the Tot-Alk model is not required to be updated. However, doing more study in this regard with more data is recommended.

5.5 MEA campaign in 2017

In 2017, Technology Centre Mongstad (TCM) operated another comprehensive test campaign using the benchmark aqueous 30 and 40wt% Monoethanolamine (MEA) solvent from June 12th, 2017 until July 30th, 2018 with more than 7000 operation hours [3]. Following previous collaboration, TCM also provided USN with the laboratory measured concentration of Total Inorganic Carbon (TIC) and Total Alkalinity (Tot-Alk) of this campaign from June 13th to August 31st, 2017.

The tabulated received measured concentration during the 2017 MEA campaign is available in appendix C.

5.5.1 2017 campaign conditions

The flue gases sources in 2017 campaign were Combined Heat and Power plant (CHP) and Residual Fluidized Catalytic Cracker (RFCC) from Mongstad refinery. However, as a result of lack of Brownian Diffusion filter (BD) in TCM plants in 2015, only CHP was used for 2015 campaign. RFCC contains considerable amount of solid particles and liquid and need to be filtered in BD. Due to emission of amine which is more than 20 ppmv and negative environmental effect using RFCC in 2015 campaign was not possible and used for a short period from 16th Oct to 24 Oct 2015[1]. Typical CHP and RFCC gas concentrations are shown in Table 5-9. [3]

The general mass balance in lean solvent are illustrated in Figure 5-27 [3]. However, the received data from TCM is from July 13th, 2017 to August 31st, 2017 and not cover entire campaign. The predictions in next articles were done for this period of the campaign.

The significant differences between 2015 & 2017 campaign are flue gas source, adding oxygen scavenger, freshen MEA & solvent swap in 2017 campaign.

1. As it was mentioned above, in 2015 mostly CHP was used as the flue gas and in 2017 campaign, CHP, RFCC and mixture of RFCC & CHP were used.

2. To inhibit the oxidative degradation reactions, Potassium Bisulfite (PBS) as the oxygen scavenger was injected to the system from the first day 2017 campaign. (Figure 5-27)

$$KHSO_3 + \frac{1}{2}O_2 \rightarrow K^+ + SO_4^{2-} + H^+ \tag{5.1}$$

   However, as a result of using PBS in 2017 campaign, there was a significant amount of accumulated heat stable salts (HSS) in system and salt precipitation was observed on valves and pumps at cold lean part of the plant. Although, adding oxygen scavenger decreased the solvent degradation, it caused accumulating of HSS in the system and also corrosion on the available heat exchanger in the plant. Due to injecting PBS, the amount of sulfite and sulfate in solvent were increased (measured during the campaign) which gave rise to restricted the reformation of reformation of protective oxide layer on the plate. [3]
3. In 2015 campaign solvent thermal reclaiming was performed at the end of this campaign. [1] However, in 2017 campaign, below treatments was undergone for MEA and solvent to keep solvent impurity at the lowest possible level:

- MEA make up: during this campaign and to compensate the degraded MEA and keep the amine at required level, small amount of fresh MEA was added to the system.
- Solvent reclaiming: solvent was reclaimed two times (during the studied period in this work)
- Solvent swap: during this period, all solvents were replaced with fresh MEA in 27th August 2017.

Table 5-9: TCM flue gas compositions [3]

Description	CHP	RFCC
Operating temperature (°C)	25-50	15-50
Operating pressure (mbarg)	Up to 250	Up to 250
N_2 (mole%)	73-79	73-79
O_2 (mole%)	13-14	3-8
CO_2 (mole%)	3.6-4.0	13-14.5
H_2O (mole%)	Saturated	Saturated
SO_2 (ppmv)	< 0.3	< 5
NO_x (ppmv)	< 5	100
NH_3 (ppmv)	< 5	< 1
CO (ppmv)		< 10
Particles (parts/cm^3)		$0.3 - 0.8 \times 10^6$

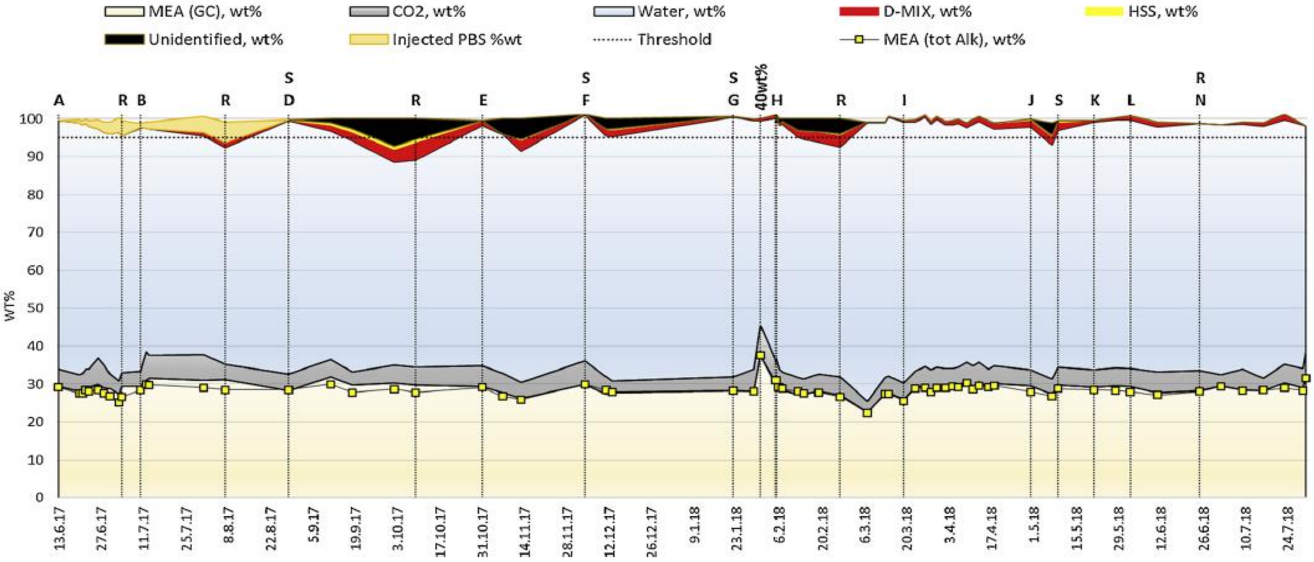


Figure 5-27: Mass balance in lean solvent in 2017 campaign [3]

5.5.2 TIC model for last lean samples – 2017 campaign

The same approach for 2017 campaign has been followed i.e. a proper PLSR model was prepared for both TIC and Tot-Alk and the predictability of the model for the last lean samples in 2017 campaign was checked.

The average predicted TIC concentration in last lean samples was 1.166 mole/kg which was closed to the average measure values during the 2017 campaign, 1.138 mole/kg. (Table 5-10)

Table 5-10: Average TIC values for last lean samples of 2017 campaign (measured vs predicted)

Average measured TIC values (mole/kg)	Average TIC values predicted by model (mole/kg)
1.138	1.166

Again, to evaluate the errors in predicted values, the RMSEP was calculated. The average of RMSEP was 0.074 mole/kg. The Figures 5-28 & 5-29 show that the predicted TIC concentration for a lean sample which was collected on July 14th, 2017 is not compatible with the measured values (measured TIC concentration in laboratory: 2.381 mole/kg and predicted TIC: 1.3343 mole/kg). It may because of the noise in the instruments during the FTIR spectroscopy or probable mistake in measurement at laboratory.

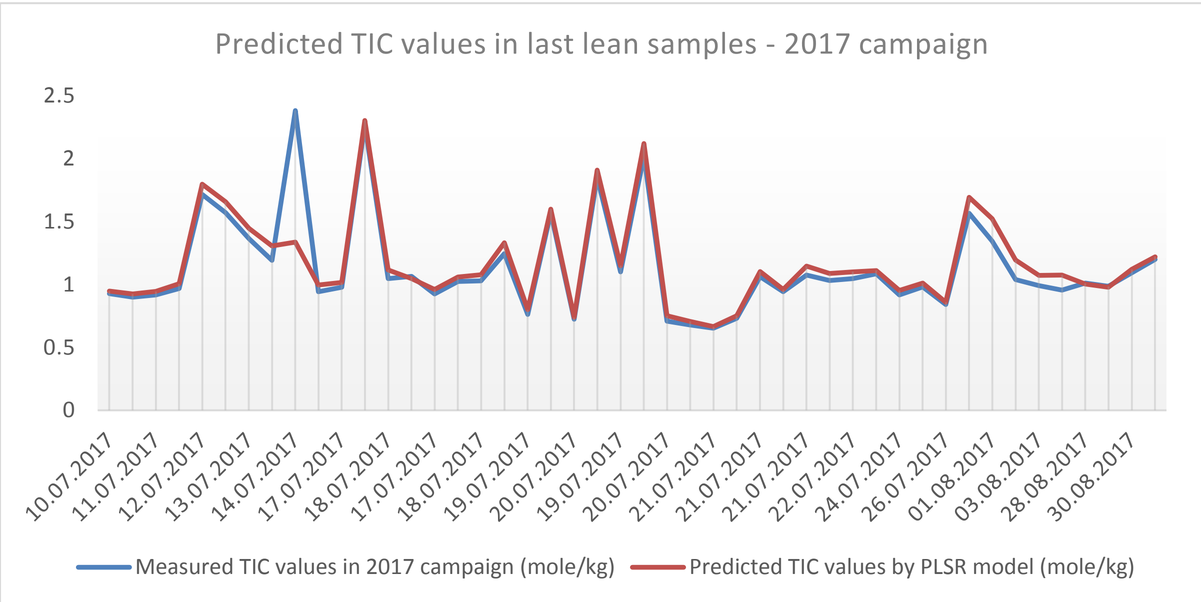


Figure 5-28: Predicted TIC concentration in last lean samples – 2017 campaign

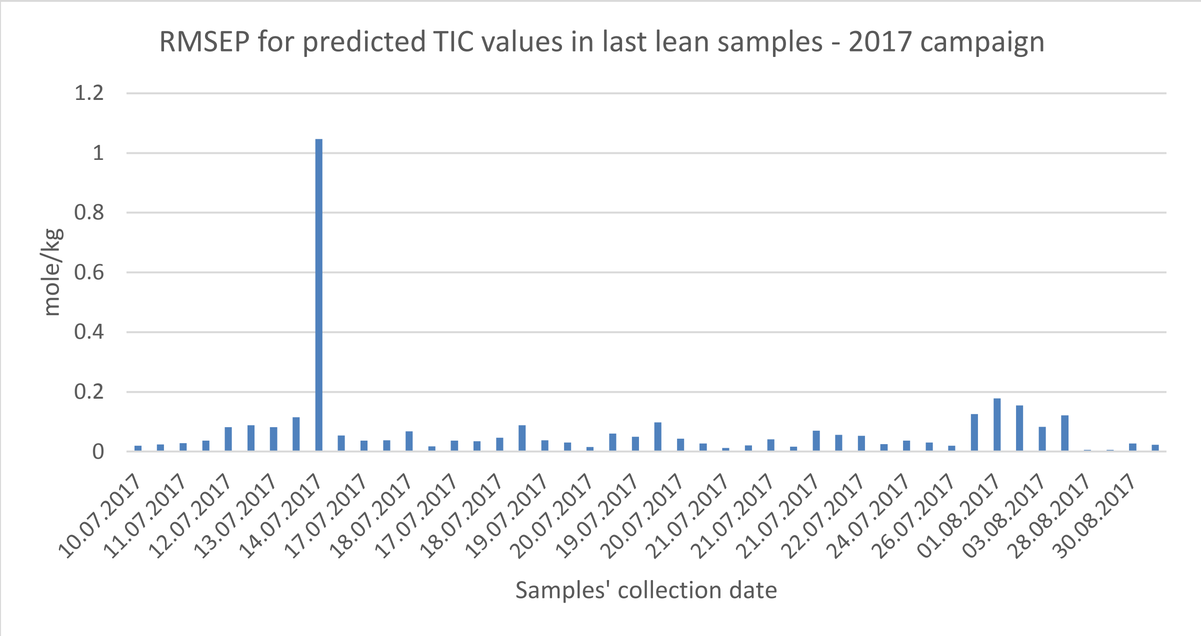


Figure 5-29: Calculated RMSEP for predicted TIC values in last lean samples – 2017 campaign

This evluating, confirms that the PLSR models are able to predcit the TIC concentrations in lean samples without update requirement.

5.5.3 Tot-Alk model for last lean samples – 2017 campaign

By preparing PLSR model based on received FTRI spectra and dataset (oldest samples and without baseline correction), the ability of the model to predict the Tot-Alk concentration in last lean samples was checked.

The average predicted Tot-Alk concentration in last lean samples was 4.795 mole/kg which was very closed to the average measured values during the 2017 campaign, 4.761 mole/kg. (Table 5-11)

Table 5-11: Average Tot-Alk values in last lean samples – 2017 campaign (measured & predicted)

Average measured Tot-Alk values (mole/kg)	Average Tot-Alk values predicted by model (mole/kg)
4.761	4.795

Also, to evaluate the errors in predicted values, the RMSEP was calculated. The average RMSEP was 0.086 mole/kg. The Figures 5-30 & 5-31 show that the predicted Tot-Alk concentration are compatible with the measured values.

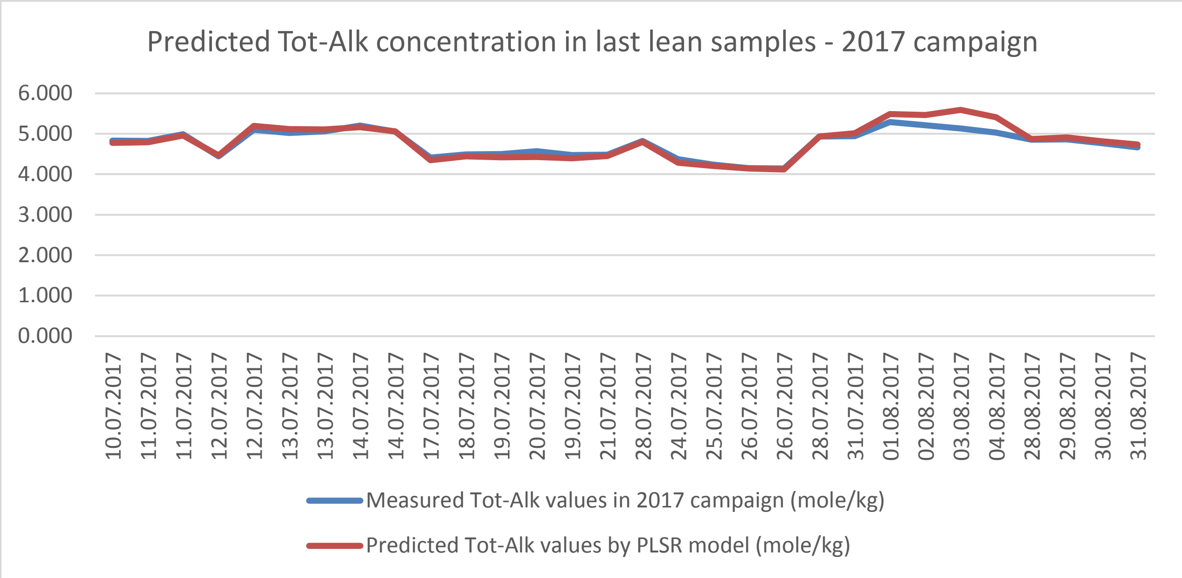


Figure 5-30: Predicted Tot-Alk concentration in last lean samples – 2017 campaign

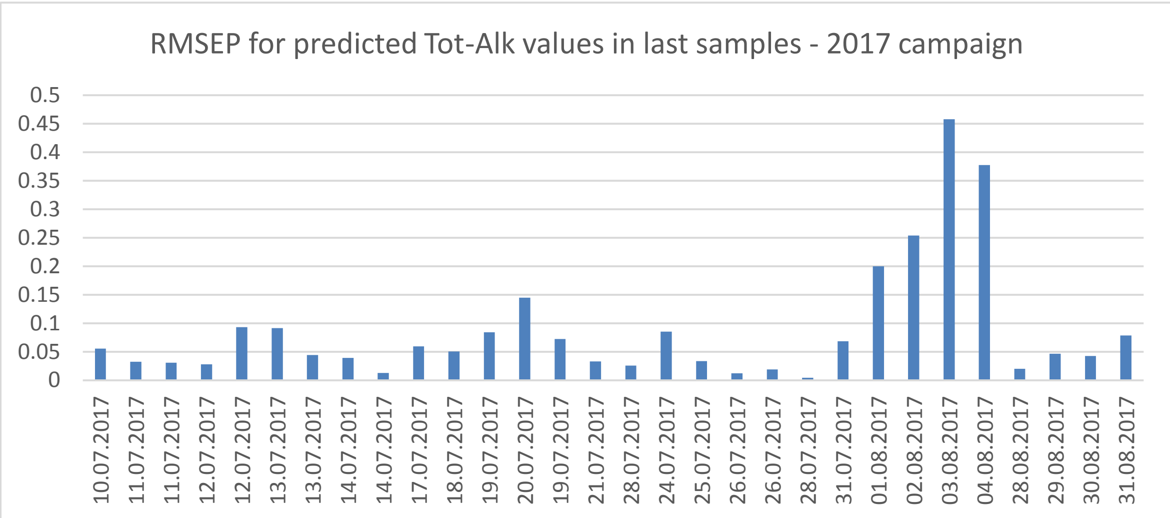


Figure 5-31: Calculated RMSEP for Tot-Alk prediction in last lean samples – 2017 campaign

This evluating, confirms that the PLSR models are able to predcit the Tot-Alk concentrations in lean samples without update requirement.

5.5.4 Prediction of TIC concentration in lean samples for 2017 campaign by PLSR model based on 2015 campaign

Since the purpose of study is to demonstrate that using PLSR model can be a reliable technique to predict required species' concentration in a real industrial plant, it would be an interesting idea to use the prepared PLSR model based on received data from 2015 campaign and make prediction of TIC and Tot-Alk concentration in 2017 campaign with a 2 years' gap.

Undoubtedly using a computer based model is by far cheaper to run instead of operating expensive campaigns in a real process plants.

To do this, an accurate PLSR model has been prepared by considering all lean samples in 2015 campaign, Figure 5-32, to predict the TIC concentration in lean samples of 2017 campaign.

To do this prediction by 2015 model, the 2017 data set was selected to be predicted in the Unscrambler software.

The TIC values for 2017 campaign were predicted by 2015 model. Then, they have been compared with the measured values during the 2017 campaign. (Figure 5-33)

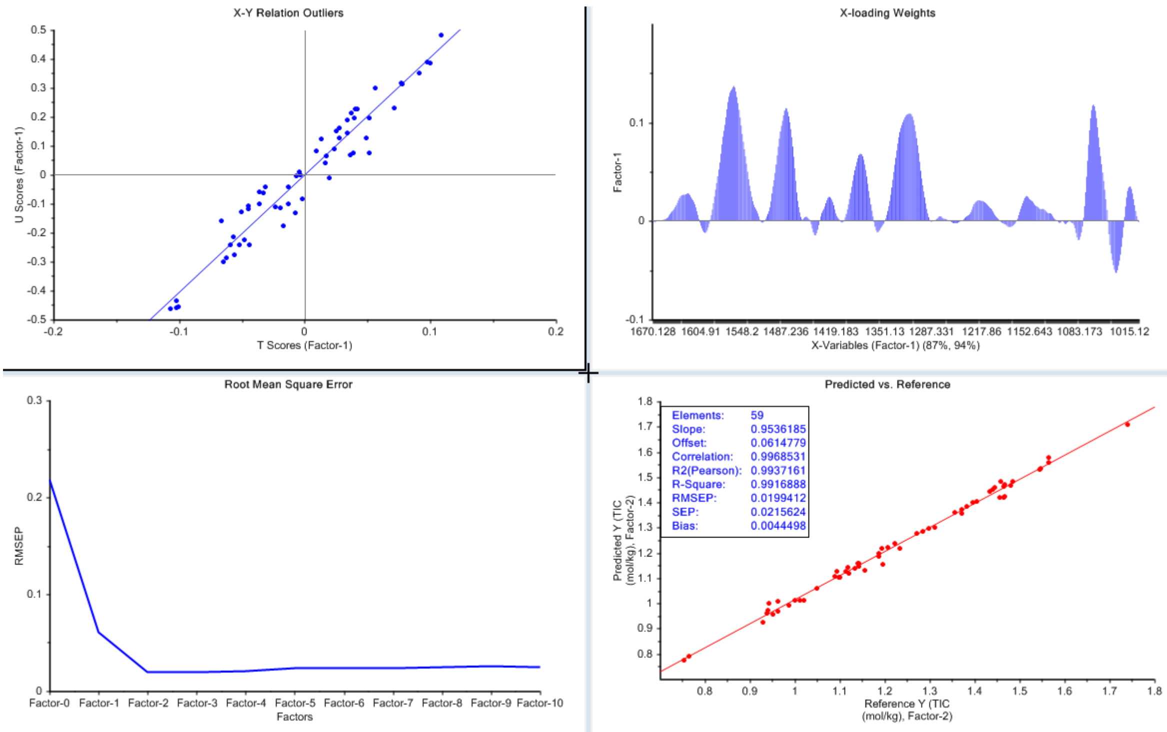


Figure 5-32: PLSR model for TIC prediction in 2017 campaign, made from lean samples of 2015 campaign

As it can be seen in Figure 5-33, the predicted TIC concentration in lean samples for 2017 campaign were not compatible with the measured values during this campaign.

The average predicted TIC concentration for 2017 campaign was 5 mol/kg which was approximately 4.5 times more than the average of the measured concentration during the 2017 campaign (1.13 mole/kg). (Table 5-12)

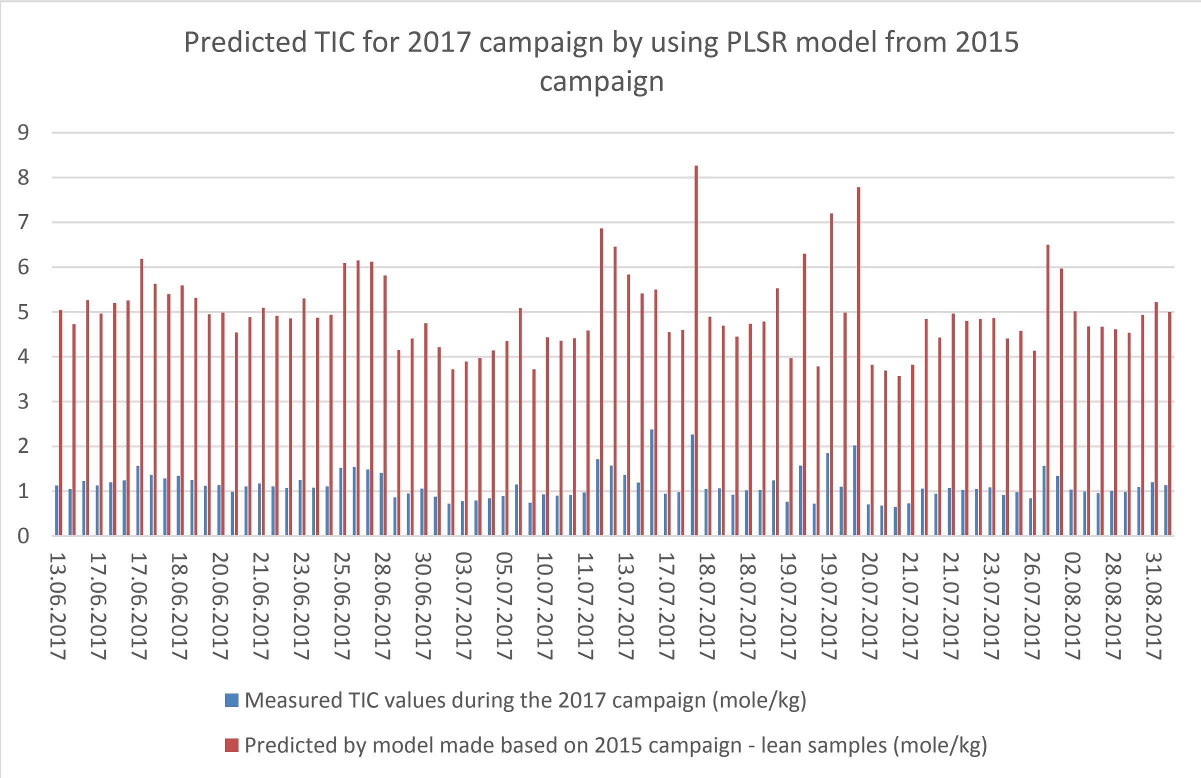


Figure 5-33: Predicted TIC concentration in lean samples for 2017 campaign by using the PLSR model from 2015 campaign

Table 5-12: Average TIC values (Measured in 2017 vs Predicted by 2015)

Average measured TIC values in 2017 campaign (mole/kg)	Average predicted TIC values by model from 2015 campaign (mole/kg)
1.13	5.00

In order to make prediction of TIC concentration in 2017 campaign, a PLSR model from 2015 campaign has been used which had been prepared based on a corrected baseline. The model seemed accurate but as it can be seen in Figure 5-33, the predicted values are not in a good range. The reason for this big deviation is that as it was previously described, noises have been removed from this data set and PLSR model was prepared based on that. This model cannot make a good prediction of dataset including noises. So, having deviation is certain. To solve this issue, a PLSR model has been prepared based on the original data set of the 2015 campaign. So, by this approach, the PLSR model with maximum accuracy has been prepared (Figure 5-34) and its predictability was checked as well. (Figure 5-35)

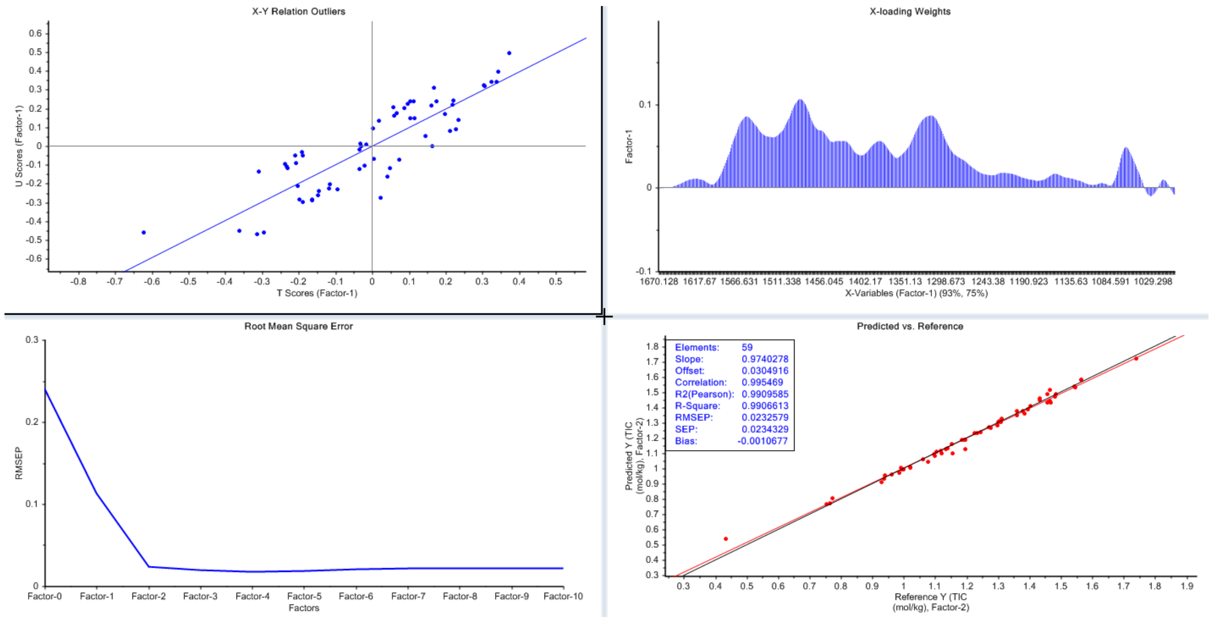


Figure 5-34: PLSR model for TIC prediction, made from 2015 campaign with considering the original dataset

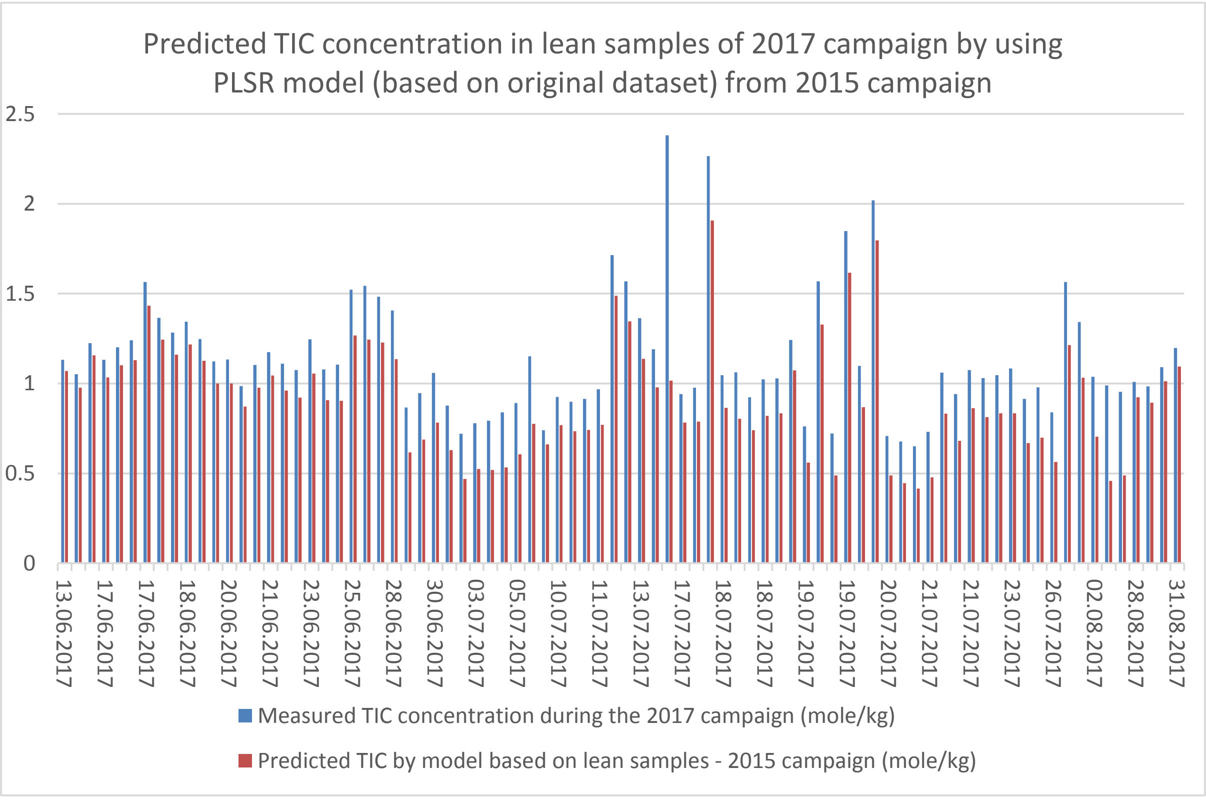


Figure 5-35: Predicted TIC values for lean samples of 2017 campaign by PLSR model from original dataset of 2015 campaign

Table 5-13: TIC values in lean samples of 2017 campaign (measured & predicted)

Average measured TIC values in 2017 campaign (mole/kg)	Average predicted TIC values by model from 2015 campaign (mole/kg)
1.13	0.91

The Figures 5-35 and 5-36 confirm that the predicted TIC concentrations for lean samples of 2017 campaign by means of PLSR model (based on original dataset) from 2015 campaign is slightly compatible with the measured values during the 2017 campaign. It means, the model is able to predict TIC concentration even after a two-year gap.

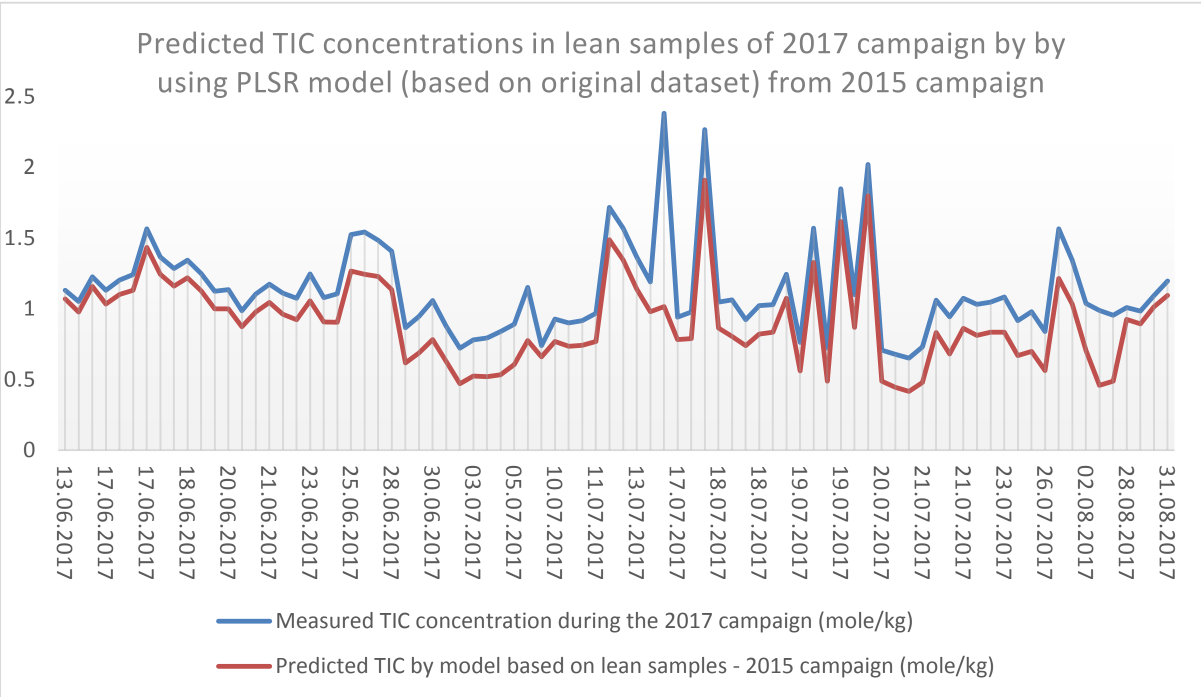


Figure 5-36: Predicted TIC values in lean samples of 2017 campaign by PLSR model from 2015 campaign

The predicted TIC concentration and measured concentration follow the same trend with some deviation/error.

Again, to evaluate the PLSR model predictability and to check the amount of the error of prediction, the RMSEP was calculated, Figure 5-37. Like before, the RMSEP was calculated for every two samples. The average of error in the prediction was 0.12 mole/kg.

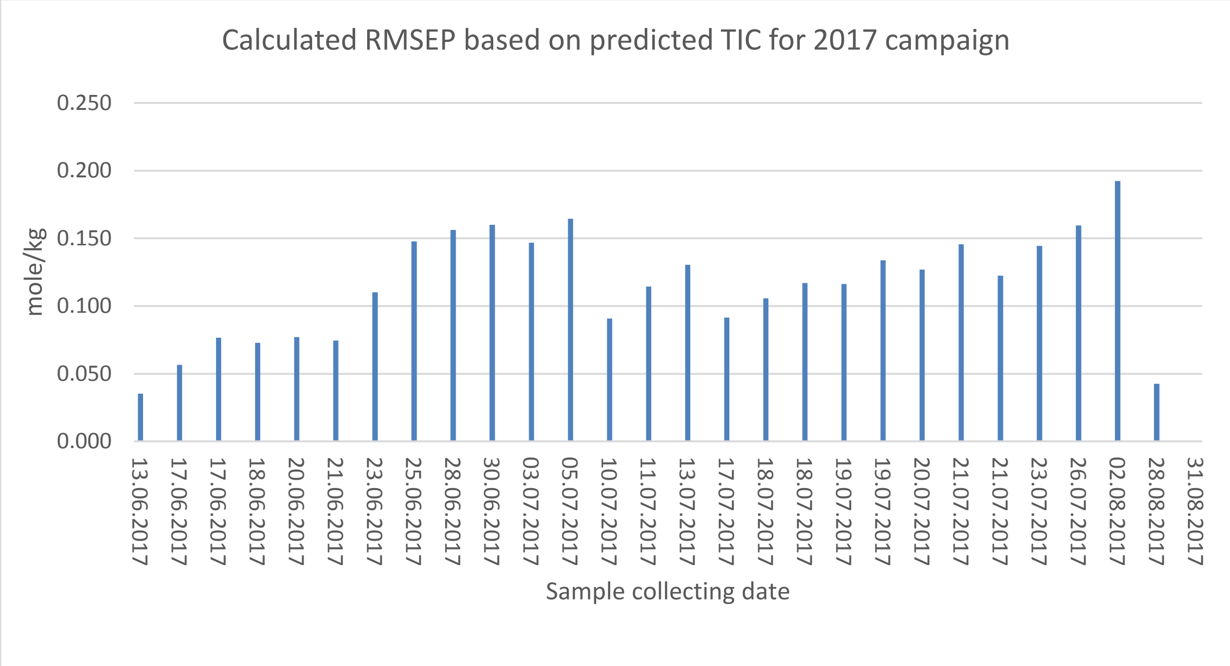


Figure 5-37: Calculated RMSEP for prediction of TIC values in lean samples - 2017 campaign

As it was described in article 5.5.1, there are some significant differences between campaign 2017 and 2015. One of them was injection of PBS as an oxygen scavenger. Figure 5-38 shows the injection rate os potssium bisulfite (PBS) during the oxygen scavenger test period 2017 campaign. From 30th June 2017 which the injected PBS in the system exceeds 2wt%, some salt crystals on some equiment in cold lean part of the plant were observed. By increasinng the amount of PBS to around 5wt%, the solvent reclaiming has been done in this campaign. Then, the amount of injected PBS reduced to 1wt%. [3]

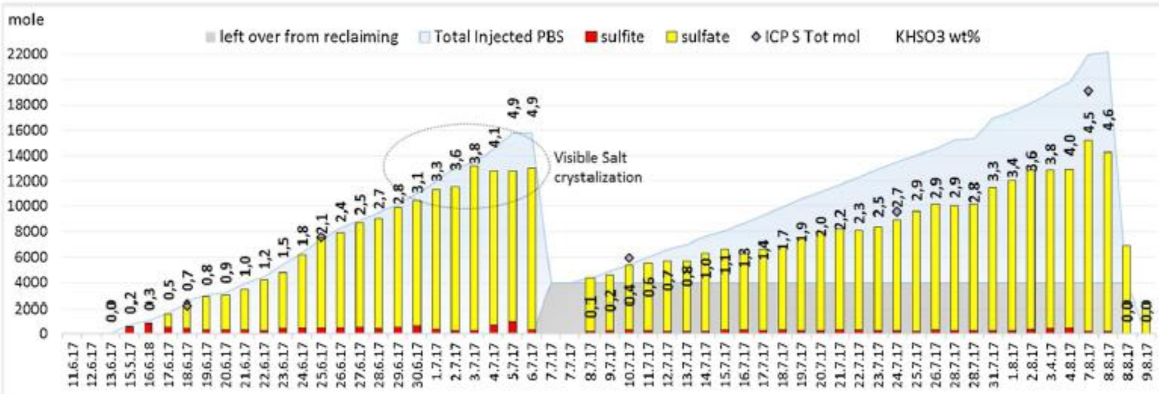


Figure 5-38: Potassium bisulfite (PBS) injection during the 2017 campaign [3]

The average error of prediction, Figure 5-37 and application of oxygen scavenger during th 2017 campaig, Figure 5-38 follow same trend.

By increasing the amount of PBS in the system, the amount of salts in the system and also the average error of the prediction are increasing as well. These two figures show that the applying oxygen scavenger, which is only in 2017 campaign, has significant effect on the campaign conditions and lead to a deviation in predicted concentrations by PLSR model.

5.5.5 Prediction of Total Alkalinity concentration in lean samples for 2017 campaign by PLSR model based on 2015 campaign

Like TIC concentration prediction, same approach for predicting the Total alkalinity concentration in lean samples of 2017 campaign was followed. A model by considering dataset from 2015 campaign (without baseline correction) was prepared and the prediction was done. (Figures 5-39-41)

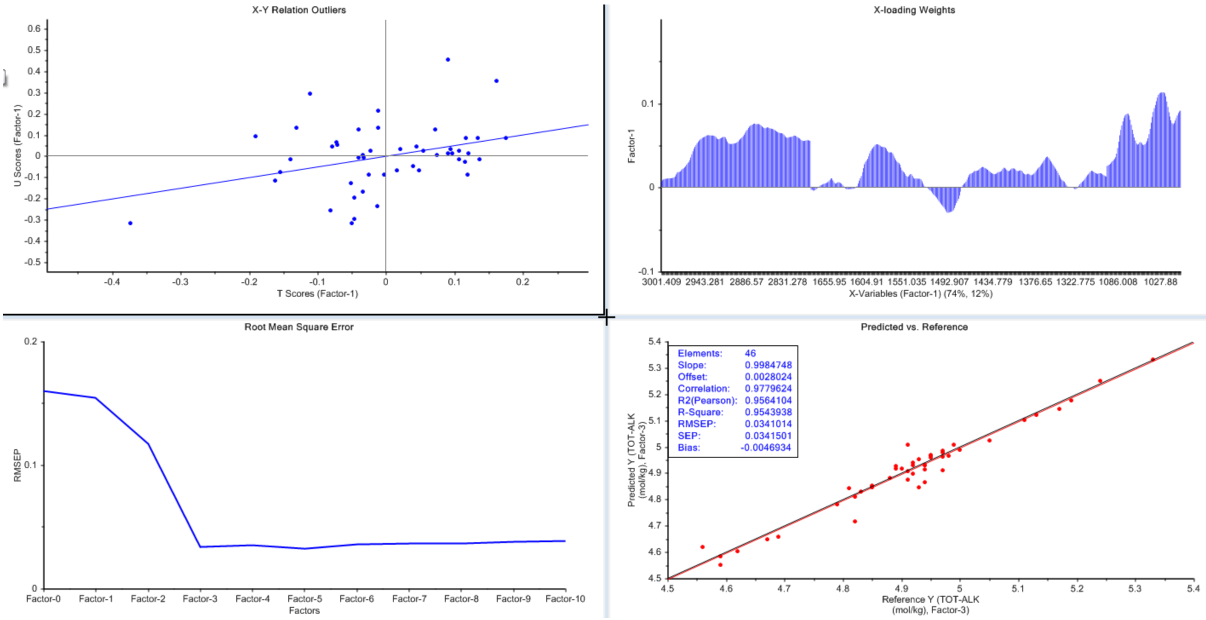


Figure 5-39: PLSR model for Tot-Alk prediction, from 2015 campaign with considering the original dataset

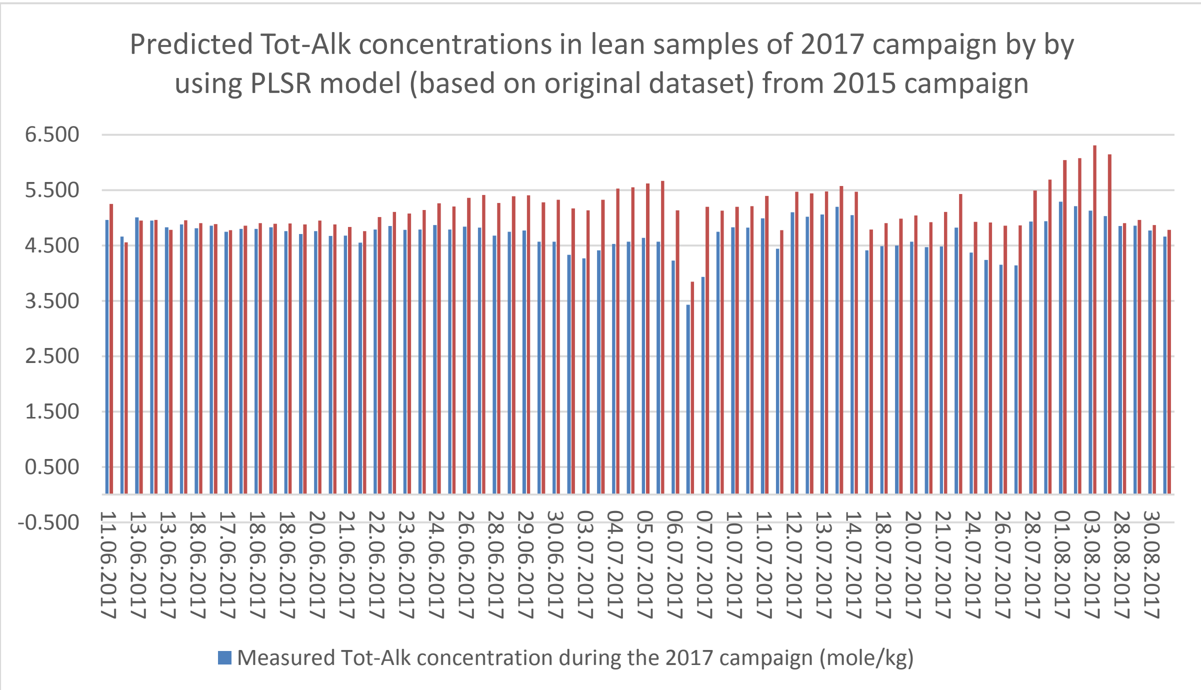


Figure 5-40: Predicted Tot-Alk values in lean samples of 2017 campaign by PLSR model from 2015 campaign

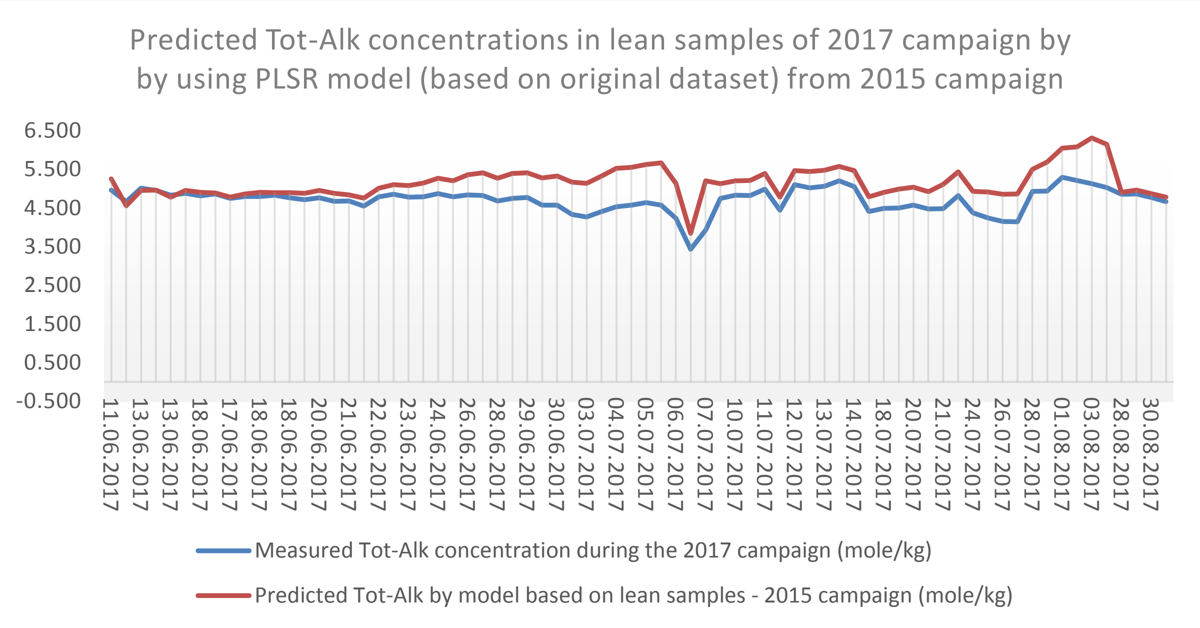


Figure 5-41: Predicted Tot-Alk values in lean samples of 2017 campaign by PLSR model from 2015 campaign

Figures 5-40 and 5-41 confirm that the predicted Total alkalinity values by means of model from 2015 campaign is compatible with the measured values during the 2017 campaign. It means, the model is able to predict Tot-Alk values even after a two-year gap.

The average predicted Tot-Alk concentration for 2017 campaign was 5.16 mole/kg which is close to the average of measured values during the campaign, 4.70 mole/kg. (Table-14)

Table 5-14: Tot-Alk values in lean samples of 2017 campaign (measured & predicted)

Average measured Tot-Alk values in 2017 campaign (mole/kg)	Average predicted Tot-Alk values by PLSR model from 2015 campaign (mole/kg)
4.70	5.16

Again, to evaluate the PLSR model’s predictions, the average error of the prediction (RMSEP) was calculated for every two samples. (Table 5-42)

Like predicted TIC concentration, the average error of prediction (RMSEP) follow the same trend with PBS injection in the system. As a result of increasing the HSS in the system, the error of prediction is also increased.

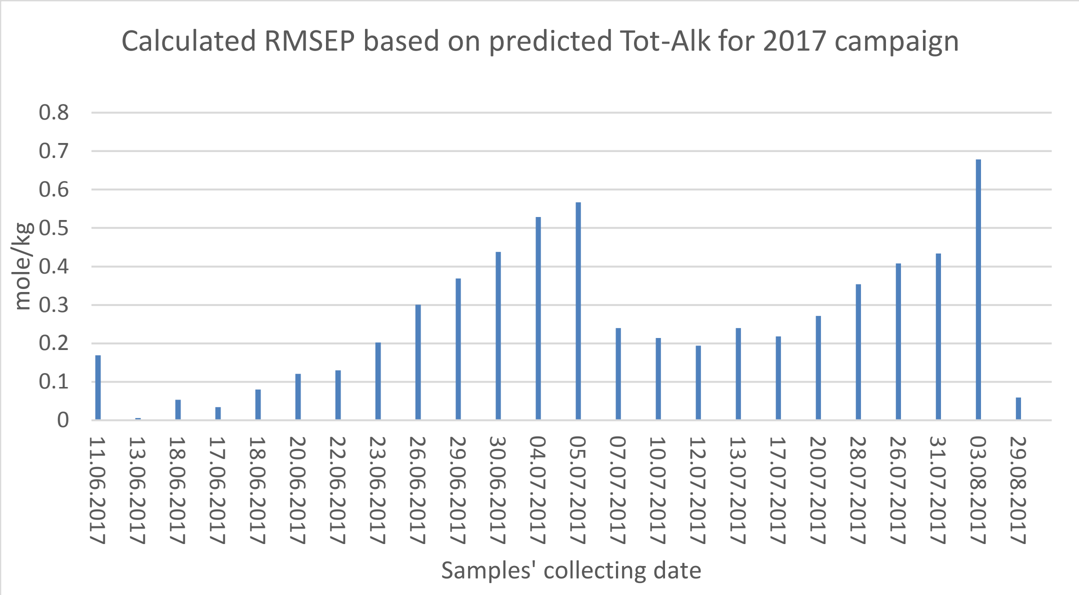


Figure 5-42: Calculated RMSEP for prediction of Tot-Alk values in lean samples - 2017 campaign

5.5.6 Prediction of TIC and Tot-Alk concentration in lean amine samples of 2015 campaign by PLSR model from 2017 campaign

Eventually, last part of this study is using the PLSR model whish was prepared based on received FTIR spectra and dataset (without baseline correction) from 2017 campaign to predict TIC and Tot-Alk concentration in lean amine samples of 2015 campaign.

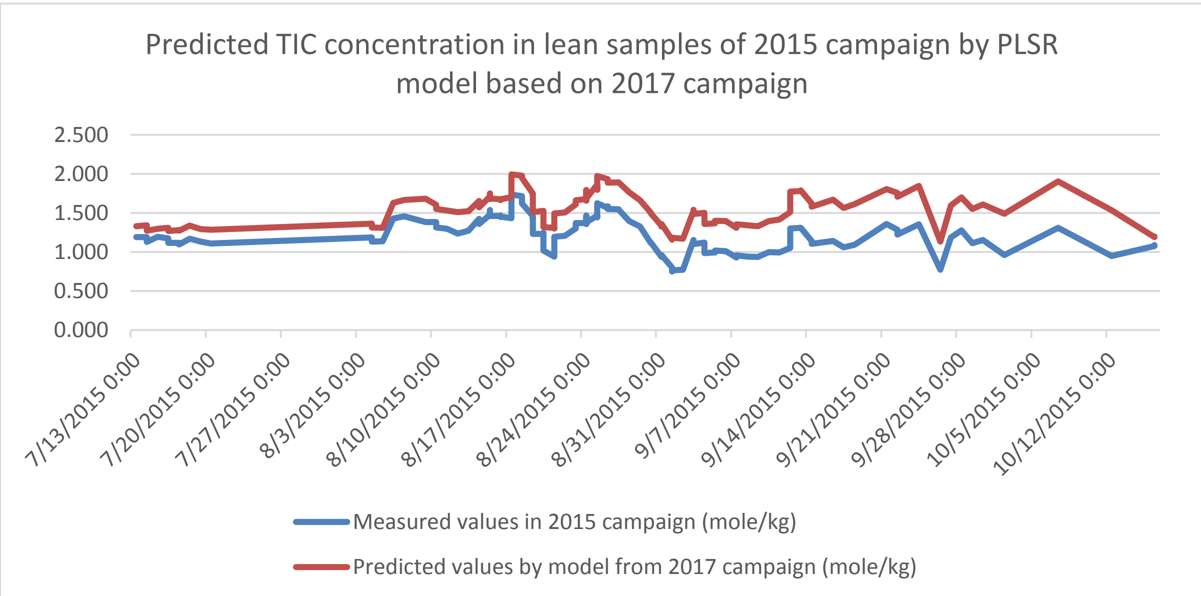


Figure 5-43: Predicted TIC concentration in lean samples of 2015 campaign by PLSR model based on 2017 campaign

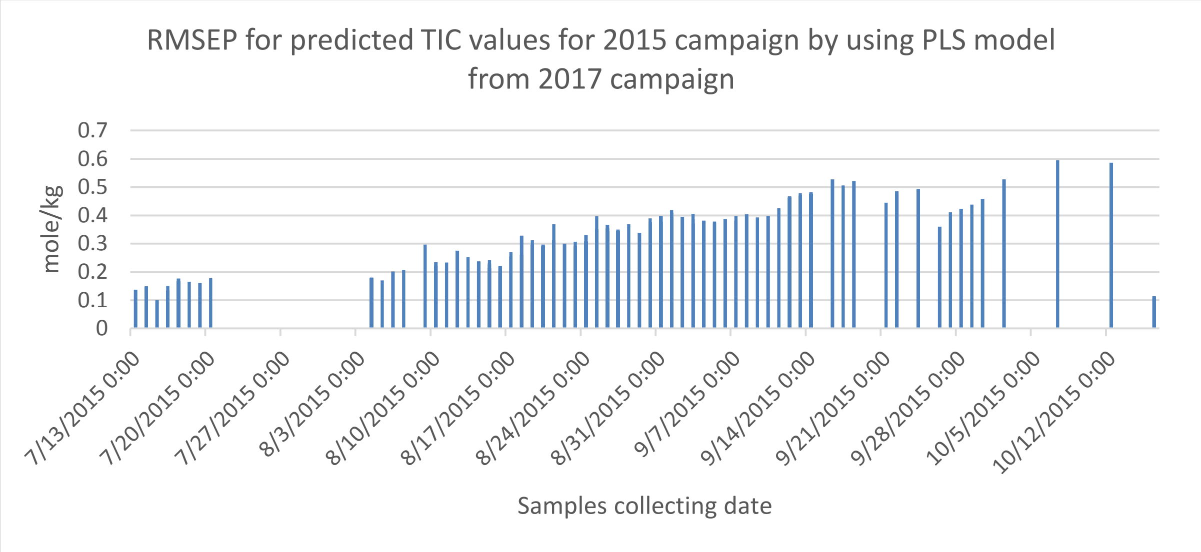


Figure 5-44: Calculated RMSEP for prediction of TIC values in lean amine of 2017 campaign by PLSR model from 2017 campaign

Table 5-15: TIC values for 2015 campaign (measured & predicted)

Average measured TIC value in 2015 campaign (mole/kg)	Average predicted TIC values by PLSR model from 2017 campaign (mole/kg)
1.232	1.556

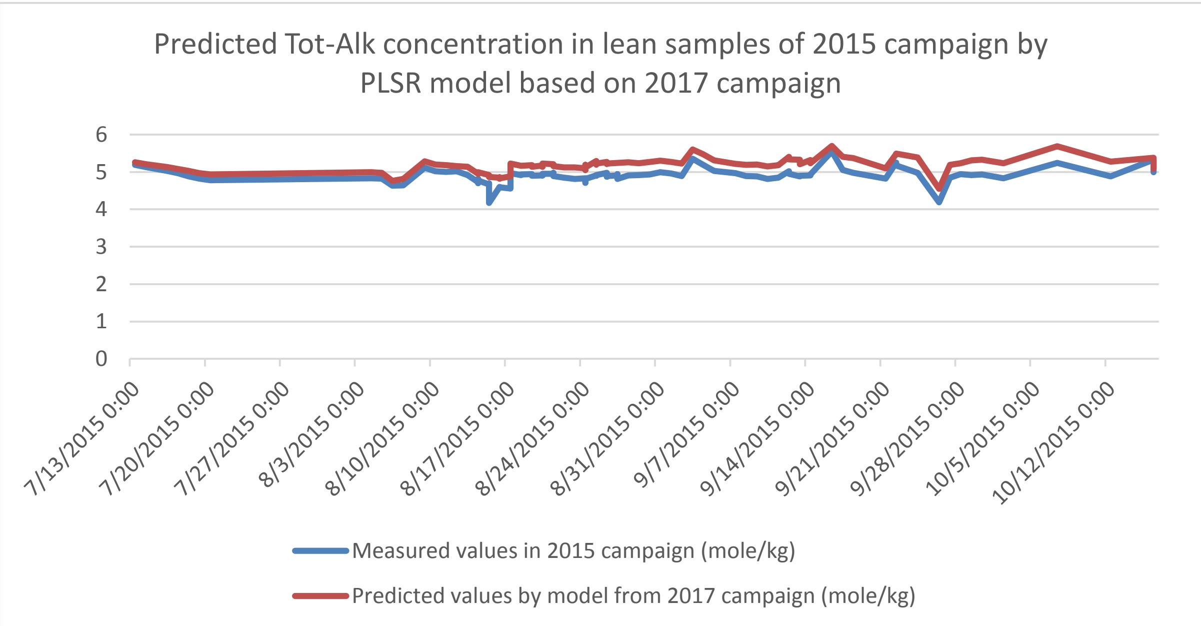


Figure 5-45: Predicted Tot-Alk concentration in lean samples of 2015 campaign by PLSR model based on 2017 campaign

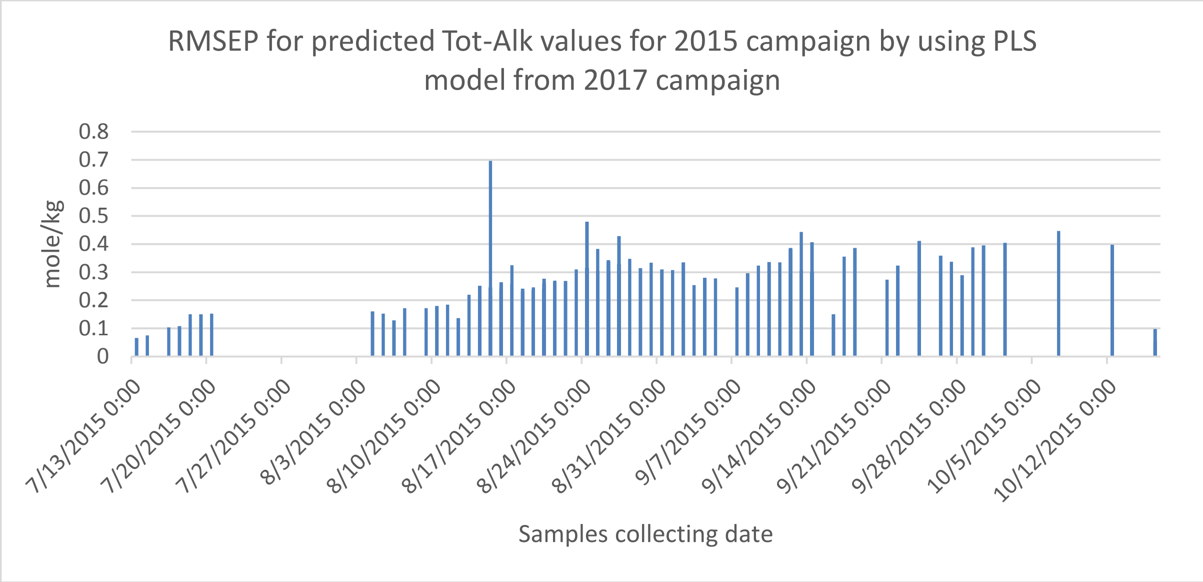


Figure 5-46: Calculated RMSEP for prediction of Tot-Alk values in lean amine of 2017 campaign by PLSR model from 2017 campaign

Table 5-16: Tot-Alk values for 2015 campaign (measured & predicted)

Average measured Tot-Alk values in 2015 campaign (mole/kg)	Average predicted Tot-Alk values by model from 2017 campaign (mole/kg)
4.892	5.166

It is observed that it is possible to predict the required concentrations in the other campaign, here 2015, by prepared PLSR model from the other campaign, 2017. But, there was a problem in prediction in both camaigns (2015 and 2017). Some samples had FTIR spectra and did not have measured values during the campaign and vice versa. Hence, it was not possible to compare the predicted and measured values for this kind of samples.

It is recommended that in order to have more reliable PLSR model, for each sample, FTIR spectra and measured values are provided at the same time. (if it is possible).

6 Conclusions

The purpose of this study is to show the multivariate data analysis alongside FTIR spectroscopy are technically and economically viable for online monitoring or even the prediction of the required component concentration in a real industrial process.

In this study and with collaboration with Technology Centre Mongstad (TCM), USN was provided with dataset containing FTIR spectra and laboratory test results for two comprehensive MEA campaigns in 2015 & 2017 at TCM's CO_2 capture plant.

The received data were mainly related to measured concentration of two major compounds i.e. Total Inorganic Carbon (TIC) and Total Alkalinity (Tot-Alk) in these campaigns. So, my research was focused on these two main compounds.

Therefore, the Partial Least Square Regression (PLSR) methodology was applied on the received FTRI spectra and dataset. Many PLSR models have been prepared and their predictability was tested accordingly to find the best possible PLSR model for prediction.

The predicted concentrations for TIC and Tot-Alk of the 2015 campaign was exactly same as the measured values during the campaign.

Table 6-1: TIC & Tot-Alk concentration in lean amine samples – 2015 campaign

Compound	Average measured concentration during the 2015 campaign (mole/kg)	Average predicted concentration by PLSR model (mole/kg)
TIC	1.2238	1.2237
Tot-Alk	4.895	4.895

Also, I checked the other predictability of PLSR model to predict TIC and Tot-Alk amount in rich samples. The received data set contained only measured values for lean amine. But the received FTIR spectra contained data for rich amine as well. It was an interesting challenge, predicting the required compounds' concentrations in rich amine by using the FTIR spectra. This is the advantage of MVA i.e. PLSR model alongside FTIR spectroscopy and this study confirms that the PLSR model can be used to predict concentration of required compound when the measurement in a process plant is not possible.

Table 6-2: TIC & Tot-Alk concentration in rich amine samples – 2015 campaign

Compound	Normal concentration (mole/kg)	Average predicted concentration by PLSR model (mole/kg)
TIC	2.209	2.037
Tot-Alk	4.91	4.66

During this study, I have been asked by TCM that how often the PLSR model should be updated to have proper prediction?

Although it is not easy to respond this question, an applicable approach was followed. Preparing the PLSR model based on oldest lean amine (first half of samples) and predict the last samples (second half of samples). By this method, it was possible to observe the possible deviation in predicted values by the model for second half of campaign. If the deviation increased over time, it was a sign for requiring an update. But, the PLSR model could predict the concentration of last samples precisely (Table 6-3).

Table 6-3: TIC & Tot-Alk concentration for last lean samples (predicted & measured) – 2015 campaign

Compound	Average measured concentration during the 2015 campaign (mole/kg)	Average predicted concentration by PLSR model (mole/kg)
TIC	1.134	1.145
Tot-Alk	4.964	4.965

To evaluate this method, average error of prediction (RMSEP) was calculated, Table 6-4. Since the model could predict the required values precisely and the average error was not significant, it not required to be updated.

Table 6-4: Average RMSEP for predicted concentration of last amines – 2015 campaign

Compound	Average RMSEP (mole/kg)
TIC	0.0138
Tot-Alk	0.041

By reviewing the above results, the PLSR model seems technically viable for every campaign with similar conditions, however, it is recommended to receive more possible measured concentration during the campaign to prepare proper model.

In the other part of this study, TCM provided USN with FTIR spectra and dataset from the 2017 campaign (partially). Again, a PLSR model was prepared for both TIC and Tot-Alk and the predictability of the model for the last lean samples in 2017 campaign was checked. (Tables 6-5 & 6)

The PLSR model could predict the TIC and Tot-Alk concentration accurately.

Table 6-5: TIC & Tot-Alk concentration for last lean samples (predicted & measured) – 2017 campaign

Compound	Average measured concentration during the 2017 campaign (mole/kg)	Average predicted concentration by PLSR model (mole/kg)
TIC	1.138	1.166
Tot-Alk	4.761	4.795

Table 6-6: Average RMSEP for predicted concentration in last lean samples – 2017 campaign

Compound	Average RMSEP (mole/kg)
TIC	0.074
Tot-Alk	0.086

In the next step, our research purpose was exceeded ambitiously. I tried to prepare a proper PLSR model from the dataset of 2015 campaign to predict the concentration of TIC and Tot-Alk in lean samples of 2017 campaign.

Table 6-7: Predicted TIC & Tot-Alk concentration in lean amine for 2017 campaign by using PLSR model from 2015 campaign

Compound	Average measured concentration during the 2017 campaign (mole/kg)	Average predicted concentration by PLSR model from 2015 campaign (mole/kg)
TIC	1.13	0.91
Tot-Alk	4.70	5.16

By following this approach, it was observed that the PLSR model could predict the TIC and Tot-Alk concentration in 2017 campaign with a good accuracy but with deviations.

By calculating the average error of prediction (RMSEP), the errors in prediction was reviewed.

These deviations were related to the different conditions of 2017 campaign in respect to 2015 campaign. There are significant changes in 2017 campaign.

1- In 2015 mostly CHP was used as the flue gas and in 2017 campaign, CHP, RFCC and mixture of RFCC & CHP were used.

2- Potassium bisulfite (PBS) as oxygen scavenger was injected to the system in 2017 campaign which caused increasing the amount of heat stable salt (HSS) in system.
3- MEA make up, solvent swap and solvent reclaiming was performed in 2017 campaign but in only solvent reclaiming was performed in 2015 campaign.

By comparing the calculated average error of prediction (RMSEP) and amount of PBS injection in system, the similar trend can be seen. (Figure 6-1&2)

By increasing the PBS and subsequently HSS in the system, the RMSEP is also increased. Hence, because of these changes during the 2017 campaign, deviations are inevitable. By considering above mentioned explanations and modeling, it was definitely possible that the PLSR model could prepare the TIC and Tot-Alk concentration precisely if the conditions of the 2017 campaign was similar to 2015 campaign, without any destructive changes like PBS injections which has an adverse effect on the results.

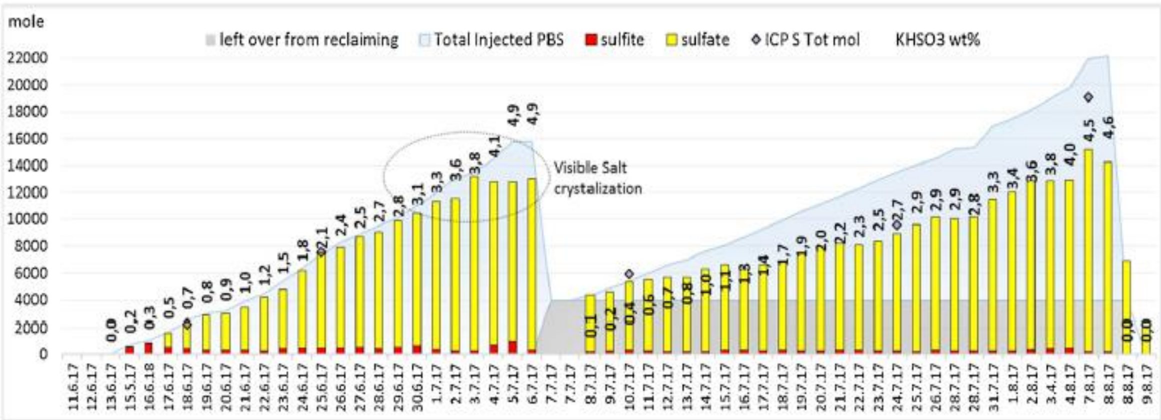


Figure 6-1: Potassium bisulfite (PBS) injection during the 2017 campaign [3]

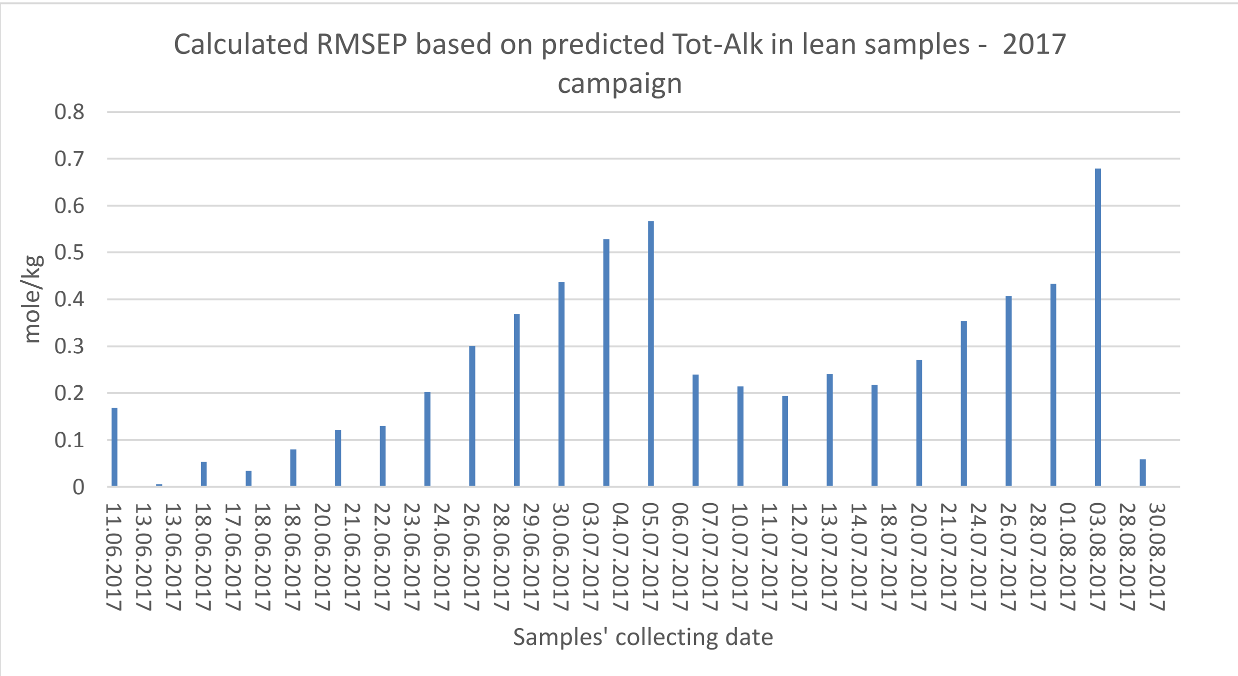


Figure 6-2: Calculated RMSEP for prediction of Tot-Alk values in lean samples - 2017 campaign

Eventually, last part of this study was prediction of TIC and Tot-Alk concentration in lean amine samples for 2015 campaign by using the PLSR model which was prepared based on FTIR spectra and dataset for 2017 campaign.

Although the predicted concentrations are close to the measured values in 2015 campaign, some deviations are inevitable. Because, as it was described before, the conditions of these two campaign were different.

Table 6-8: Predicted TIC & Tot-Alk concentration in lean amine for 2015 campaign by using PLSR model from 2017 campaign

Compound	Average measured concentration during the 2015 campaign (mole/kg)	Average predicted concentration by PLSR model from 2017 campaign (mole/kg)
TIC	1.232	1.556
Tot-Alk	4.892	5.166

By preparing numerous PLSR models and comparing their predictability, it was found out that multivariate data analysis integrated with spectroscopic analysis is an appropriate method for CO_2 capture plant monitoring. However, this study has been done based on the received dataset and FTIR spectra.

It was confirmed that it is possible to predict the required concentrations in the other campaigns by a proper PLSR model from which is made based on FTIR data of the other campaign. But, there was a problem in making prediction for both camaigns (2015 & 2017). Some samples had FTIR spectra and did not have measured values during the campaign and vice versa. Hence, it was not possible to compare the predicted and measured values for this kind of samples.

It is recommended in order to have more reliable PLSR model, for each samples, FTIR spectra and laboratory measeuements provided simultaneously. (if it is possible).

By having more data and considering more effective variables, the output of the PLSR model will be more reliable, undoubtedly.

It is also still believed that using MVA and FTIR spectra is technically and economically viable for real industrial CO_2 capture process. Through this, it is possible to reduce the time consuming and expensive conventional laboratory analyses of samples. Meanwhile, further development and validation of PLSR model are still required before using this technique in a real CO_2 capture plant.

7 Prepared for publication (Draft)

Keywords: Multivariate data analysis, MEA, FTIR, CO_2 capture, PLSR method, Technology Centre Mongstad (TCM)

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Abstract

The CO_2 Technology Centre Mongstad (TCM) is one of the largest post-combustion CO_2 capture test centers in the world. TCM is a joint venture set up by the Norwegian government through Gassnova, Equinor, Shell and Sasol. In 2015 and 2017 TCM operated two comprehensive test campaigns using the benchmark aqueous 30 wt% Monoethanolamine (MEA) solvent.

Results from these campaigns have been published[1-4, 14], giving insight into MEA behaviors including process conditions, degradation and atmospheric emission.

Through collaboration with TCM, University of South-eastern Norway (USN) has provided with relevant analytical data including Fourier Transform Infrared (FTIR) spectra, and other laboratory test results of the collected samples from the 1960-hour campaign in 2015 and from June to August 2017 and from June to end of August 2017 from 2017 campaign [2, 3]. FTIR spectra are the multivariate data source containing plenty of important chemical information of the sample. Partial least squares regression (PLS-R) is an advanced statistical method that can be used to extract the chemical information by calibrating models for specific chemical species [5, 6]. PLS-R models can be used for online-monitoring of dynamic systems[7]. We have also demonstrated that the online solvent monitoring was possible for CO_2 capture plants in our earlier publications [18, 27].

In this paper, we present the PLS-R models of Total Inorganic content (TIC) and Total Alkalinity which were prepared using FTIR spectra from TCM 2015 & 2017 campaigns. Furthermore, by using the prepared models from these two campaigns, the concentration of TIC and Total Alkalinity have been predicted. From this study, it is evident that online monitoring integrated with spectroscopic analysis is an appropriate method for CO_2 capture plant monitoring. Through this, it is possible to reduce the time consuming and expensive conventional laboratory analyses of samples from CO_2 capture plants.

1. Introduction

This is the next step of ongoing research at University of South-eastern Norway (USN) to enable FTIR spectra integrated with multivariate analysis for industrial scale CO_2 capture process. First the output of PAT instruments alongside measured property for two comprehensive campaigns have been received from TCM.

After pre-processing of this data including hundreds of wavenumbers correlated and the relevant models have been prepared. Wavenumbers are x variables which are correlated with y variables (measured properties). By this method we try to maximize covariance between x and y.

At this step, first, Raman and multivariate based PLS models have been calibrated and validated for complete wavenumbers and measured properties i.e. Total inorganic Carbon (TIC) and Total Alkalinity (TOT-Alk).

The prepared models have been assessed for their different types of predictability.

2. 2015 campaign

Upon receiving the FTIR spectra (for lean and rich amine) and laboratory test results (for collected lean samples during the 2015 campaign) we worked on them to prepare a proper PLSR model with maximum accuracy and predictability at the same time. To do this, different spectral region have been tried for both TIC and Tot-Alk. The best results were achieved was spectrum from 1000 to 1670 cm^{-1} for TIC and for Tot-Alk the spectral range were 2800 to 3000, 1280 to 1680 and 1000 to 1100 cm^{-1}.

2.1 Prediction of TIC and Tot-Alk concentrations in lean amine

The PLSR models with best accuracy and predictability was prepared and concentration of TIC and Tot-Alk for 2015 campaign has been predicted. Figures 1 and 2.

The results show the PLSR model could predict the concentrations of these two compound in lean amine exactly same as the measured values inn laboratory. (Table 1)

Table 1: TIC & Tot-Alk concentration for lean amine – 2015 campaign

Compound	Average measured concentration during the 2015 campaign (mole/kg)	Average predicted concentration by PLSR model (mole/kg)
TIC	1.2238	1.2237
Tot-Alk	4.895	4.895

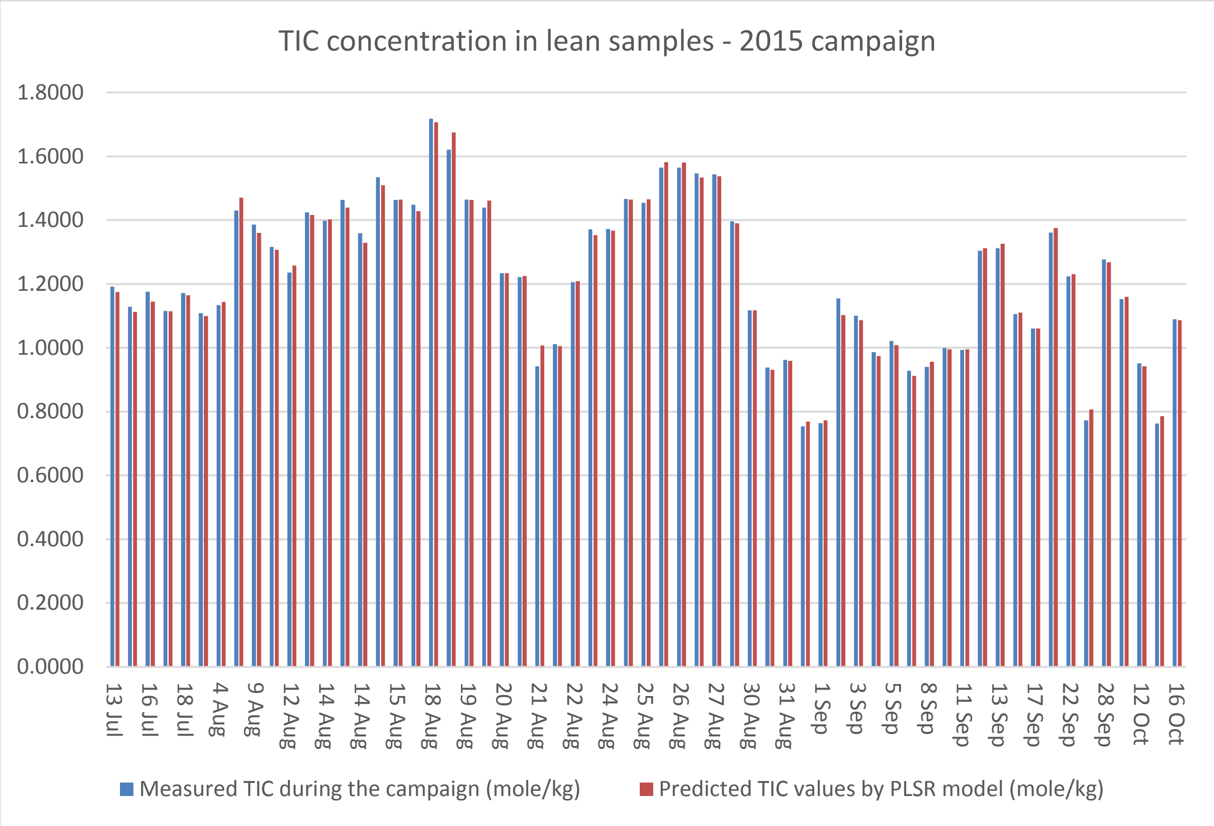

Figure 1: Prediction of TIC concentration in lean samples by PLSR model and measured TIC values during the 2015 campaign

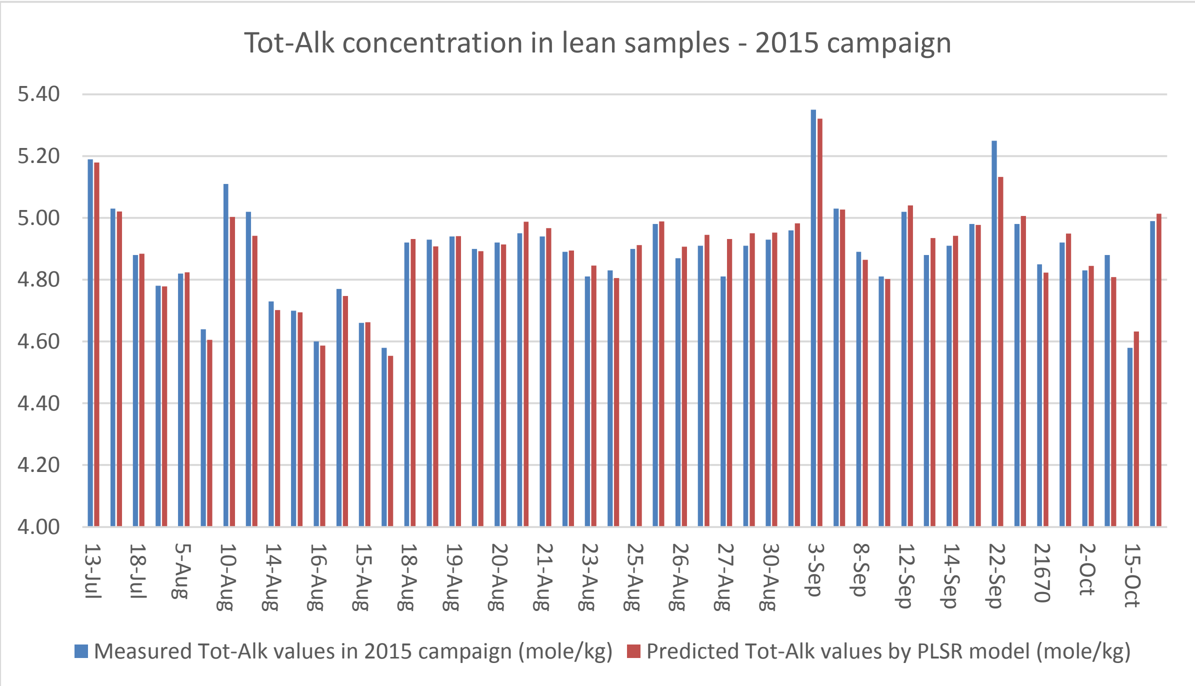

Figure 2: Prediction of Tot-Alk concentration in lean samples by PLSR model and measured Tot-Alk values during the 2015 campaign

2.2 Prediction of TIC and Tot-Alk concentration in rich amine

Since the received FTIR spectra contained data for lean and rich samples but the laboratory test results were related only to collected lean samples during the 2015 campaign, it was interesting how powerful is multivariate data analysis i.e. PLSR model integrated with FTIR spectroscopy.

The prediction of TIC and Tot-Alk concentration in rich amine for 2015 campaign was performed and the predicted values was very close to the normal concentration in rich amine. (Figures 3 & 4, Table 2)

Table 2: TIC & Tot-Alk concentration in rich amine – 2015 campaign

Compound	Normal concentration (mole/kg)	Average predicted concentration by PLSR model (mole/kg)
TIC	2.209	2.037
Tot-Alk	4.91	4.66

To evaluate this prediction, the normal concentration of TIC and Tot-Alk in rich amine are calculated:

Molecular weight of MEA= 61.08 g/mol

30 wt% Monoethanolamine (MEA) solvent means in 30 grams of MEA in 100 grams of Solvent.

$$\frac{30_{gr,MEA}}{100_{gr,Solvent}} = 30_{gr} \times \frac{1_{mole}}{61.08_{gr}} = 0.491\ mole\ MEA\ in\ solvent$$

$$\frac{0.491\ mole}{100\ gr_{solvent}} = \frac{0.491\ mole}{0.1\ kg} = 4.91\ mole/kg$$

4.91 mole/kg is normal concentration of Tot-Alk in rich amine.

For TIC concentration calculation, normally CO_2 loading value is used and for rich 30%MEA it may vary around 0.3-0.6 mol CO_2/mol amine. [26]

So, the average rich CO_2 loading is 0.45 CO_2 mol/mol amine.

Meanwhile, 1 Kg of solvent of 30% MEA have 4.91 mol of amine.

CO_2 loading value can be converted into CO_2 mol in 1 kg of solvent by multiplying by 4.91.

$$0.45\,\frac{CO_2\ mole}{amine\ mole} \times 4.91\ \frac{amine\ mole}{kg} = 2.209\ CO_2\ \frac{mole}{1\ kg}\ \text{of solvent}$$

The calculated normal TIC concentration in rich amine is closed to the predicted values by PLSR model.

Since, the laboratory test results/measurement for rich sample had not been provided/available, the samples collection date were not clear. Hence, the charts were prepared based on samples number.

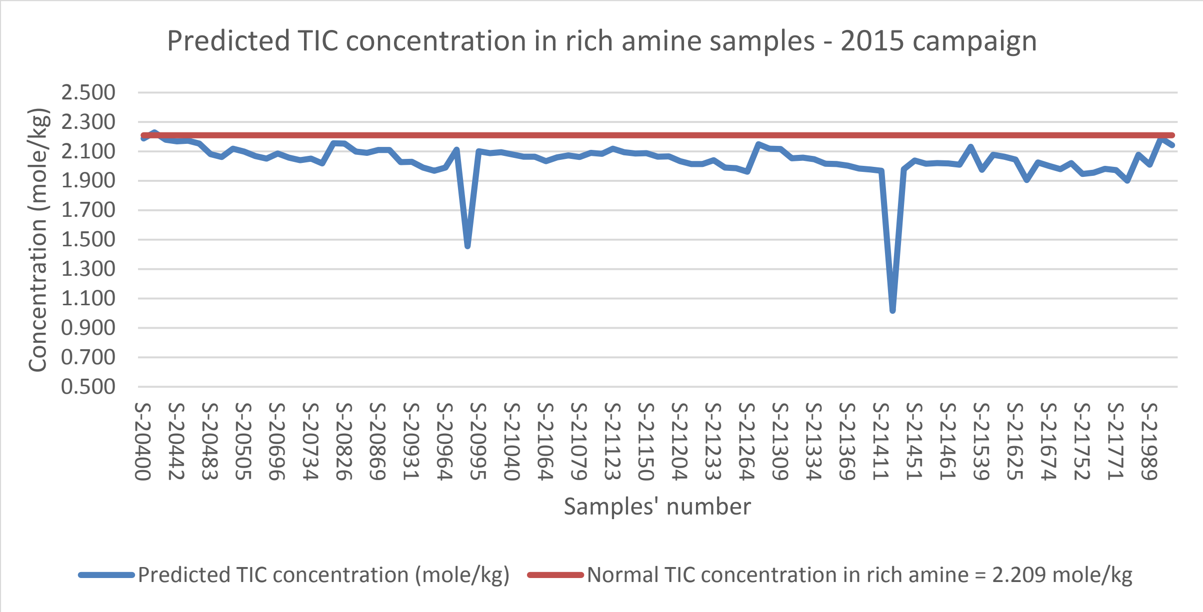

Figure 3: Predicted TIC concentration in rich amine samples - 2015 campaign

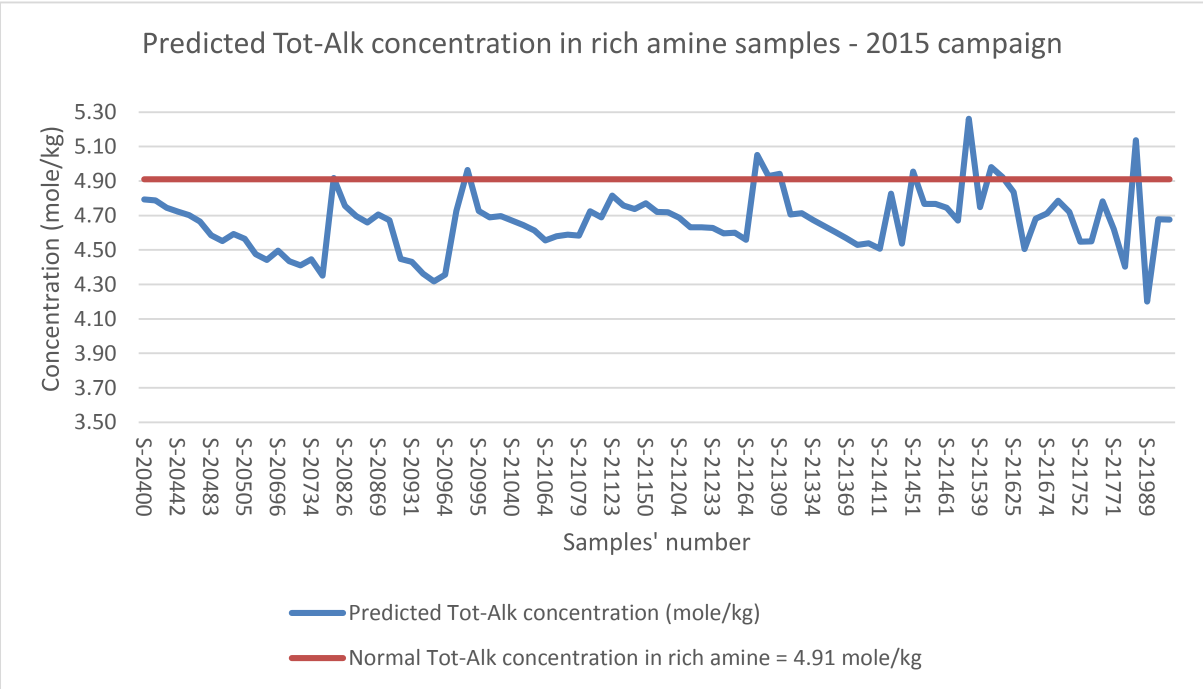

Figure 4: Predicted Tot-Alk concentration in rich amine samples - 2015 campaign

This is the advantage of MVA i.e. PLSR model alongside FTIR spectroscopy and this study confirms that the PLSR model can be used to predict concentration of required compounds when FTIR spectra are available and the measurement in a process plant is not possible.

2.3 Evaluation of prepared PLSR models

We have been asked by TCM, how often the PLSR models should be updated in a real industrial process to have proper prediction? Since, we only received FTIR spectra and laboratory test results, it was not easy to answer this question. But, we select a special approach to find a logical answer to this question. Calibrating a PLSR model based on the FTIR spectra from the first half of campaign and predict the TIC and Tot-Alk concentrations for the second half of the campaign. Then plot the predictions and references values (measured during the campaign) according to the time and see if the predictions get worse or deviate more in the end than in the beginning.

First tries were not successful and PLSR could not predict the accurate concentration. Then we corrected FTRI spectra by applying Automatic Whittaker Filter via Matlab PLS toolbox. The prediction was performed and the predicted concentration were as same as measured values during the campaign. (Table 3)

Table 3: TIC & Tot-Alk concentration for last lean samples (prediction & measured) – 2015 campaign

Compound	Average measured concentration during the 2015 campaign (mole/kg)	Average predicted concentration by PLSR model (mole/kg)
TIC	1.134	1.145
Tot-Alk	4.964	4.965

To evaluate this method, average error of prediction (RMSEP) sounds a proper technique to monitor error of prediction. The RMSEP shows the estimation of the average prediction error in the prepared model, with same measurement units. For instance, if the measurement has been done in meter, the RMSEP estimates the prediction error in meter. [22]

The definition of the root mean square error of prediction (RMSEP) is given in below equation. This is the average of squared differences between measured and predicted values. (Table 4)

$$RMSEP = \sqrt{\frac{\sum_{i=1}^{I}(y_{predicted} - y_{reference})^2}{I}} \tag{7.1}$$

$y_{predicted}$ = the predicted values

$y_{reference}$ = the measured values

I = total number of samples.

Since the models could predict the required values precisely and the average error was not significant, it does not require to be updated.

Table 4: Average RMSEP for predicted concentration of last amines – 2015 campaign

Compound	Average RMSEP (mole/kg)
TIC	0.0138
Tot-Alk	0.041

By reviewing the above results, the PLSR model seems technically viable for every campaign with similar conditions, however, it is recommended to receive more possible measured concentration during the campaign to prepare proper model.

3. 2017 Campaign

The same approach for 2017 campaign has been followed i.e. a proper PLSR model was prepared for both TIC and Tot-Alk and the predictability of the model for the last lean samples in 2017 campaign was checked. The PLSR model could predict the concentrations of these two compounds precisely. (Table 5)

Table 5: TIC & Tot-Alk concentration for last samples (prediction & measured) – 2017 campaign

Compound	Average measured concentration during the 2015 campaign (mole/kg)	Average predicted concentration by PLSR model (mole/kg)
TIC	1.138	1.166
Tot-Alk	4.761	4.795

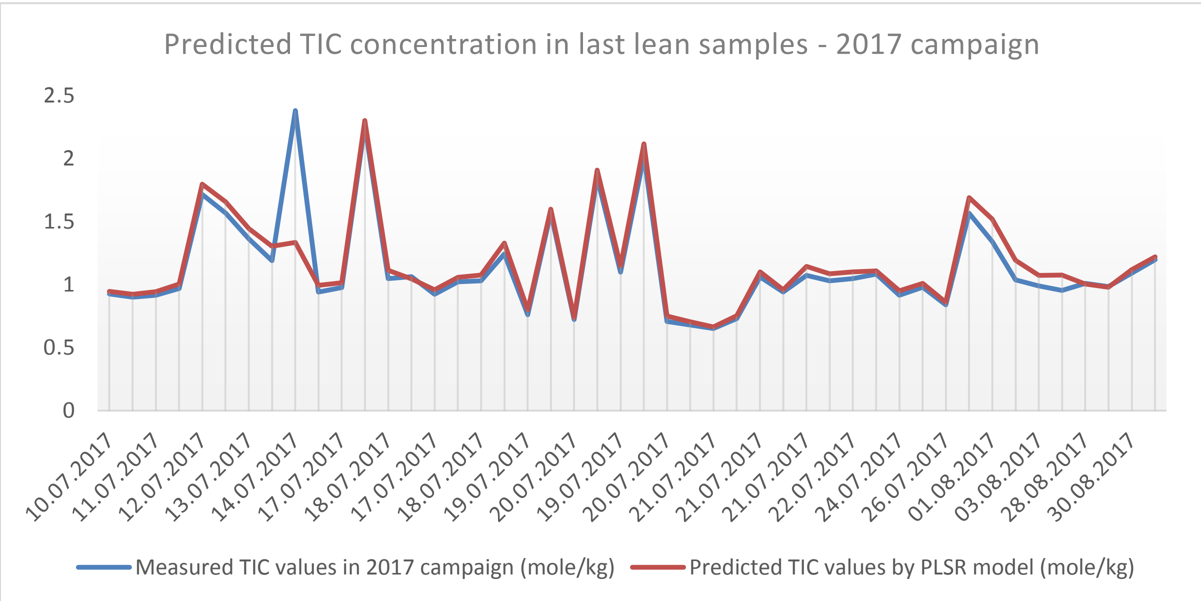

Figure 5: Predicted TIC concentration in last lean samples – 2017 campaign

The Figure 5 shows that the predicted TIC concentration for a lean sample which was collected on July 14th, 2017 is not compatible with the measured values (measured TIC concentration in laboratory: 2.381 mole/kg and predicted TIC: 1.3343 mole/kg). It may because of the noise in the instruments during the spectroscopy or probable mistake in measurement at laboratory.

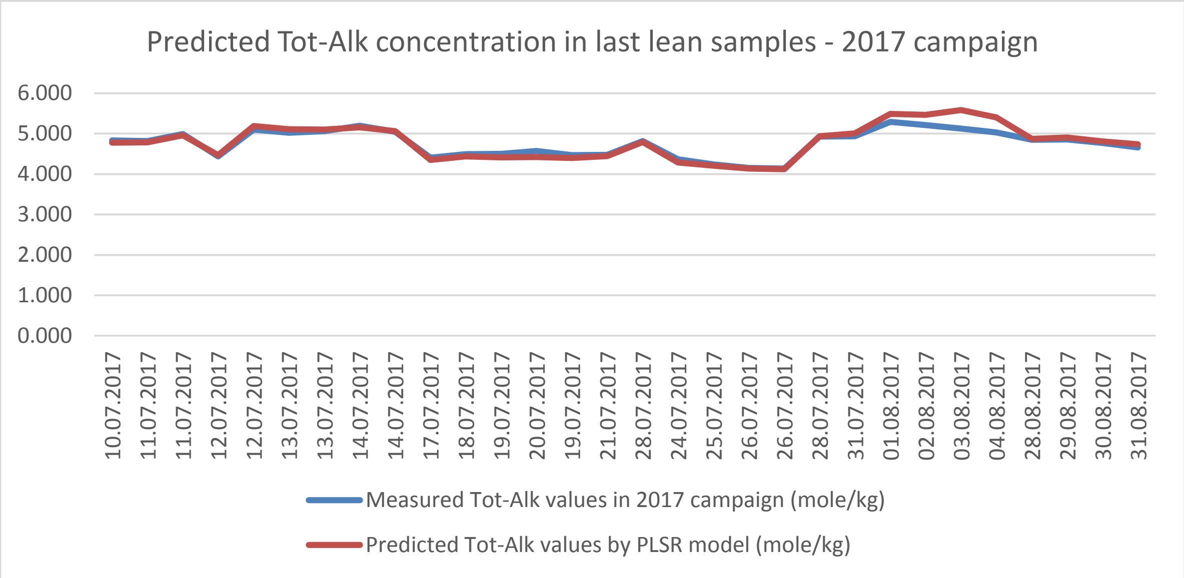

Figure 6: Predicted Tot-Alk concentration in last lean samples – 2017 campaign

To evaluate this predictability, the RMSEP was calculated. This is confirms that the PLSR models are able to predcit the concentrations without update requirement. (Table 6)

Table 6: Average RMSEP for predicted concentration of last amines – 2017 campaign

Compound	Average RMSEP (mole/kg)
TIC	0.074
Tot-Alk	0.086

3.2 Prediction of TIC and Tot-Alk in lean amine for 2017 campaign by PLSR models based on 2015 campaign

In next part of this study, we tried to prepare a proper PLSR model from the dataset of 2015 campaign to predict the concentration of TIC and Tot-Alk for 2017 campaign.

Table 7: Predicted TIC & Tot-Alk concentration in lean amine for 2017 campaign by using PLSR model from 2015 campaign

Compound	Average measured concentration during the 2017 campaign (mole/kg)	Average predicted concentration by PLSR model from 2015 campaign (mole/kg)
TIC	1.13	0.91
Tot-Alk	4.70	5.16

By following this approach, it was observed that the PLSR model could predict the TIC and Tot-Alk concentration in 2017 campaign with a good accuracy but with deviations.

By calculating the average error of prediction (RMSEP), the errors in prediction was reviewed.

These deviations were related to the different conditions of 2017 campaign in respect to 2015 campaign. There are significant changes in 2017 campaign as described below. [3]

1- As it was mentioned above, in 2015 mostly CHP was used as the flue gas and in 2017 campaign, CHP, RFCC and mixture of RFCC & CHP were used.

2- To inhibit the oxidative degradation reactions, Potassium Bisulfite (PBS) as the oxygen scavenger was injected to the system from the first day 2017 campaign. (Figure 5-27)

$$KHSO_3 + \frac{1}{2}O_2 \rightarrow K^+ + SO_4^{2-} + H^+ \qquad (7.2)$$

However, as a result of using PBS in 2017 campaign, there was a significant amount of accumulated heat stable salts (HSS) in system and salt precipitation was observed on valves and pumps at cold lean part of the plant. Although, adding oxygen scavenger decreased the solvent degradation, it caused accumulating of HSS in the system and also corrosion on the available heat exchanger in the plant. Due to injecting PBS, the amount of sulfite and sulfate in solvent were increased (measured during the campaign) which gave rise to restricted the reformation of reformation of protective oxide layer on the plate. [3]

3- In 2015 campaign solvent thermal reclaiming was performed at the end of this campaign. [1] However, in 2017 campaign, below treatments performed for MEA and solvent to keep solvent impurity at the lowest possible level:

- MEA make up: during this campaign and to compensate the degraded MEA and keep the amine at required level, small amount of fresh MEA was added to the system.
- Solvent reclaiming: solvent was reclaimed two times (during the studied period in this work)
- Solvent swap: during this period, all solvents were replaced with fresh MEA in 27th August 2017.

By comparing the calculated average error of prediction (Figure 7) and amount of PBS injection in system (Figure 6), the similar trend can be observed. By increasing the PBS and subsequently HSS in the system, the RMSEP is also increased. Hence, because of these changes during the 2017 campaign, deviations are inevitable. By considering above mentioned explanations and modeling, it was definitely possible that the PLSR model could prepare the TIC and Tot-Alk concentration precisely if the conditions of the 2017 campaign was similar to 2015 campaign, without any destructive changes like PBS injections which has an adverse effect on the results.

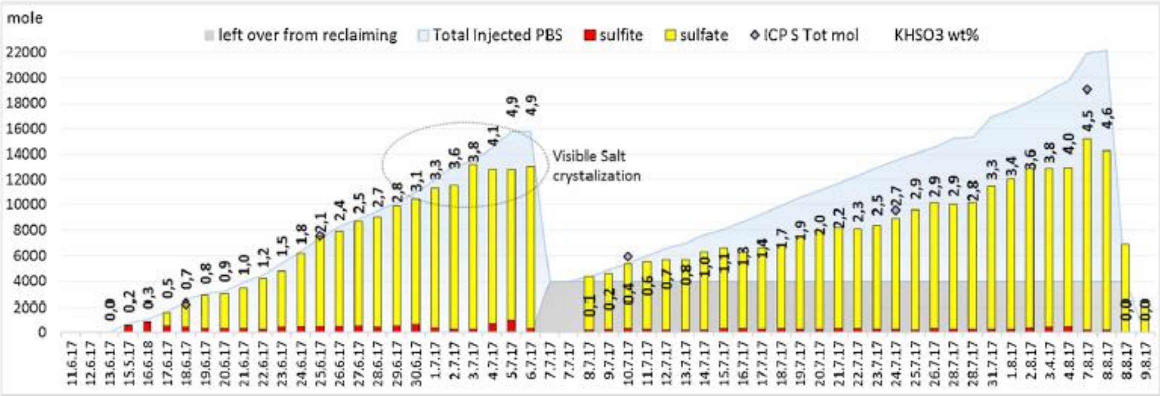

Figure 7: Potassium bisulfite (PBS) injection during the 2017 campaign [3]

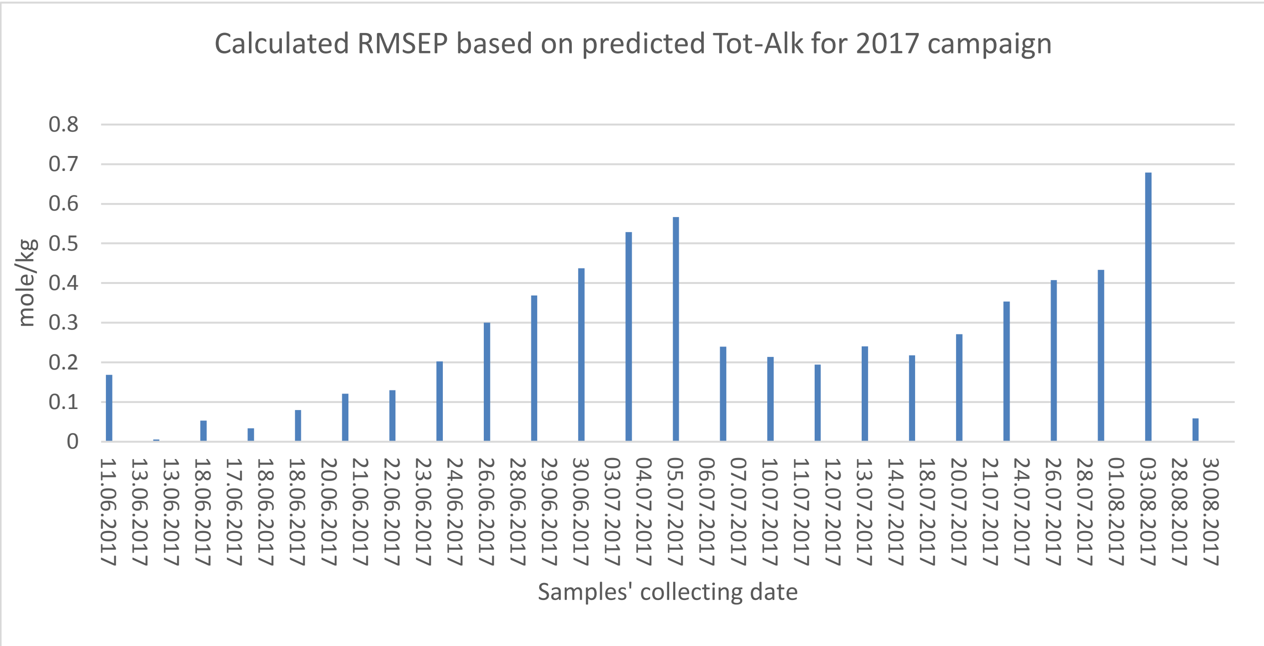

Figure 8: Calculated RMSEP for prediction of Tot-Alk values in lean amine - 2017 campaign

3.3 Prediction of TIC and Tot-Alk in lean amine for 2015 campaign by PLSR models based on 2017 campaign

Eventually, last part of this study was predict the TIC and Tot-Alk concentration in lean amine for 2015 campaign by using the PLSR model which was prepared based on FTIR spectra and dataset for 2017 campaign.

Although the predicted concentrations are close to the measured values in 2015 campaign, some deviations are inevitable. Because, as it was described before, the conditions of these two campaign were different.

Table 8: Predicted TIC & Tot-Alk concentration in lean amine for 2015 campaign by using PLSR model from 2017 campaign

Compound	Average measured concentration during the 2015 campaign (mole/kg)	Average predicted concentration by PLSR model from 2017 campaign (mole/kg)
TIC	1.232	1.556
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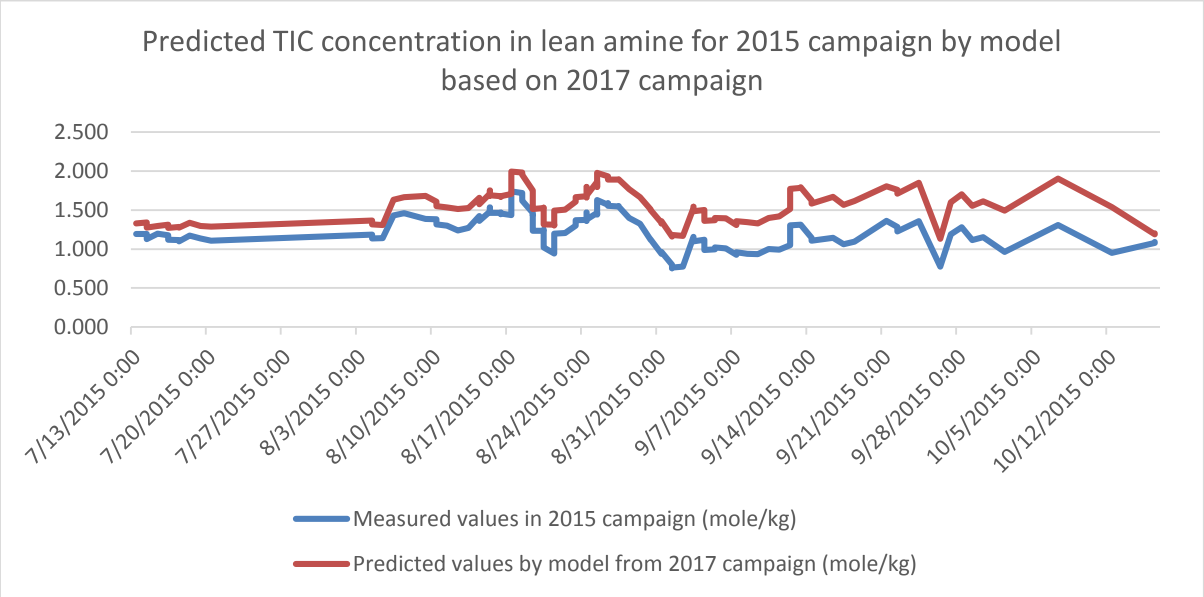

Figure 9: Predicted TIC concentration in lean amine for 2015 campaign by model based on PLSR model from 2017 campaign

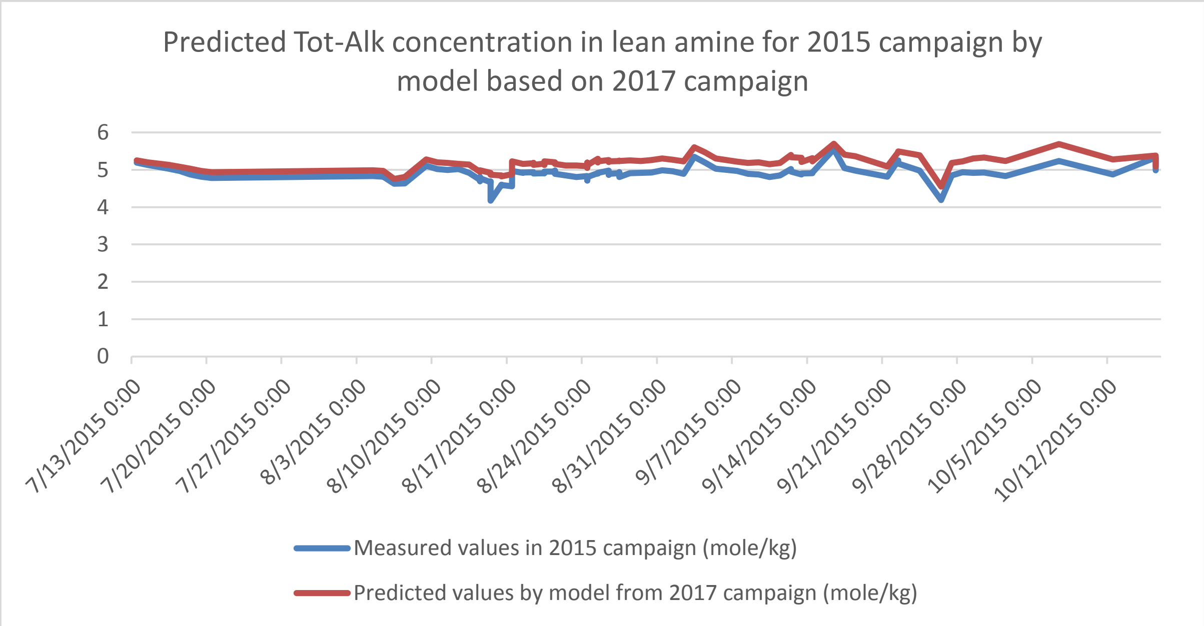

Figure 10: Predicted Tot-Alk concentration in lean amine for 2015 campaign by model based on PLSR model from 2017 campaign

4. Conclusion

By preparing numerous PLSR models and comparing their predictability, it was found out that multivariate data analysis integrated with spectroscopic analysis is an appropriate method for CO_2 capture plant monitoring. However, this study has been done based on the received dataset and FTIR spectra.

It was confirmed that it is possible to predict the required concentrations in the other campaigns by a proper PLSR model from the other campaign. But, there was a problem in making prediction for both camaigns (2015 & 2017). Some samples had FTIR spectra and did not have measured values during the campaign and vice versa. Hence, it was not possible to compare the predicted and measured values for this kind of samples.

It is recommended in order to have more reliable PLSR model, the provided FTIR spectra and measured values should be compatible with each other (if it is possible).

By having more data and considering more effective variables, the output of the PLSR model will be more reliable, undoubtedly.

It is also still believed that using MVA and FTIR spectra is technically and economically viable. Through this, it is possible to reduce the time consuming and expensive conventional laboratory analyses of samples. Meanwhile, further development and validation of PLSR model are still required before using this technique in a real CO_2 capture plant.

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9 Appendices

9 Appendices

Appendix A - Final project topic description and Non-Disclosure declaration

University of South-Eastern Norway

Faculty of Technology, Natural Sciences and Maritime Sciences, Campus Porsgrunn

FMH606 Master's Thesis

Title: Chemometric analysis of CO_2 capture solvent

USN supervisor: Jayangi Wagaarachchige, Maths Halstensen, Klaus J Jens and Zulkifli Idris

External partner: TCM

Task background:
Flue gas carbon capture and storage is necessary to reach globally agreed greenhouse gas targets. MEA, the benchmark CO_2 capture solvent, degrades during service creating solvent make-up and disposal costs. Improvement of this situation is urgent. This project will analyse spent MEA solvent samples from a large scale test plant (TCM[i]) to provide information for improvement.

Task description:
The work shall start with a literature survey of MEA speciation during CO_2 capture as well as MEA degradation during service. Thereafter, the solvent samples shall be characterized by e.g. Raman spectroscopy. The set of Raman spectra shall be analysed for speciation using PLS toolbox and models previously developed by USN. The speciation results shall be evaluated in light of the state-of-the-art MEA speciation and in service degradation knowledge.

The student will be provided with a chemometrics online course and a PLS toolbox tutorial workshop at the start of the work if desired.

Student category: EET, EPE, IIA or PT students

The task is suitable for online students (not present at the campus): Yes

Practical arrangements:
The student will be provided with a set of Raman spectra of the spent MEA solvent samples as well as access to necessary software.

Supervision: Jayangi Wagaarachchige, Maths Halstensen, Klaus J Jens and Zulkifli Idris

Signatures:

Supervisor: JAYANGI DINESHA WAGAARACHCHIGE 29. 01.2021

Student: AYANDEH KHATIBZADEH

Student: 29 January 2021

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[i] Technology Centre Mongstad; https://tcmda.com/no/

TECHNOLOGY CENTRE MONGSTAD

NON-DISCLOSURE DECLARATION

I accept

- that I through my work for Technology Centre Mongstad DA (TCM DA) will obtain knowledge to confidential information which shall not be disclosed to third parties; and
- that this work requires sense of responsibility, loyalty and conscientiousness.

I undertake to

- keep all information received through my work for TCM DA strictly confidential;
- exercise great caution with regard to TCM DA's correspondence, contracts, data information, drawings etc., in such a way that such information will not be disclosed to third parties;
- at end of my work for TCM DA to:
    - return all material belonging to TCM DA,
    - not remove or copy any documents or any magnetizable media;
- familiarize with TCM DA rules and information security.

I accept that

- any violation of this non-disclosure declaration will result in termination and end of my work for TCM DA, and possible criminal liability;
- this non-disclosure declaration does also apply after end of my work for TCM DA; and
- this non-disclosure declaration will be regulated by Norwegian law.

Name: Ayandeh Khatibzadeh Date of birth: 11 Sep. 1984

Employer:

Place: Date: 12 Feb. 2021

Signature:______________________________

Appendix B - Measured values during the 2015 campaign

Sample No.	Id numeric	Sampled date	Sampling point	Description	Analysis	Component name	Result text	Units	Date result entered	Project id	TIC	TOT-ALK	HSS	ICP-OES	PH	Store	LC-MS	IC
1	20401	7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.19	mol/kg	7/13/2015 11:05	TCM MEA 2015		x						
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.192	mol/kg	7/13/2015 12:07	TCM MEA 2015	x							
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS	0.011	mol/kg	7/21/2015 13:27	TCM MEA 2015			x					
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Al_wt	2	mg/kg	7/15/2015 15:07	TCM MEA 2015				x				
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ca_wt	1.1	mg/kg	7/15/2015 15:06	TCM MEA 2015				x				
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Co_wt	<0.2	mg/kg	7/15/2015 15:08	TCM MEA 2015				x				
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cr_wt	0.2	mg/kg	7/15/2015 15:05	TCM MEA 2015				x				
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cu_wt	<0.2	mg/kg	7/15/2015 15:07	TCM MEA 2015				x				
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Fe_wt	3.2	mg/kg	7/15/2015 15:05	TCM MEA 2015				x				
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	ICP-OES	K_wt	0.7	mg/kg	7/15/2015 15:07	TCM MEA 2015				x				
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mg_wt	0.3	mg/kg	7/15/2015 15:07	TCM MEA 2015				x				
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mo_wt	<0.2	mg/kg	7/15/2015 15:03	TCM MEA 2015				x				
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Na_wt	1.3	mg/kg	7/15/2015 15:06	TCM MEA 2015				x				
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ni_wt	0.2	mg/kg	7/15/2015 15:05	TCM MEA 2015				x				
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Si_wt	1.6	mg/kg	7/15/2015 15:04	TCM MEA 2015				x				
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	ICP-OES	V_wt	<0.2	mg/kg	7/15/2015 15:06	TCM MEA 2015				x				
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Zn_wt	<0.2	mg/kg	7/15/2015 15:07	TCM MEA 2015				x				
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.5		7/13/2015 11:05	TCM MEA 2015					x			
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		7/13/2015 11:22	TCM MEA 2015						x		
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	371041	mg/L	7/15/2015 14:57	TCM MEA 2015							x	
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	LC-MS	BHEOX	<100	mg/L	7/15/2015 8:31	TCM MEA 2015							x	
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEA	117	mg/L	7/15/2015 8:32	TCM MEA 2015							x	
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEF	263	mg/L	7/15/2015 8:31	TCM MEA 2015							x	
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEGly	2274	mg/L	7/15/2015 8:31	TCM MEA 2015							x	
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEI	66	mg/L	7/15/2015 8:31	TCM MEA 2015							x	
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEPO	3317	mg/L	7/15/2015 8:31	TCM MEA 2015							x	
		7/13/2015 4:39	S-8611-2013	Lean amine - absorber inlet	LC-MS	OZD	38	mg/L	7/15/2015 8:31	TCM MEA 2015							x	
2	20423	7/14/2015 4:07	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.13	mol/kg	7/14/2015 10:17	TCM MEA 2015		x						
		7/14/2015 4:07	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.193	mol/kg	7/14/2015 14:55	TCM MEA 2015	x							
		7/14/2015 4:07	S-8611-2013	Lean amine - absorber inlet	IC	AA	<125	mg/L	7/21/2015 12:58	TCM MEA 2015								x
		7/14/2015 4:07	S-8611-2013	Lean amine - absorber inlet	IC	FA	110	mg/L	7/21/2015 12:58	TCM MEA 2015								x
		7/14/2015 4:07	S-8611-2013	Lean amine - absorber inlet	IC	NO2-	<110	mg/L	7/20/2015 15:22	TCM MEA 2015								x
		7/14/2015 4:07	S-8611-2013	Lean amine - absorber inlet	IC	OA	<55	mg/L	7/21/2015 12:58	TCM MEA 2015								x
		7/14/2015 4:07	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	<55	mg/L	7/20/2015 15:22	TCM MEA 2015								x
		7/14/2015 4:07	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.5		7/14/2015 9:57	TCM MEA 2015					x			
		7/14/2015 4:07	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		7/14/2015 11:55	TCM MEA 2015						x		
3	20439	7/14/2015 17:50	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.129	mol/kg	7/15/2015 15:10	TCM MEA 2015	x							
		7/14/2015 17:50	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		7/15/2015 13:10	TCM MEA 2015						x		
4	20443	7/15/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.12	mol/kg	7/15/2015 13:12	TCM MEA 2015		x						
		7/15/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.142	mol/kg	7/15/2015 14:50	TCM MEA 2015	x							
		7/15/2015 4:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.5		7/15/2015 12:23	TCM MEA 2015					x			
		7/15/2015 4:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		7/15/2015 13:10	TCM MEA 2015						x		
		7/15/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	364145	mg/L	7/20/2015 8:01	TCM MEA 2015							x	
5	20461	7/15/2015 18:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.196	mol/kg	7/16/2015 13:33	TCM MEA 2015	x							
		7/15/2015 18:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		7/16/2015 10:54	TCM MEA 2015						x		
6	20465	7/16/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.03	mol/kg	7/16/2015 10:51	TCM MEA 2015		x						
		7/16/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.176	mol/kg	7/16/2015 13:46	TCM MEA 2015	x							
		7/16/2015 4:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.4		7/16/2015 10:55	TCM MEA 2015					x			
		7/16/2015 4:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		7/16/2015 10:54	TCM MEA 2015						x		
7	20484	7/16/2015 18:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.119	mol/kg	7/17/2015 14:30	TCM MEA 2015	x							
		7/16/2015 18:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		7/17/2015 10:25	TCM MEA 2015						x		
8	20488	7/17/2015 3:30	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.97	mol/kg	7/17/2015 11:08	TCM MEA 2015		x						
		7/17/2015 3:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.116	mol/kg	7/17/2015 14:26	TCM MEA 2015	x							
		7/17/2015 3:30	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.5		7/17/2015 11:08	TCM MEA 2015					x			
		7/17/2015 3:30	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		7/17/2015 10:25	TCM MEA 2015						x		
		7/17/2015 3:30	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	343144	mg/L	7/20/2015 8:02	TCM MEA 2015							x	
9	20502	7/17/2015 17:45	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.097	mol/kg	7/21/2015 8:21	TCM MEA 2015	x							
		7/17/2015 17:45	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		7/20/2015 11:51	TCM MEA 2015						x		
10	20506	7/18/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.88	mol/kg	7/20/2015 14:49	TCM MEA 2015		x						
		7/18/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.172	mol/kg	7/21/2015 8:21	TCM MEA 2015	x							
		7/18/2015 4:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.4		7/20/2015 11:38	TCM MEA 2015					x			
		7/18/2015 4:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		7/20/2015 11:51	TCM MEA 2015						x		
11	20511	7/19/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.82	mol/kg	7/20/2015 14:28	TCM MEA 2015		x						
		7/19/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.134	mol/kg	7/20/2015 15:07	TCM MEA 2015	x							
		7/19/2015 4:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.5		7/20/2015 14:48	TCM MEA 2015					x			
		7/19/2015 4:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		7/20/2015 11:51	TCM MEA 2015						x		
12	20516	7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.78	mol/kg	7/20/2015 13:25	TCM MEA 2015		x						
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.108	mol/kg	7/20/2015 13:41	TCM MEA 2015	x							
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS	0.038	mol/kg	7/21/2015 13:28	TCM MEA 2015			x					
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Al_wt	2.6	mg/kg	7/23/2015 10:58	TCM MEA 2015				x				
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ca_wt	1.3	mg/kg	7/23/2015 10:55	TCM MEA 2015				x				
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Co_wt	<0.1	mg/kg	7/23/2015 10:58	TCM MEA 2015				x				
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cr_wt	0.4	mg/kg	7/23/2015 10:56	TCM MEA 2015				x				
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cu_wt	<0.1	mg/kg	7/23/2015 10:58	TCM MEA 2015				x				
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Fe_wt	7.2	mg/kg	7/23/2015 10:56	TCM MEA 2015				x				
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	K_wt	0.7	mg/kg	7/23/2015 10:58	TCM MEA 2015				x				
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mg_wt	0.5	mg/kg	7/23/2015 10:57	TCM MEA 2015				x				
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mo_wt	<0.1	mg/kg	7/23/2015 10:55	TCM MEA 2015				x				
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Na_wt	1.8	mg/kg	7/23/2015 10:57	TCM MEA 2015				x				
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ni_wt	0.7	mg/kg	7/23/2015 10:57	TCM MEA 2015				x				
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Si_wt	2.1	mg/kg	7/23/2015 10:54	TCM MEA 2015				x				
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	V_wt	<0.1	mg/kg	7/23/2015 10:58	TCM MEA 2015				x				
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Zn_wt	<0.1	mg/kg	7/23/2015 10:58	TCM MEA 2015				x				
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	342226	mg/L	7/21/2015 8:09	TCM MEA 2015							x	
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	BHEOX	<100	mg/L	7/22/2015 7:47	TCM MEA 2015							x	
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEA	434	mg/L	7/22/2015 7:47	TCM MEA 2015							x	
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEF	849	mg/L	7/22/2015 7:46	TCM MEA 2015							x	
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEGly	5438	mg/L	7/22/2015 7:47	TCM MEA 2015							x	

Sample No.	Id numeric	Sampled date	Sampling point	Description	Analysis	Component name	Result text	Units	Date result entered	Project id	TIC	TOT-ALK	HSS	ICP-OES	PH	Store	LC-MS	IC
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEI	398	mg/L	7/22/2015 7:46	TCM MEA 2015							x	
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEPO	8739	mg/L	7/22/2015 7:47	TCM MEA 2015							x	
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	OZD	55	mg/L	7/22/2015 7:46	TCM MEA 2015							x	
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.5		7/20/2015 11:38	TCM MEA 2015					x			
		7/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		7/20/2015 11:51	TCM MEA 2015						x		
13	20652	7/30/2015 11:45	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.12	mol/kg	7/30/2015 12:50	TCM MEA 2015		x						
		7/30/2015 11:45	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk_wt%	25.18	%wt	7/30/2015 12:50	TCM MEA 2015		x						
14	20665	7/31/2015 8:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk_wt%	27.2	%wt	7/31/2015 9:40	TCM MEA 2015		x						
		7/31/2015 8:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.46	mol/kg	7/31/2015 9:40	TCM MEA 2015		x						
15	20666	7/31/2015 9:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk_wt%	27.3	%wt	7/31/2015 12:12	TCM MEA 2015		x						
		7/31/2015 9:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.47	mol/kg	7/31/2015 12:12	TCM MEA 2015		x						
16	20667	7/31/2015 15:15	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk_wt%	30.3	%wt	7/31/2015 15:32	TCM MEA 2015		x						
		7/31/2015 15:15	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.95	mol/kg	7/31/2015 15:32	TCM MEA 2015		x						
17	20697	8/4/2015 7:20	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.83	mol/kg	8/4/2015 12:24	TCM MEA 2015		x						
		8/4/2015 7:20	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.186	mol/kg	8/4/2015 13:22	TCM MEA 2015	x							
		8/4/2015 7:20	S-8611-2013	Lean amine - absorber inlet	IC	AA	160	mg/L	8/17/2015 13:11	TCM MEA 2015								x
		8/4/2015 7:20	S-8611-2013	Lean amine - absorber inlet	IC	FA	570	mg/L	8/17/2015 13:10	TCM MEA 2015								x
		8/4/2015 7:20	S-8611-2013	Lean amine - absorber inlet	IC	NO2-	<250	mg/L	8/17/2015 13:11	TCM MEA 2015								x
		8/4/2015 7:20	S-8611-2013	Lean amine - absorber inlet	IC	OA	<125	mg/L	8/17/2015 13:11	TCM MEA 2015								x
		8/4/2015 7:20	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	<125	mg/L	8/17/2015 13:11	TCM MEA 2015								x
		8/4/2015 7:20	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.4		8/4/2015 12:34	TCM MEA 2015					x			
		8/4/2015 7:20	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/4/2015 9:30	TCM MEA 2015						x		
18	20713	8/4/2015 18:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.134	mol/kg	8/5/2015 12:38	TCM MEA 2015	x							
		8/4/2015 18:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/5/2015 8:02	TCM MEA 2015						x		
19	20717	8/5/2015 4:30	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.82	mol/kg	8/5/2015 9:29	TCM MEA 2015		x						
		8/5/2015 4:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.14	mol/kg	8/5/2015 12:28	TCM MEA 2015	x							
		8/5/2015 4:30	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.4		8/5/2015 8:26	TCM MEA 2015					x			
		8/5/2015 4:30	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/5/2015 8:02	TCM MEA 2015						x		
		8/5/2015 4:30	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	356423	mg/L	8/7/2015 14:24	TCM MEA 2015							x	
20	20735	8/5/2015 13:45	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.77	mol/kg	8/5/2015 14:16	TCM MEA 2015		x						
		8/5/2015 13:45	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.106	mol/kg	8/6/2015 9:16	TCM MEA 2015	x							
		8/5/2015 13:45	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/5/2015 14:13	TCM MEA 2015						x		
21	20789	8/6/2015 13:10	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.63	mol/kg	8/6/2015 13:44	TCM MEA 2015		x						
		8/6/2015 13:10	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.43	mol/kg	8/6/2015 14:46	TCM MEA 2015	x							
		8/6/2015 13:10	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/6/2015 13:53	TCM MEA 2015						x		
22	20790	8/6/2015 14:40	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.62	mol/kg	8/6/2015 15:00	TCM MEA 2015		x						
23	20791	8/6/2015 15:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.69	mol/kg	8/6/2015 15:20	TCM MEA 2015		x						
24	20797	8/7/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.64	mol/kg	8/7/2015 8:19	TCM MEA 2015		x						
		8/7/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.458	mol/kg	8/7/2015 12:26	TCM MEA 2015	x							
		8/7/2015 4:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.1		8/7/2015 10:18	TCM MEA 2015					x			
		8/7/2015 4:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/7/2015 10:18	TCM MEA 2015						x		
		8/7/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	358066	mg/L	8/10/2015 14:49	TCM MEA 2015							x	
25	20811	8/7/2015 12:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.84	mol/kg	8/7/2015 12:50	TCM MEA 2015		x						
		8/7/2015 12:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk_wt%	29.53	%wt	8/7/2015 12:51	TCM MEA 2015		x						
26	20822	8/9/2015 16:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.11	mol/kg	8/10/2015 13:05	TCM MEA 2015		x						
		8/9/2015 16:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.386	mol/kg	8/10/2015 13:40	TCM MEA 2015	x							
		8/9/2015 16:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.3		8/10/2015 13:54	TCM MEA 2015					x			
		8/9/2015 16:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/10/2015 12:56	TCM MEA 2015						x		
27	20827	8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.02	mol/kg	8/10/2015 13:05	TCM MEA 2015		x						
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.383	mol/kg	8/10/2015 13:39	TCM MEA 2015	x							
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS	0.052	mol/kg	8/18/2015 14:07	TCM MEA 2015			x					
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Al_wt	1.8	mg/kg	8/13/2015 13:34	TCM MEA 2015				x				
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ca_wt	1	mg/kg	8/13/2015 13:34	TCM MEA 2015				x				
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Co_wt	<0.1	mg/kg	8/13/2015 13:34	TCM MEA 2015				x				
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cr_wt	0.4	mg/kg	8/13/2015 13:33	TCM MEA 2015				x				
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cu_wt	<0.1	mg/kg	8/13/2015 13:34	TCM MEA 2015				x				
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Fe_wt	8.9	mg/kg	8/13/2015 13:33	TCM MEA 2015				x				
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	K_wt	0.7	mg/kg	8/13/2015 13:34	TCM MEA 2015				x				
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mg_wt	0.5	mg/kg	8/13/2015 13:35	TCM MEA 2015				x				
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mo_wt	<0.1	mg/kg	8/13/2015 13:34	TCM MEA 2015				x				
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Na_wt	2.1	mg/kg	8/13/2015 13:34	TCM MEA 2015				x				
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ni_wt	0.7	mg/kg	8/13/2015 13:33	TCM MEA 2015				x				
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Si_wt	1.7	mg/kg	8/13/2015 13:35	TCM MEA 2015				x				
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	V_wt	<0.1	mg/kg	8/13/2015 13:34	TCM MEA 2015				x				
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Zn_wt	0.2	mg/kg	8/13/2015 13:34	TCM MEA 2015				x				
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	393269	mg/L	8/19/2015 8:06	TCM MEA 2015							x	
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	BHEOX	<250	mg/L	8/20/2015 10:54	TCM MEA 2015							x	
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEA	599	mg/L	8/20/2015 10:54	TCM MEA 2015							x	
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEF	1200	mg/L	8/20/2015 10:54	TCM MEA 2015							x	
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEGly	5324	mg/L	8/20/2015 10:54	TCM MEA 2015							x	
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEI	980	mg/L	8/20/2015 10:54	TCM MEA 2015							x	
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEPO	10869	mg/L	8/20/2015 10:54	TCM MEA 2015							x	
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	OZD	65	mg/L	8/20/2015 10:54	TCM MEA 2015							x	
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.3		8/10/2015 13:54	TCM MEA 2015					x			
		8/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/10/2015 12:56	TCM MEA 2015						x		
28	20845	8/10/2015 18:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.316	mol/kg	8/11/2015 14:22	TCM MEA 2015	x							
		8/10/2015 18:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/11/2015 11:52	TCM MEA 2015						x		
29	20849	8/11/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5	mol/kg	8/11/2015 12:38	TCM MEA 2015		x						
		8/11/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.298	mol/kg	8/11/2015 14:22	TCM MEA 2015	x							
		8/11/2015 4:00	S-8611-2013	Lean amine - absorber inlet	IC	AA	290	mg/L	8/17/2015 13:12	TCM MEA 2015								x
		8/11/2015 4:00	S-8611-2013	Lean amine - absorber inlet	IC	FA	830	mg/L	8/17/2015 13:11	TCM MEA 2015								x
		8/11/2015 4:00	S-8611-2013	Lean amine - absorber inlet	IC	NO2-	<250	mg/L	8/17/2015 13:12	TCM MEA 2015								x
		8/11/2015 4:00	S-8611-2013	Lean amine - absorber inlet	IC	OA	210	mg/L	8/17/2015 13:12	TCM MEA 2015								x
		8/11/2015 4:00	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	<125	mg/L	8/17/2015 13:12	TCM MEA 2015								x
		8/11/2015 4:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.3		8/11/2015 15:15	TCM MEA 2015					x			
		8/11/2015 4:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/11/2015 11:52	TCM MEA 2015						x		
		8/12/2015 9:35	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.02	mol/kg	8/12/2015 12:13	TCM MEA 2015		x						
		8/12/2015 9:35	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.236	mol/kg	8/12/2015 13:58	TCM MEA 2015	x							

Sample No.	Id numeric	Sampled date	Sampling point	Description	Analysis	Component name	Result text	Units	Date result entered	Project id	TIC	TOT-ALK	HSS	ICP-OES	PH	Store	LC-MS	IC
30	20870	8/12/2015 9:35	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.3		8/12/2015 12:14	TCM MEA 2015					x			
		8/12/2015 9:35	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/12/2015 12:12	TCM MEA 2015						x		
		8/12/2015 9:35	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	371009	mg/L	8/19/2015 8:07	TCM MEA 2015							x	
31	20884	8/12/2015 11:33	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.24	mol/kg	8/12/2015 15:21	TCM MEA 2015	x							
32	20885	8/12/2015 13:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.265	mol/kg	8/13/2015 9:57	TCM MEA 2015	x							
33	20891	8/13/2015 9:15	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.92	mol/kg	8/13/2015 14:15	TCM MEA 2015		x						
		8/13/2015 9:15	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.272	mol/kg	8/14/2015 8:19	TCM MEA 2015	x							
		8/13/2015 9:15	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.3		8/13/2015 14:14	TCM MEA 2015					x			
		8/13/2015 9:15	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/13/2015 14:14	TCM MEA 2015						x		
34	20909	8/12/2015 15:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.275	mol/kg	8/13/2015 11:31	TCM MEA 2015	x							
35	20910	8/14/2015 2:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.424	mol/kg	8/14/2015 15:09	TCM MEA 2015	x							
		8/14/2015 2:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/14/2015 8:54	TCM MEA 2015						x		
		8/14/2015 2:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.73	mol/kg	8/14/2015 13:11	TCM MEA 2015		x						
36	20911	8/14/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.404	mol/kg	8/14/2015 14:57	TCM MEA 2015	x							
		8/14/2015 4:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/14/2015 8:54	TCM MEA 2015						x		
		8/14/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.81	mol/kg	8/14/2015 13:11	TCM MEA 2015		x						
37	20915	8/14/2015 6:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.7	mol/kg	8/14/2015 13:11	TCM MEA 2015		x						
		8/14/2015 6:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.398	mol/kg	8/14/2015 13:52	TCM MEA 2015	x							
		8/14/2015 6:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.2		8/14/2015 13:12	TCM MEA 2015					x			
		8/14/2015 6:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/14/2015 8:54	TCM MEA 2015						x		
		8/14/2015 6:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	351972	mg/L	8/19/2015 8:08	TCM MEA 2015							x	
38	20932	8/15/2015 8:12	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.69	mol/kg	8/17/2015 12:09	TCM MEA 2015		x						
		8/15/2015 8:12	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.485	mol/kg	8/18/2015 12:17	TCM MEA 2015	x							
		8/15/2015 8:12	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.2		8/17/2015 12:12	TCM MEA 2015					x			
		8/15/2015 8:12	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/17/2015 12:08	TCM MEA 2015						x		
39	20937	8/16/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.6	mol/kg	8/17/2015 12:10	TCM MEA 2015		x						
		8/16/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.463	mol/kg	8/18/2015 12:17	TCM MEA 2015	x							
		8/16/2015 4:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.2		8/17/2015 12:12	TCM MEA 2015					x			
		8/16/2015 4:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/17/2015 12:08	TCM MEA 2015						x		
40	20942	8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.56	mol/kg	8/17/2015 12:10	TCM MEA 2015		x						
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.433	mol/kg	8/18/2015 12:17	TCM MEA 2015	x							
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS	0.069	mol/kg	8/18/2015 14:07	TCM MEA 2015			x					
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Al_wt	2	mg/kg	8/20/2015 8:52	TCM MEA 2015				x				
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ca_wt	1.1	mg/kg	8/20/2015 8:53	TCM MEA 2015				x				
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Co_wt	<0.1	mg/kg	8/20/2015 8:53	TCM MEA 2015				x				
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cr_wt	0.6	mg/kg	8/20/2015 8:51	TCM MEA 2015				x				
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cu_wt	<0.1	mg/kg	8/20/2015 8:52	TCM MEA 2015				x				
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Fe_wt	9.6	mg/kg	8/20/2015 8:51	TCM MEA 2015				x				
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	K_wt	0.6	mg/kg	8/20/2015 8:52	TCM MEA 2015				x				
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mg_wt	0.6	mg/kg	8/20/2015 8:53	TCM MEA 2015				x				
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mo_wt	<0.1	mg/kg	8/20/2015 8:52	TCM MEA 2015				x				
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Na_wt	2.5	mg/kg	8/20/2015 8:52	TCM MEA 2015				x				
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ni_wt	1.1	mg/kg	8/20/2015 8:52	TCM MEA 2015				x				
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Si_wt	1.9	mg/kg	8/20/2015 8:53	TCM MEA 2015				x				
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	V_wt	<0.1	mg/kg	8/20/2015 8:52	TCM MEA 2015				x				
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Zn_wt	0.3	mg/kg	8/20/2015 8:52	TCM MEA 2015				x				
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	346787	mg/L	8/19/2015 8:09	TCM MEA 2015							x	
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	BHEOX	<250	mg/L	8/20/2015 10:55	TCM MEA 2015							x	
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEA	825	mg/L	8/20/2015 10:56	TCM MEA 2015							x	
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEF	1527	mg/L	8/20/2015 10:55	TCM MEA 2015							x	
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEGly	6599	mg/L	8/20/2015 10:55	TCM MEA 2015							x	
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEI	1120	mg/L	8/20/2015 10:56	TCM MEA 2015							x	
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEPO	15417	mg/L	8/20/2015 10:56	TCM MEA 2015							x	
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	OZD	92	mg/L	8/20/2015 10:56	TCM MEA 2015							x	
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.2		8/17/2015 12:12	TCM MEA 2015					x			
		8/17/2015 5:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/17/2015 12:08	TCM MEA 2015						x		
41	20960	8/14/2015 15:50	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.77	mol/kg	8/17/2015 14:50	TCM MEA 2015		x						
		8/14/2015 15:50	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.359	mol/kg	8/18/2015 12:17	TCM MEA 2015	x							
		8/14/2015 15:50	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/17/2015 14:40	TCM MEA 2015						x		
42	20961	8/15/2015 0:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.67	mol/kg	8/17/2015 14:50	TCM MEA 2015		x						
		8/15/2015 0:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.48	mol/kg	8/18/2015 12:17	TCM MEA 2015	x							
		8/15/2015 0:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/17/2015 14:40	TCM MEA 2015						x		
43	20962	8/15/2015 8:20	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.66	mol/kg	8/17/2015 14:50	TCM MEA 2015		x						
		8/15/2015 8:20	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.535	mol/kg	8/18/2015 12:17	TCM MEA 2015	x							
		8/15/2015 8:20	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/17/2015 14:40	TCM MEA 2015						x		
44	20963	8/15/2015 14:35	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.62	mol/kg	8/17/2015 14:50	TCM MEA 2015		x						
		8/15/2015 14:35	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.465	mol/kg	8/18/2015 12:17	TCM MEA 2015	x							
		8/15/2015 14:35	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/17/2015 14:40	TCM MEA 2015						x		
45	20965	8/15/2015 21:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.463	mol/kg	8/18/2015 12:18	TCM MEA 2015	x							
		8/15/2015 21:30	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.17	mol/kg	8/17/2015 14:49	TCM MEA 2015		x						
		8/15/2015 21:30	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/17/2015 14:40	TCM MEA 2015						x		
46	20966	8/16/2015 9:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.59	mol/kg	8/17/2015 14:41	TCM MEA 2015		x						
		8/16/2015 9:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.467	mol/kg	8/18/2015 12:18	TCM MEA 2015	x							
		8/16/2015 9:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/17/2015 14:40	TCM MEA 2015						x		
47	20967	8/16/2015 15:30	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.58	mol/kg	8/17/2015 14:41	TCM MEA 2015		x						
		8/16/2015 15:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.448	mol/kg	8/18/2015 12:18	TCM MEA 2015	x							
		8/16/2015 15:30	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/17/2015 14:40	TCM MEA 2015						x		
48	20968	8/16/2015 22:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.456	mol/kg	8/18/2015 12:18	TCM MEA 2015	x							
		8/16/2015 22:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.59	mol/kg	8/17/2015 14:40	TCM MEA 2015		x						
		8/16/2015 22:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/17/2015 14:40	TCM MEA 2015						x		
49	20969	8/17/2015 14:45	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.99	mol/kg	8/17/2015 15:24	TCM MEA 2015		x						
		8/17/2015 14:45	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk_wt%	30.5	%wt	8/17/2015 15:25	TCM MEA 2015		x						
50	20973	8/18/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.92	mol/kg	8/18/2015 13:16	TCM MEA 2015		x						
		8/18/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.718	mol/kg	8/18/2015 13:37	TCM MEA 2015	x							
		8/18/2015 4:00	S-8611-2013	Lean amine - absorber inlet	IC	AA	475	mg/L	8/19/2015 12:21	TCM MEA 2015								x
		8/18/2015 4:00	S-8611-2013	Lean amine - absorber inlet	IC	FA	1065	mg/L	8/19/2015 12:21	TCM MEA 2015								x
		8/18/2015 4:00	S-8611-2013	Lean amine - absorber inlet	IC	NO2-	<250	mg/L	8/19/2015 12:21	TCM MEA 2015								x
		8/18/2015 4:00	S-8611-2013	Lean amine - absorber inlet	IC	OA	345	mg/L	8/19/2015 12:21	TCM MEA 2015								x

Sample No.	Id numeric	Sampled date	Sampling point	Description	Analysis	Component name	Result text	Units	Date result entered	Project id	TIC	TOT-ALK	HSS	ICP-OES	PH	Store	LC-MS	IC
		8/18/2015 4:00	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	<125	mg/L	8/19/2015 12:21	TCM MEA 2015								x
		8/18/2015 4:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.1		8/18/2015 12:08	TCM MEA 2015					x			
		8/18/2015 4:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/18/2015 12:08	TCM MEA 2015						x		
51	20988	8/17/2015 20:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.97	mol/kg	8/18/2015 13:16	TCM MEA 2015		x						
		8/17/2015 20:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.739	mol/kg	8/18/2015 13:37	TCM MEA 2015	x							
		8/17/2015 20:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/18/2015 12:09	TCM MEA 2015						x		
52	20989	8/18/2015 10:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.93	mol/kg	8/18/2015 13:16	TCM MEA 2015		x						
		8/18/2015 10:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.621	mol/kg	8/19/2015 7:58	TCM MEA 2015	x							
		8/18/2015 10:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/18/2015 12:09	TCM MEA 2015						x		
53	20991	8/18/2015 17:55	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.459	mol/kg	8/20/2015 9:39	TCM MEA 2015	x							
		8/18/2015 17:55	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/19/2015 11:29	TCM MEA 2015						x		
		8/18/2015 17:55	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.95	mol/kg	8/20/2015 9:39	TCM MEA 2015		x						
54	20992	8/19/2015 0:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.464	mol/kg	8/19/2015 15:18	TCM MEA 2015	x							
		8/19/2015 0:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/19/2015 11:29	TCM MEA 2015						x		
		8/19/2015 0:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.94	mol/kg	8/19/2015 11:32	TCM MEA 2015		x						
55	20996	8/19/2015 4:15	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.94	mol/kg	8/19/2015 11:32	TCM MEA 2015		x						
		8/19/2015 4:15	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.433	mol/kg	8/19/2015 15:18	TCM MEA 2015	x							
		8/19/2015 4:15	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.3		8/19/2015 11:31	TCM MEA 2015					x			
		8/19/2015 4:15	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/19/2015 11:29	TCM MEA 2015						x		
		8/19/2015 4:15	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	340008	mg/L	8/31/2015 9:05	TCM MEA 2015							x	
56	21008	8/19/2015 7:50	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.439	mol/kg	8/19/2015 15:18	TCM MEA 2015	x							
		8/19/2015 7:50	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/19/2015 11:29	TCM MEA 2015						x		
		8/19/2015 7:50	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.94	mol/kg	8/19/2015 11:32	TCM MEA 2015		x						
57	21016	8/19/2015 20:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.232	mol/kg	8/20/2015 12:29	TCM MEA 2015	x							
		8/19/2015 20:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/20/2015 9:41	TCM MEA 2015						x		
		8/19/2015 20:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.9	mol/kg	8/20/2015 11:58	TCM MEA 2015		x						
58	21017	8/20/2015 0:01	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.234	mol/kg	8/20/2015 12:29	TCM MEA 2015	x							
		8/20/2015 0:01	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/20/2015 9:41	TCM MEA 2015						x		
		8/20/2015 0:01	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.91	mol/kg	8/20/2015 11:58	TCM MEA 2015		x						
59	21021	8/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.92	mol/kg	8/20/2015 11:58	TCM MEA 2015		x						
		8/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.245	mol/kg	8/20/2015 12:29	TCM MEA 2015	x							
		8/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.3		8/20/2015 12:34	TCM MEA 2015					x			
		8/20/2015 4:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/20/2015 9:41	TCM MEA 2015						x		
60	21034	8/20/2015 8:04	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.222	mol/kg	8/20/2015 13:48	TCM MEA 2015	x							
		8/20/2015 8:04	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/20/2015 9:41	TCM MEA 2015						x		
		8/20/2015 8:04	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.91	mol/kg	8/20/2015 11:59	TCM MEA 2015		x						
61	21041	8/20/2015 20:14	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.021	mol/kg	8/21/2015 14:16	TCM MEA 2015	x							
		8/20/2015 20:14	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/21/2015 9:50	TCM MEA 2015						x		
		8/20/2015 20:14	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.95	mol/kg	8/21/2015 12:48	TCM MEA 2015		x						
62	21042	8/21/2015 0:01	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.942	mol/kg	8/21/2015 14:16	TCM MEA 2015	x							
		8/21/2015 0:01	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/21/2015 9:50	TCM MEA 2015						x		
		8/21/2015 0:01	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.95	mol/kg	8/21/2015 12:48	TCM MEA 2015		x						
63	21046	8/21/2015 4:01	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.94	mol/kg	8/21/2015 12:48	TCM MEA 2015		x						
		8/21/2015 4:01	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.992	mol/kg	8/21/2015 14:17	TCM MEA 2015	x							
		8/21/2015 4:01	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.5		8/21/2015 12:49	TCM MEA 2015					x			
		8/21/2015 4:01	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/21/2015 9:50	TCM MEA 2015						x		
		8/21/2015 4:01	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	338042	mg/L	8/31/2015 9:06	TCM MEA 2015							x	
64	21058	8/21/2015 7:50	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.011	mol/kg	8/21/2015 14:17	TCM MEA 2015	x							
		8/21/2015 7:50	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/21/2015 9:50	TCM MEA 2015						x		
		8/21/2015 7:50	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.98	mol/kg	8/21/2015 13:18	TCM MEA 2015		x						
65	21061	8/21/2015 17:55	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.195	mol/kg	8/25/2015 7:48	TCM MEA 2015	x							
		8/21/2015 17:55	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/24/2015 13:44	TCM MEA 2015						x		
		8/21/2015 17:55	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/24/2015 13:44	TCM MEA 2015						x		
		8/21/2015 17:55	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.89	mol/kg	8/24/2015 11:19	TCM MEA 2015		x						
66	21065	8/22/2015 3:50	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.85	mol/kg	8/24/2015 11:20	TCM MEA 2015		x						
		8/22/2015 3:50	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.206	mol/kg	8/25/2015 7:51	TCM MEA 2015	x							
		8/22/2015 3:50	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.4		8/24/2015 12:15	TCM MEA 2015					x			
		8/22/2015 3:50	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/24/2015 13:44	TCM MEA 2015						x		
67	21072	8/23/2015 3:55	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.81	mol/kg	8/25/2015 8:16	TCM MEA 2015		x						
		8/23/2015 3:55	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.301	mol/kg	8/25/2015 7:51	TCM MEA 2015	x							
		8/23/2015 3:55	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.3		8/24/2015 13:40	TCM MEA 2015					x			
		8/23/2015 3:55	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/24/2015 13:43	TCM MEA 2015						x		
68	21075	8/23/2015 17:55	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.371	mol/kg	8/25/2015 7:52	TCM MEA 2015	x							
		8/23/2015 17:55	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/24/2015 13:44	TCM MEA 2015						x		
69	21076	8/24/2015 23:57	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.379	mol/kg	8/24/2015 13:18	TCM MEA 2015	x							
		8/24/2015 23:57	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/24/2015 13:44	TCM MEA 2015						x		
		8/24/2015 23:57	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.81	mol/kg	8/25/2015 8:19	TCM MEA 2015		x						
70	21080	8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.83	mol/kg	8/24/2015 11:18	TCM MEA 2015		x						
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.372	mol/kg	8/24/2015 13:17	TCM MEA 2015	x							
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS	0.083	mol/kg	8/28/2015 14:02	TCM MEA 2015			x					
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Al_wt	2	mg/kg	8/27/2015 7:49	TCM MEA 2015				x				
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ca_wt	1.3	mg/kg	8/27/2015 7:49	TCM MEA 2015				x				
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Co_wt	<0.1	mg/kg	8/27/2015 7:49	TCM MEA 2015				x				
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cr_wt	0.7	mg/kg	8/27/2015 7:48	TCM MEA 2015				x				
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cu_wt	<0.1	mg/kg	8/27/2015 7:49	TCM MEA 2015				x				
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Fe_wt	10	mg/kg	8/27/2015 7:48	TCM MEA 2015				x				
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	K_wt	0.7	mg/kg	8/27/2015 7:48	TCM MEA 2015				x				
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mg_wt	0.6	mg/kg	8/27/2015 7:49	TCM MEA 2015				x				
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mo_wt	<0.1	mg/kg	8/27/2015 7:48	TCM MEA 2015				x				
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Na_wt	3.5	mg/kg	8/27/2015 7:48	TCM MEA 2015				x				
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ni_wt	1.6	mg/kg	8/27/2015 7:48	TCM MEA 2015				x				
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Si_wt	1.7	mg/kg	8/27/2015 7:49	TCM MEA 2015				x				
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	V_wt	<0.1	mg/kg	8/27/2015 7:48	TCM MEA 2015				x				
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Zn_wt	<0.1	mg/kg	8/27/2015 7:49	TCM MEA 2015				x				
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	346466	mg/L	8/31/2015 9:07	TCM MEA 2015							x	
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	LC-MS	BHEOX	<100	mg/L	9/11/2015 9:23	TCM MEA 2015							x	
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEA	1011	mg/L	9/11/2015 9:23	TCM MEA 2015							x	
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEF	1868	mg/L	9/11/2015 9:23	TCM MEA 2015							x	

Sample No.	Id numeric	Sampled date	Sampling point	Description	Analysis	Component name	Result text	Units	Date result entered	Project id	TIC	TOT-ALK	HSS	ICP-OES	PH	Store	LC-MS	IC
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEGly	6756	mg/L	9/11/2015 9:23	TCM MEA 2015							x	
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEI	1283	mg/L	9/11/2015 9:24	TCM MEA 2015							x	
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEPO	19316	mg/L	9/11/2015 9:23	TCM MEA 2015							x	
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	LC-MS	OZD	92	mg/L	9/11/2015 9:23	TCM MEA 2015							x	
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.2		8/24/2015 13:41	TCM MEA 2015					x			
		8/24/2015 4:45	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/24/2015 13:44	TCM MEA 2015						x		
71	21094	8/24/2015 8:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.361	mol/kg	8/24/2015 11:43	TCM MEA 2015	x							
		8/24/2015 8:30	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/24/2015 13:45	TCM MEA 2015						x		
		8/24/2015 8:30	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.79	mol/kg	8/24/2015 11:35	TCM MEA 2015		x						
72	21099	8/24/2015 20:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.466	mol/kg	8/26/2015 6:53	TCM MEA 2015	x							
		8/24/2015 20:30	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/25/2015 9:10	TCM MEA 2015						x		
		8/24/2015 20:30	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/25/2015 9:10	TCM MEA 2015						x		
		8/24/2015 20:30	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.71	mol/kg	8/25/2015 9:52	TCM MEA 2015		x						
73	21104	8/25/2015 5:30	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.91	mol/kg	8/25/2015 9:52	TCM MEA 2015		x						
		8/25/2015 5:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.465	mol/kg	8/26/2015 6:53	TCM MEA 2015	x							
		8/25/2015 5:30	S-8611-2013	Lean amine - absorber inlet	IC	AA	<160	mg/L	9/3/2015 13:11	TCM MEA 2015								x
		8/25/2015 5:30	S-8611-2013	Lean amine - absorber inlet	IC	FA	1300	mg/L	9/3/2015 13:09	TCM MEA 2015								x
		8/25/2015 5:30	S-8611-2013	Lean amine - absorber inlet	IC	NO2-	<320	mg/L	9/3/2015 13:11	TCM MEA 2015								x
		8/25/2015 5:30	S-8611-2013	Lean amine - absorber inlet	IC	OA	410	mg/L	9/3/2015 14:12	TCM MEA 2015								x
		8/25/2015 5:30	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	<160	mg/L	9/3/2015 13:11	TCM MEA 2015								x
		8/25/2015 5:30	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.2		8/25/2015 9:58	TCM MEA 2015					x			
		8/25/2015 5:30	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/25/2015 9:10	TCM MEA 2015						x		
74	21122	8/25/2015 9:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.445	mol/kg	8/26/2015 6:54	TCM MEA 2015	x							
		8/25/2015 9:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/25/2015 12:23	TCM MEA 2015						x		
		8/25/2015 9:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.9	mol/kg	8/26/2015 6:49	TCM MEA 2015		x						
75	21124	8/25/2015 21:45	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.626	mol/kg	8/26/2015 13:34	TCM MEA 2015	x							
		8/25/2015 21:45	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/26/2015 9:29	TCM MEA 2015						x		
		8/25/2015 21:45	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.92	mol/kg	8/26/2015 8:48	TCM MEA 2015		x						
76	21125	8/26/2015 1:20	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.565	mol/kg	8/26/2015 13:34	TCM MEA 2015	x							
		8/26/2015 1:20	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/26/2015 9:29	TCM MEA 2015						x		
		8/26/2015 1:20	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.98	mol/kg	8/26/2015 8:49	TCM MEA 2015		x						
77	21129	8/26/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.95	mol/kg	8/26/2015 8:54	TCM MEA 2015		x						
		8/26/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.587	mol/kg	8/26/2015 13:35	TCM MEA 2015	x							
		8/26/2015 4:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.2		8/26/2015 10:08	TCM MEA 2015					x			
		8/26/2015 4:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/26/2015 9:29	TCM MEA 2015						x		
		8/26/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	342372	mg/L	8/31/2015 9:08	TCM MEA 2015							x	
78	21142	8/26/2015 9:02	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.565	mol/kg	8/27/2015 12:11	TCM MEA 2015	x							
		8/26/2015 9:02	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ottles stored		8/26/2015 12:03	TCM MEA 2015						x		
		8/26/2015 9:02	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.87	mol/kg	8/26/2015 10:09	TCM MEA 2015		x						
79	21146	8/26/2015 19:45	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.553	mol/kg	8/28/2015 9:08	TCM MEA 2015	x							
		8/26/2015 19:45	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/27/2015 12:05	TCM MEA 2015						x		
		8/26/2015 19:45	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.89	mol/kg	8/27/2015 9:51	TCM MEA 2015		x						
80	21147	8/27/2015 1:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.547	mol/kg	8/28/2015 9:09	TCM MEA 2015	x							
		8/27/2015 1:30	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/27/2015 12:05	TCM MEA 2015						x		
		8/27/2015 1:30	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.91	mol/kg	8/27/2015 9:51	TCM MEA 2015		x						
81	21151	8/27/2015 3:55	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.94	mol/kg	8/27/2015 9:50	TCM MEA 2015		x						
		8/27/2015 3:55	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.55	mol/kg	8/28/2015 9:09	TCM MEA 2015	x							
		8/27/2015 3:55	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.1		8/27/2015 13:20	TCM MEA 2015					x			
		8/27/2015 3:55	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/27/2015 12:05	TCM MEA 2015						x		
82	21169	8/27/2015 8:45	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.544	mol/kg	8/28/2015 9:10	TCM MEA 2015	x							
		8/27/2015 8:45	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/27/2015 12:05	TCM MEA 2015						x		
		8/27/2015 8:45	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.81	mol/kg	8/27/2015 13:21	TCM MEA 2015		x						
83	21172	8/28/2015 12:30	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/28/2015 13:30	TCM MEA 2015						x		
		8/28/2015 12:30	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.97	mol/kg	8/28/2015 13:30	TCM MEA 2015		x						
84	21176	8/29/2015 3:08	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.94	mol/kg	8/31/2015 14:15	TCM MEA 2015		x						
		8/29/2015 3:08	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.127	mol/kg	9/2/2015 12:01	TCM MEA 2015	x							
		8/29/2015 3:08	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.3		8/31/2015 15:17	TCM MEA 2015					x			
		8/29/2015 3:08	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/31/2015 13:43	TCM MEA 2015						x		
		8/29/2015 3:08	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	349869	mg/L	9/11/2015 18:02	TCM MEA 2015							x	
85	21192	8/28/2015 20:15	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.396	mol/kg	9/8/2015 13:00	TCM MEA 2015	x							
		8/28/2015 20:15	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/31/2015 13:44	TCM MEA 2015						x		
		8/28/2015 20:15	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.91	mol/kg	8/31/2015 14:17	TCM MEA 2015		x						
86	21196	8/29/2015 5:15	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.92	mol/kg	8/31/2015 14:16	TCM MEA 2015		x						
		8/29/2015 5:15	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.326	mol/kg	9/2/2015 12:01	TCM MEA 2015	x							
		8/29/2015 5:15	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.3		8/31/2015 15:06	TCM MEA 2015					x			
		8/29/2015 5:15	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/31/2015 13:44	TCM MEA 2015						x		
87	21198	8/29/2015 8:17	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.3	mol/kg	9/1/2015 8:34	TCM MEA 2015	x							
88	21199	8/29/2015 14:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.289	mol/kg	9/1/2015 8:34	TCM MEA 2015	x							
89	21201	8/29/2015 19:35	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.283	mol/kg	9/1/2015 8:34	TCM MEA 2015	x							
		8/29/2015 19:35	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/31/2015 13:44	TCM MEA 2015						x		
90	21205	8/30/2015 5:40	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.93	mol/kg	8/31/2015 14:14	TCM MEA 2015		x						
		8/30/2015 5:40	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.118	mol/kg	9/1/2015 8:30	TCM MEA 2015	x							
		8/30/2015 5:40	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.4		8/31/2015 15:06	TCM MEA 2015					x			
		8/30/2015 5:40	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/31/2015 13:11	TCM MEA 2015						x		
91	21207	8/30/2015 8:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.145	mol/kg	9/1/2015 8:31	TCM MEA 2015	x							
92	21208	8/30/2015 13:40	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.125	mol/kg	9/1/2015 8:31	TCM MEA 2015	x							
93	21210	8/30/2015 20:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.124	mol/kg	9/1/2015 8:31	TCM MEA 2015	x							
		8/30/2015 20:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/31/2015 13:11	TCM MEA 2015						x		
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.91	mol/kg	8/31/2015 9:04	TCM MEA 2015		x						
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.922	mol/kg	9/1/2015 8:33	TCM MEA 2015	x							
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS	0.12	mol/kg	9/7/2015 13:12	TCM MEA 2015			x					
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Al_wt	2.2	mg/kg	9/14/2015 7:53	TCM MEA 2015				x				
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ca_wt	1.5	mg/kg	9/14/2015 7:53	TCM MEA 2015				x				
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Co_wt	<0.1	mg/kg	9/14/2015 7:53	TCM MEA 2015				x				
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cr_wt	1	mg/kg	9/14/2015 7:52	TCM MEA 2015				x				
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cu_wt	<0.1	mg/kg	9/14/2015 7:53	TCM MEA 2015				x				
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Fe_wt	14	mg/kg	9/14/2015 7:52	TCM MEA 2015				x				
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	K_wt	0.9	mg/kg	9/14/2015 7:52	TCM MEA 2015				x				

Sample No.	Id numeric	Sampled date	Sampling point	Description	Analysis	Component name	Result text	Units	Date result entered	Project id	TIC	TOT-ALK	HSS	ICP-OES	PH	Store	LC-MS	IC
94	21215	8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mg_wt	0.7	mg/kg	9/14/2015 7:53	TCM MEA 2015				x				
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mo_wt	<0.1	mg/kg	9/14/2015 14:49	TCM MEA 2015				x				
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Na_wt	3.9	mg/kg	9/14/2015 7:52	TCM MEA 2015				x				
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ni_wt	2.6	mg/kg	9/14/2015 7:52	TCM MEA 2015				x				
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Si_wt	2.6	mg/kg	9/14/2015 7:53	TCM MEA 2015				x				
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	V_wt	<0.1	mg/kg	9/14/2015 7:52	TCM MEA 2015				x				
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Zn_wt	<0.1	mg/kg	9/14/2015 7:53	TCM MEA 2015				x				
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	344491	mg/L	9/11/2015 18:01	TCM MEA 2015							x	
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	BHEOX	127	mg/L	9/11/2015 9:27	TCM MEA 2015							x	
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEA	1274	mg/L	9/11/2015 9:27	TCM MEA 2015							x	
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEF	2294	mg/L	9/11/2015 9:27	TCM MEA 2015							x	
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEGly	8135	mg/L	9/11/2015 9:27	TCM MEA 2015							x	
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEI	1425	mg/L	9/11/2015 9:28	TCM MEA 2015							x	
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEPO	25563	mg/L	9/11/2015 9:28	TCM MEA 2015							x	
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	OZD	74	mg/L	9/11/2015 9:28	TCM MEA 2015							x	
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.5		8/31/2015 15:06	TCM MEA 2015					x			
		8/31/2015 6:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/31/2015 14:07	TCM MEA 2015						x		
95	21231	8/31/2015 7:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.938	mol/kg	8/31/2015 15:03	TCM MEA 2015	x							
		8/31/2015 7:30	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		8/31/2015 13:12	TCM MEA 2015						x		
		8/31/2015 7:30	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.99	mol/kg	8/31/2015 9:03	TCM MEA 2015		x						
96	21232	8/31/2015 11:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.95	mol/kg	9/2/2015 13:24	TCM MEA 2015	x							
97	21234	8/31/2015 20:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.962	mol/kg	9/2/2015 13:24	TCM MEA 2015	x							
		8/31/2015 20:30	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/1/2015 14:31	TCM MEA 2015						x		
98	21240	9/1/2015 5:15	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.96	mol/kg	9/1/2015 8:41	TCM MEA 2015		x						
		9/1/2015 5:15	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.8	mol/kg	9/2/2015 12:02	TCM MEA 2015	x							
		9/1/2015 5:15	S-8611-2013	Lean amine - absorber inlet	IC	AA	240	mg/L	9/3/2015 14:03	TCM MEA 2015								x
		9/1/2015 5:15	S-8611-2013	Lean amine - absorber inlet	IC	FA	1700	mg/L	9/3/2015 14:02	TCM MEA 2015								x
		9/1/2015 5:15	S-8611-2013	Lean amine - absorber inlet	IC	NO2-	<330	mg/L	9/3/2015 14:03	TCM MEA 2015								x
		9/1/2015 5:15	S-8611-2013	Lean amine - absorber inlet	IC	OA	420	mg/L	9/3/2015 14:07	TCM MEA 2015								x
		9/1/2015 5:15	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	<170	mg/L	9/3/2015 14:04	TCM MEA 2015								x
		9/1/2015 5:15	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.6		9/1/2015 13:56	TCM MEA 2015					x			
		9/1/2015 5:15	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/1/2015 14:31	TCM MEA 2015						x		
99	21255	9/1/2015 8:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.754	mol/kg	9/2/2015 13:23	TCM MEA 2015	x							
		9/1/2015 8:30	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/1/2015 14:31	TCM MEA 2015						x		
100	21260	9/1/2015 18:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.779	mol/kg	9/3/2015 8:48	TCM MEA 2015	x							
		9/1/2015 18:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/2/2015 9:51	TCM MEA 2015						x		
101	21261	9/1/2015 21:50	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.764	mol/kg	9/3/2015 8:48	TCM MEA 2015	x							
		9/1/2015 21:50	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/2/2015 9:51	TCM MEA 2015						x		
102	21265	9/2/2015 5:35	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.89	mol/kg	9/2/2015 9:35	TCM MEA 2015		x						
		9/2/2015 5:35	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.775	mol/kg	9/3/2015 8:49	TCM MEA 2015	x							
		9/2/2015 5:35	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.5		9/2/2015 12:18	TCM MEA 2015					x			
		9/2/2015 5:35	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/2/2015 9:51	TCM MEA 2015						x		
		9/2/2015 5:35	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	326789	mg/L	9/11/2015 18:03	TCM MEA 2015							x	
103	21286	9/3/2015 5:30	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.35	mol/kg	9/3/2015 9:24	TCM MEA 2015		x						
		9/3/2015 5:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.155	mol/kg	9/3/2015 14:46	TCM MEA 2015	x							
		9/3/2015 5:30	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.4		9/3/2015 9:57	TCM MEA 2015					x			
		9/3/2015 5:30	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/3/2015 8:56	TCM MEA 2015						x		
104	21304	9/3/2015 8:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.135	mol/kg	9/3/2015 14:47	TCM MEA 2015	x							
		9/3/2015 8:30	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/3/2015 9:22	TCM MEA 2015						x		
105	21306	9/3/2015 18:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.1	mol/kg	9/4/2015 14:08	TCM MEA 2015	x							
		9/3/2015 18:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/4/2015 10:27	TCM MEA 2015						x		
106	21310	9/4/2015 3:30	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.19	mol/kg	9/4/2015 11:47	TCM MEA 2015		x						
		9/4/2015 3:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.12	mol/kg	9/4/2015 14:08	TCM MEA 2015	x							
		9/4/2015 3:30	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.5		9/4/2015 11:49	TCM MEA 2015					x			
		9/4/2015 3:30	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/4/2015 10:27	TCM MEA 2015						x		
		9/4/2015 3:30	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	352976	mg/L	9/11/2015 18:04	TCM MEA 2015							x	
107	21325	9/4/2015 23:55	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.986	mol/kg	9/8/2015 7:58	TCM MEA 2015	x							
		9/4/2015 23:55	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/7/2015 11:13	TCM MEA 2015						x		
108	21329	9/5/2015 4:50	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.03	mol/kg	9/7/2015 11:16	TCM MEA 2015		x						
		9/5/2015 4:50	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.995	mol/kg	9/8/2015 7:59	TCM MEA 2015	x							
		9/5/2015 4:50	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.5		9/7/2015 13:26	TCM MEA 2015					x			
		9/5/2015 4:50	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/7/2015 11:13	TCM MEA 2015						x		
109	21331	9/5/2015 17:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.021	mol/kg	9/8/2015 7:59	TCM MEA 2015	x							
		9/5/2015 17:30	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/7/2015 11:13	TCM MEA 2015						x		
110	21335	9/6/2015 3:37	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.97	mol/kg	9/7/2015 11:16	TCM MEA 2015		x						
		9/6/2015 3:37	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.029	mol/kg	9/7/2015 13:47	TCM MEA 2015	x							
		9/6/2015 3:37	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.4		9/7/2015 13:26	TCM MEA 2015					x			
		9/6/2015 3:37	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/7/2015 11:13	TCM MEA 2015						x		
111	21337	9/6/2015 17:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.009	mol/kg	9/7/2015 13:47	TCM MEA 2015	x							
		9/6/2015 17:30	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/7/2015 11:13	TCM MEA 2015						x		
112	21341	9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.97	mol/kg	9/7/2015 11:15	TCM MEA 2015		x						
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.928	mol/kg	9/7/2015 13:47	TCM MEA 2015	x							
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS	0.108	mol/kg	9/22/2015 14:09	TCM MEA 2015			x					
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Al_wt	2	mg/kg	9/14/2015 10:25	TCM MEA 2015				x				
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ca_wt	1.5	mg/kg	9/14/2015 10:25	TCM MEA 2015				x				
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Co_wt	<0.1	mg/kg	9/14/2015 10:25	TCM MEA 2015				x				
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cr_wt	1.2	mg/kg	9/14/2015 10:22	TCM MEA 2015				x				
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cu_wt	<0.1	mg/kg	9/14/2015 10:25	TCM MEA 2015				x				
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Fe_wt	13	mg/kg	9/14/2015 10:22	TCM MEA 2015				x				
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	ICP-OES	K_wt	0.8	mg/kg	9/14/2015 10:24	TCM MEA 2015				x				
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mg_wt	0.7	mg/kg	9/14/2015 10:25	TCM MEA 2015				x				
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mo_wt	<0.1	mg/kg	9/14/2015 14:48	TCM MEA 2015				x				
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Na_wt	4.2	mg/kg	9/14/2015 10:24	TCM MEA 2015				x				
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ni_wt	3.4	mg/kg	9/14/2015 10:22	TCM MEA 2015				x				
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Si_wt	2.3	mg/kg	9/14/2015 10:25	TCM MEA 2015				x				
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	ICP-OES	V_wt	<0.1	mg/kg	9/14/2015 10:25	TCM MEA 2015				x				
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Zn_wt	0.1	mg/kg	9/14/2015 10:25	TCM MEA 2015				x				
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	336889	mg/L	9/12/2015 9:35	TCM MEA 2015							x	

Sample No.	Id numeric	Sampled date	Sampling point	Description	Analysis	Component name	Result text	Units	Date result entered	Project id	TIC	TOT-ALK	HSS	ICP-OES	PH	Store	LC-MS	IC
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	LC-MS	BHEOX	126	mg/L	9/11/2015 9:30	TCM MEA 2015							x	
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEA	1399	mg/L	9/11/2015 9:30	TCM MEA 2015							x	
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEF	2412	mg/L	9/11/2015 9:30	TCM MEA 2015							x	
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEGly	8073	mg/L	9/11/2015 9:30	TCM MEA 2015							x	
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEI	1386	mg/L	9/11/2015 9:31	TCM MEA 2015							x	
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEPO	28822	mg/L	9/11/2015 9:30	TCM MEA 2015							x	
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	LC-MS	OZD	72	mg/L	9/11/2015 9:30	TCM MEA 2015							x	
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.5		9/7/2015 13:26	TCM MEA 2015					x			
		9/7/2015 5:25	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/7/2015 11:13	TCM MEA 2015						x		
113	21366	9/7/2015 18:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.959	mol/kg	9/8/2015 12:48	TCM MEA 2015	x							
		9/7/2015 18:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/8/2015 9:07	TCM MEA 2015						x		
114	21370	9/8/2015 4:02	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.89	mol/kg	9/8/2015 9:30	TCM MEA 2015		x						
		9/8/2015 4:02	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.94	mol/kg	9/8/2015 12:49	TCM MEA 2015	x							
		9/8/2015 4:02	S-8611-2013	Lean amine - absorber inlet	IC	AA	275	mg/L	9/10/2015 11:01	TCM MEA 2015								x
		9/8/2015 4:02	S-8611-2013	Lean amine - absorber inlet	IC	FA	1240	mg/L	9/10/2015 11:01	TCM MEA 2015								x
		9/8/2015 4:02	S-8611-2013	Lean amine - absorber inlet	IC	GA	255	mg/L	9/10/2015 11:01	TCM MEA 2015								x
		9/8/2015 4:02	S-8611-2013	Lean amine - absorber inlet	IC	NO2-	<220	mg/L	9/10/2015 11:02	TCM MEA 2015								x
		9/8/2015 4:02	S-8611-2013	Lean amine - absorber inlet	IC	OA	550	mg/L	9/10/2015 11:02	TCM MEA 2015								x
		9/8/2015 4:02	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	115	mg/L	9/10/2015 11:03	TCM MEA 2015								x
		9/8/2015 4:02	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.5		9/8/2015 9:37	TCM MEA 2015					x			
		9/8/2015 4:02	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/8/2015 9:07	TCM MEA 2015						x		
115	21391	9/9/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.88	mol/kg	9/9/2015 9:10	TCM MEA 2015		x						
		9/9/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.936	mol/kg	9/9/2015 12:06	TCM MEA 2015	x							
		9/9/2015 4:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.5		9/9/2015 13:40	TCM MEA 2015					x			
		9/9/2015 4:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/9/2015 9:33	TCM MEA 2015						x		
		9/9/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	328576	mg/L	9/12/2015 9:38	TCM MEA 2015							x	
116	21408	9/9/2015 18:10	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.986	mol/kg	9/10/2015 14:06	TCM MEA 2015	x							
		9/9/2015 18:10	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/10/2015 11:22	TCM MEA 2015						x		
117	21412	9/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.81	mol/kg	9/10/2015 11:28	TCM MEA 2015		x						
		9/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.999	mol/kg	9/10/2015 12:46	TCM MEA 2015	x							
		9/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.4		9/10/2015 12:04	TCM MEA 2015					x			
		9/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/10/2015 11:22	TCM MEA 2015						x		
118	21431	9/10/2015 20:42	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.019	mol/kg	9/11/2015 12:59	TCM MEA 2015	x							
		9/10/2015 20:42	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/11/2015 11:31	TCM MEA 2015						x		
119	21435	9/11/2015 4:05	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.85	mol/kg	9/11/2015 9:57	TCM MEA 2015		x						
		9/11/2015 4:05	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.993	mol/kg	9/11/2015 13:00	TCM MEA 2015	x							
		9/11/2015 4:05	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.4		9/11/2015 11:56	TCM MEA 2015					x			
		9/11/2015 4:05	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/11/2015 11:31	TCM MEA 2015						x		
		9/11/2015 4:05	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	321428	mg/L	9/12/2015 9:39	TCM MEA 2015							x	
120	21448	9/11/2015 15:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.08	mol/kg	9/11/2015 15:34	TCM MEA 2015		x						
121	21452	9/12/2015 2:10	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.05	mol/kg	9/14/2015 14:09	TCM MEA 2015	x							
		9/12/2015 2:10	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/14/2015 11:27	TCM MEA 2015						x		
		9/12/2015 2:10	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.02	mol/kg	9/14/2015 12:53	TCM MEA 2015		x						
122	21455	9/12/2015 12:55	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.304	mol/kg	9/14/2015 13:49	TCM MEA 2015	x							
		9/12/2015 12:55	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/14/2015 11:27	TCM MEA 2015						x		
		9/12/2015 12:55	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.95	mol/kg	9/14/2015 12:53	TCM MEA 2015		x						
123	21457	9/13/2015 1:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.312	mol/kg	9/14/2015 13:49	TCM MEA 2015	x							
		9/13/2015 1:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/14/2015 11:27	TCM MEA 2015						x		
		9/13/2015 1:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.88	mol/kg	9/14/2015 12:52	TCM MEA 2015		x						
124	21460	9/13/2015 13:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.312	mol/kg	9/14/2015 13:50	TCM MEA 2015	x							
		9/13/2015 13:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/14/2015 11:27	TCM MEA 2015						x		
		9/13/2015 13:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.9	mol/kg	9/14/2015 12:16	TCM MEA 2015		x						
125	21462	9/14/2015 1:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.142	mol/kg	9/14/2015 13:50	TCM MEA 2015	x							
		9/14/2015 1:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/14/2015 11:27	TCM MEA 2015						x		
		9/14/2015 1:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.91	mol/kg	9/14/2015 13:05	TCM MEA 2015		x						
126	21466	9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.93	mol/kg	9/14/2015 8:36	TCM MEA 2015		x						
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.105	mol/kg	9/14/2015 13:50	TCM MEA 2015	x							
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS	0.141	mol/kg	9/22/2015 14:15	TCM MEA 2015			x					
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Al_wt	2	mg/kg	9/18/2015 13:34	TCM MEA 2015				x				
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ca_wt	1.4	mg/kg	9/18/2015 13:34	TCM MEA 2015				x				
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Co_wt	<0.1	mg/kg	9/18/2015 13:34	TCM MEA 2015				x				
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cr_wt	1.4	mg/kg	9/18/2015 13:33	TCM MEA 2015				x				
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cu_wt	<0.1	mg/kg	9/18/2015 13:34	TCM MEA 2015				x				
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Fe_wt	14	mg/kg	9/18/2015 13:33	TCM MEA 2015				x				
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	ICP-OES	K_wt	0.8	mg/kg	9/18/2015 13:33	TCM MEA 2015				x				
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mg_wt	0.7	mg/kg	9/18/2015 13:34	TCM MEA 2015				x				
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mo_wt	<0.1	mg/kg	9/18/2015 13:33	TCM MEA 2015				x				
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Na_wt	4.7	mg/kg	9/18/2015 13:33	TCM MEA 2015				x				
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ni_wt	4.1	mg/kg	9/18/2015 13:33	TCM MEA 2015				x				
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Si_wt	2.3	mg/kg	9/18/2015 13:34	TCM MEA 2015				x				
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	ICP-OES	V_wt	<0.1	mg/kg	9/18/2015 13:33	TCM MEA 2015				x				
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Zn_wt	<0.1	mg/kg	9/18/2015 13:34	TCM MEA 2015				x				
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	330061	mg/L	9/15/2015 12:02	TCM MEA 2015							x	
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	LC-MS	BHEOX	154	mg/L	9/17/2015 8:37	TCM MEA 2015							x	
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEA	1711	mg/L	9/17/2015 8:37	TCM MEA 2015							x	
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEF	2944	mg/L	9/17/2015 8:37	TCM MEA 2015							x	
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEGly	8088	mg/L	9/17/2015 8:37	TCM MEA 2015							x	
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEI	1529	mg/L	9/17/2015 8:37	TCM MEA 2015							x	
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEPO	40051	mg/L	9/17/2015 8:37	TCM MEA 2015							x	
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	LC-MS	OZD	82	mg/L	9/17/2015 8:37	TCM MEA 2015							x	
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.4		9/14/2015 13:07	TCM MEA 2015					x			
		9/14/2015 7:38	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/14/2015 11:27	TCM MEA 2015						x		
127	21484	9/14/2015 14:40	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.69	mol/kg	9/14/2015 15:25	TCM MEA 2015		x						
128	21504	9/16/2015 5:45	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.55	mol/kg	9/16/2015 9:16	TCM MEA 2015		x						
		9/16/2015 5:45	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.143	mol/kg	9/16/2015 12:57	TCM MEA 2015	x							
		9/16/2015 5:45	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.4		9/16/2015 12:54	TCM MEA 2015					x			
		9/16/2015 5:45	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/16/2015 9:46	TCM MEA 2015						x		
		9/16/2015 5:45	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	355421	mg/L	9/18/2015 15:34	TCM MEA 2015							x	

Sample No.	Id numeric	Sampled date	Sampling point	Description	Analysis	Component name	Result text	Units	Date result entered	Project id	TIC	TOT-ALK	HSS	ICP-OES	PH	Store	LC-MS	IC
129	21522	9/17/2015 5:44	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.05	mol/kg	9/17/2015 9:03	TCM MEA 2015		x						
		9/17/2015 5:44	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.06	mol/kg	9/17/2015 14:18	TCM MEA 2015	x							
		9/17/2015 5:44	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.4		9/17/2015 10:19	TCM MEA 2015					x			
		9/17/2015 5:44	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/17/2015 10:20	TCM MEA 2015						x		
		9/17/2015 5:44	S-8611-2013	Lean amine - absorber inlet	IC	AA	560	mg/L	9/23/2015 15:21	TCM MEA 2015								x
		9/17/2015 5:44	S-8611-2013	Lean amine - absorber inlet	IC	FA	2250	mg/L	9/23/2015 15:20	TCM MEA 2015								x
		9/17/2015 5:44	S-8611-2013	Lean amine - absorber inlet	IC	GA	415	mg/L	9/23/2015 15:20	TCM MEA 2015								x
		9/17/2015 5:44	S-8611-2013	Lean amine - absorber inlet	IC	NO2-	<280	mg/L	9/23/2015 15:21	TCM MEA 2015								x
		9/17/2015 5:44	S-8611-2013	Lean amine - absorber inlet	IC	OA	540	mg/L	9/23/2015 15:21	TCM MEA 2015								x
		9/17/2015 5:44	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	<140	mg/L	9/23/2015 15:21	TCM MEA 2015								x
130	21540	9/18/2015 7:20	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.98	mol/kg	9/18/2015 10:03	TCM MEA 2015		x						
		9/18/2015 7:20	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.093	mol/kg	9/18/2015 13:25	TCM MEA 2015	x							
		9/18/2015 7:20	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.4		9/18/2015 10:03	TCM MEA 2015					x			
		9/18/2015 7:20	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/18/2015 10:17	TCM MEA 2015						x		
		9/18/2015 7:20	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	337175	mg/L	9/18/2015 15:34	TCM MEA 2015							x	
131	21561	9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.82	mol/kg	9/21/2015 8:43	TCM MEA 2015		x						
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.361	mol/kg	9/21/2015 12:30	TCM MEA 2015	x							
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS	0.149	mol/kg	9/22/2015 14:16	TCM MEA 2015			x					
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Al_wt	2	mg/kg	9/30/2015 14:38	TCM MEA 2015				x				
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ca_wt	1.4	mg/kg	9/30/2015 14:38	TCM MEA 2015				x				
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Co_wt	<0.1	mg/kg	9/30/2015 14:38	TCM MEA 2015				x				
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cr_wt	1.4	mg/kg	9/30/2015 14:36	TCM MEA 2015				x				
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cu_wt	<0.1	mg/kg	9/30/2015 14:38	TCM MEA 2015				x				
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Fe_wt	13	mg/kg	9/30/2015 14:36	TCM MEA 2015				x				
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	ICP-OES	K_wt	0.8	mg/kg	9/30/2015 14:37	TCM MEA 2015				x				
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mg_wt	0.7	mg/kg	9/30/2015 14:39	TCM MEA 2015				x				
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mo_wt	<0.1	mg/kg	9/30/2015 14:36	TCM MEA 2015				x				
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Na_wt	4.5	mg/kg	9/30/2015 14:37	TCM MEA 2015				x				
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ni_wt	3.5	mg/kg	9/30/2015 14:36	TCM MEA 2015				x				
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Si_wt	2.4	mg/kg	9/30/2015 14:39	TCM MEA 2015				x				
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	ICP-OES	V_wt	<0.1	mg/kg	9/30/2015 14:37	TCM MEA 2015				x				
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Zn_wt	<0.1	mg/kg	9/30/2015 14:38	TCM MEA 2015				x				
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	329890	mg/L	9/24/2015 11:45	TCM MEA 2015							x	
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	LC-MS	BHEOX	163	mg/L	9/24/2015 12:12	TCM MEA 2015							x	
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEA	1723	mg/L	9/24/2015 12:12	TCM MEA 2015							x	
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEF	2890	mg/L	9/24/2015 12:12	TCM MEA 2015							x	
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEGly	6227	mg/L	9/24/2015 12:12	TCM MEA 2015							x	
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEI	1500	mg/L	9/24/2015 12:13	TCM MEA 2015							x	
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEPO	29950	mg/L	9/24/2015 12:13	TCM MEA 2015							x	
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	LC-MS	OZD	53	mg/L	9/24/2015 12:13	TCM MEA 2015							x	
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.2		9/21/2015 8:45	TCM MEA 2015					x			
		9/21/2015 5:15	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/21/2015 11:49	TCM MEA 2015						x		
132	21579	9/22/2015 0:20	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.284	mol/kg	9/22/2015 15:20	TCM MEA 2015	x							
		9/22/2015 0:20	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/22/2015 10:04	TCM MEA 2015						x		
		9/22/2015 0:20	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.25	mol/kg	9/22/2015 12:41	TCM MEA 2015		x						
133	21584	9/22/2015 8:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.17	mol/kg	9/22/2015 8:52	TCM MEA 2015		x						
		9/22/2015 8:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.224	mol/kg	9/22/2015 15:20	TCM MEA 2015	x							
		9/22/2015 8:00	S-8611-2013	Lean amine - absorber inlet	IC	AA	450	mg/L	9/24/2015 12:00	TCM MEA 2015								x
		9/22/2015 8:00	S-8611-2013	Lean amine - absorber inlet	IC	FA	1860	mg/L	9/24/2015 12:00	TCM MEA 2015								x
		9/22/2015 8:00	S-8611-2013	Lean amine - absorber inlet	IC	GA	365	mg/L	9/24/2015 12:00	TCM MEA 2015								x
		9/22/2015 8:00	S-8611-2013	Lean amine - absorber inlet	IC	NO2-	<290	mg/L	9/24/2015 12:01	TCM MEA 2015								x
		9/22/2015 8:00	S-8611-2013	Lean amine - absorber inlet	IC	OA	470	mg/L	9/24/2015 12:00	TCM MEA 2015								x
		9/22/2015 8:00	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	400	mg/L	9/24/2015 12:01	TCM MEA 2015								x
		9/22/2015 8:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.3		9/22/2015 12:48	TCM MEA 2015					x			
		9/22/2015 8:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/22/2015 10:04	TCM MEA 2015						x		
134	21622	9/23/2015 14:10	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.57	mol/kg	9/23/2015 15:26	TCM MEA 2015		x						
135	21626	9/24/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.98	mol/kg	9/24/2015 8:37	TCM MEA 2015		x						
		9/24/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.356	mol/kg	9/24/2015 13:46	TCM MEA 2015	x							
		9/24/2015 4:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.3		9/24/2015 8:43	TCM MEA 2015					x			
		9/24/2015 4:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/24/2015 10:00	TCM MEA 2015						x		
136	21647	9/25/2015 13:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	3.82	mol/kg	9/25/2015 14:29	TCM MEA 2015		x						
137	21661	9/25/2015 14:50	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	3.97	mol/kg	9/25/2015 15:21	TCM MEA 2015		x						
138	21665	9/26/2015 3:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.19	mol/kg	9/28/2015 9:53	TCM MEA 2015		x						
		9/26/2015 3:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.773	mol/kg	9/28/2015 13:42	TCM MEA 2015	x							
		9/26/2015 3:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/28/2015 12:12	TCM MEA 2015						x		
139	21670	9/27/2015 3:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.85	mol/kg	9/28/2015 9:48	TCM MEA 2015		x						
		9/27/2015 3:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.187	mol/kg	9/28/2015 13:42	TCM MEA 2015	x							
		9/27/2015 3:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/28/2015 12:12	TCM MEA 2015						x		
140	21675	9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.94	mol/kg	9/28/2015 9:09	TCM MEA 2015		x						
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.277	mol/kg	9/28/2015 13:42	TCM MEA 2015	x							
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS	0.138	mol/kg	10/20/2015 13:20	TCM MEA 2015			x					
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Al_wt	2.8	mg/kg	9/30/2015 14:40	TCM MEA 2015				x				
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ca_wt	7.6	mg/kg	9/30/2015 14:40	TCM MEA 2015				x				
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Co_wt	0.2	mg/kg	9/30/2015 14:41	TCM MEA 2015				x				
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cr_wt	1.5	mg/kg	9/30/2015 14:40	TCM MEA 2015				x				
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cu_wt	<0.1	mg/kg	9/30/2015 14:40	TCM MEA 2015				x				
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Fe_wt	14	mg/kg	9/30/2015 14:40	TCM MEA 2015				x				
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	K_wt	0.8	mg/kg	9/30/2015 14:40	TCM MEA 2015				x				
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mg_wt	4.9	mg/kg	9/30/2015 14:41	TCM MEA 2015				x				
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mo_wt	<0.1	mg/kg	9/30/2015 14:40	TCM MEA 2015				x				
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Na_wt	4.9	mg/kg	9/30/2015 14:40	TCM MEA 2015				x				
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ni_wt	4.1	mg/kg	9/30/2015 14:40	TCM MEA 2015				x				
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Si_wt	3.5	mg/kg	9/30/2015 14:41	TCM MEA 2015				x				
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	V_wt	<0.1	mg/kg	9/30/2015 14:40	TCM MEA 2015				x				
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Zn_wt	<0.1	mg/kg	9/30/2015 14:40	TCM MEA 2015				x				
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	337888	mg/L	9/30/2015 17:59	TCM MEA 2015							x	
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	BHEOX	<500	mg/L	10/8/2015 7:55	TCM MEA 2015							x	
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEA	1684	mg/L	10/8/2015 7:55	TCM MEA 2015							x	

Sample No.	Id numeric	Sampled date	Sampling point	Description	Analysis	Component name	Result text	Units	Date result entered	Project id	TIC	TOT-ALK	HSS	ICP-OES	PH	Store	LC-MS	IC
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEF	3223	mg/L	10/8/2015 7:55	TCM MEA 2015							x	
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEGly	7069	mg/L	10/8/2015 7:55	TCM MEA 2015							x	
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEI	1333	mg/L	10/8/2015 7:56	TCM MEA 2015							x	
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEPO	29344	mg/L	10/8/2015 7:56	TCM MEA 2015							x	
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	LC-MS	OZD	57	mg/L	10/8/2015 7:56	TCM MEA 2015							x	
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.3		9/28/2015 12:08	TCM MEA 2015					x			
		9/28/2015 4:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/28/2015 12:12	TCM MEA 2015						x		
141	21699	9/29/2015 7:41	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.92	mol/kg	9/29/2015 8:44	TCM MEA 2015		x						
		9/29/2015 7:41	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.114	mol/kg	9/29/2015 13:11	TCM MEA 2015	x							
		9/29/2015 7:41	S-8611-2013	Lean amine - absorber inlet	IC	AA	370	mg/L	10/2/2015 12:47	TCM MEA 2015								x
		9/29/2015 7:41	S-8611-2013	Lean amine - absorber inlet	IC	FA	1800	mg/L	10/2/2015 12:47	TCM MEA 2015								x
		9/29/2015 7:41	S-8611-2013	Lean amine - absorber inlet	IC	GA	370	mg/L	10/2/2015 12:47	TCM MEA 2015								x
		9/29/2015 7:41	S-8611-2013	Lean amine - absorber inlet	IC	NO2-	<330	mg/L	10/2/2015 12:47	TCM MEA 2015								x
		9/29/2015 7:41	S-8611-2013	Lean amine - absorber inlet	IC	OA	600	mg/L	10/2/2015 12:47	TCM MEA 2015								x
		9/29/2015 7:41	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	<165	mg/L	10/2/2015 12:48	TCM MEA 2015								x
		9/29/2015 7:41	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.4		9/29/2015 9:13	TCM MEA 2015					x			
		9/29/2015 7:41	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/29/2015 11:26	TCM MEA 2015						x		
142	21716	9/30/2015 4:03	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.93	mol/kg	9/30/2015 11:24	TCM MEA 2015		x						
		9/30/2015 4:03	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.153	mol/kg	9/30/2015 13:44	TCM MEA 2015	x							
		9/30/2015 4:03	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.3		9/30/2015 12:54	TCM MEA 2015					x			
		9/30/2015 4:03	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		9/30/2015 12:49	TCM MEA 2015						x		
		9/30/2015 4:03	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	333241	mg/L	10/4/2015 19:35	TCM MEA 2015							x	
143	21753	10/2/2015 4:09	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.83	mol/kg	10/2/2015 9:23	TCM MEA 2015		x						
		10/2/2015 4:09	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.963	mol/kg	10/2/2015 12:35	TCM MEA 2015	x							
		10/2/2015 4:09	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.4		10/2/2015 11:16	TCM MEA 2015					x			
		10/2/2015 4:09	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		10/2/2015 10:30	TCM MEA 2015						x		
		10/2/2015 4:09	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	341388	mg/L	10/4/2015 19:37	TCM MEA 2015							x	
144	21768	10/1/2015 13:30	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		10/2/2015 10:30	TCM MEA 2015						x		
145	21770	10/1/2015 16:02	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		10/2/2015 10:30	TCM MEA 2015						x		
146	21772	10/1/2015 20:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		10/2/2015 10:30	TCM MEA 2015						x		
147	21786	10/5/2015 9:35	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	3.93	mol/kg	10/5/2015 11:56	TCM MEA 2015		x						
		10/5/2015 9:35	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.92	mol/kg	10/5/2015 12:12	TCM MEA 2015	x							
		10/5/2015 9:35	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		10/5/2015 11:55	TCM MEA 2015						x		
148	21807	10/2/2015 13:55	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		10/5/2015 11:55	TCM MEA 2015						x		
149	21811	10/6/2015 7:05	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.36	mol/kg	10/6/2015 10:30	TCM MEA 2015		x						
150	21826	10/6/2015 12:15	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.05	mol/kg	10/6/2015 12:45	TCM MEA 2015		x						
151	21830	10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.24	mol/kg	10/7/2015 9:28	TCM MEA 2015		x						
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.309	mol/kg	10/7/2015 12:55	TCM MEA 2015	x							
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.3		10/7/2015 9:55	TCM MEA 2015					x			
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		10/7/2015 9:54	TCM MEA 2015						x		
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	LC-MS	Am1	387616	mg/L	10/8/2015 12:51	TCM MEA 2015							x	
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	LC-MS	BHEOX	<500	mg/L	10/8/2015 7:56	TCM MEA 2015							x	
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEA	2222	mg/L	10/8/2015 7:56	TCM MEA 2015							x	
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEF	4648	mg/L	10/8/2015 7:56	TCM MEA 2015							x	
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEGly	7933	mg/L	10/8/2015 7:56	TCM MEA 2015							x	
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEI	1672	mg/L	10/8/2015 7:57	TCM MEA 2015							x	
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	LC-MS	HEPO	39140	mg/L	10/8/2015 7:57	TCM MEA 2015							x	
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	LC-MS	OZD	73	mg/L	10/8/2015 7:57	TCM MEA 2015							x	
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Al_wt	3.3	mg/kg	10/13/2015 11:04	TCM MEA 2015				x				
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ca_wt	8.1	mg/kg	10/13/2015 11:04	TCM MEA 2015				x				
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Co_wt	0.5	mg/kg	10/13/2015 11:04	TCM MEA 2015				x				
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cr_wt	2.1	mg/kg	10/13/2015 11:04	TCM MEA 2015				x				
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cu_wt	<0.1	mg/kg	10/13/2015 11:04	TCM MEA 2015				x				
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Fe_wt	19	mg/kg	10/13/2015 11:04	TCM MEA 2015				x				
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	ICP-OES	K_wt	1	mg/kg	10/13/2015 11:04	TCM MEA 2015				x				
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mg_wt	5.7	mg/kg	10/13/2015 11:04	TCM MEA 2015				x				
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mo_wt	<0.1	mg/kg	10/13/2015 11:04	TCM MEA 2015				x				
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Na_wt	5.4	mg/kg	10/13/2015 11:04	TCM MEA 2015				x				
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ni_wt	5.9	mg/kg	10/13/2015 11:05	TCM MEA 2015				x				
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Si_wt	5	mg/kg	10/13/2015 11:05	TCM MEA 2015				x				
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	ICP-OES	V_wt	<0.1	mg/kg	10/13/2015 11:04	TCM MEA 2015				x				
		10/7/2015 7:53	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Zn_wt	0.1	mg/kg	10/13/2015 11:04	TCM MEA 2015				x				
152	21846	10/8/2015 3:57	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.04	mol/kg	10/8/2015 8:38	TCM MEA 2015		x						
		10/8/2015 3:57	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.223	mol/kg	10/8/2015 14:54	TCM MEA 2015	x							
		10/8/2015 3:57	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.3		10/8/2015 11:45	TCM MEA 2015					x			
		10/8/2015 3:57	S-8611-2013	Lean amine - absorber inlet	STORE	Store	OK		10/8/2015 14:53	TCM MEA 2015						x		
153	21867	10/9/2015 4:50	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.01	mol/kg	10/9/2015 9:59	TCM MEA 2015		x						
		10/9/2015 4:50	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.068	mol/kg	10/9/2015 12:03	TCM MEA 2015	x							
		10/9/2015 4:50	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.4		10/9/2015 11:52	TCM MEA 2015					x			
		10/9/2015 4:50	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		10/9/2015 9:59	TCM MEA 2015						x		
154	21883	10/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5	mol/kg	10/12/2015 14:52	TCM MEA 2015		x						
		10/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.019	mol/kg	10/12/2015 14:57	TCM MEA 2015	x							
		10/10/2015 4:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		10/12/2015 13:02	TCM MEA 2015						x		
155	21888	10/11/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.93	mol/kg	10/12/2015 15:25	TCM MEA 2015		x						
		10/11/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.962	mol/kg	10/12/2015 14:57	TCM MEA 2015	x							
		10/11/2015 4:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		10/12/2015 13:02	TCM MEA 2015						x		
156	21893	10/12/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.88	mol/kg	10/12/2015 13:11	TCM MEA 2015		x						
		10/12/2015 4:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.951	mol/kg	10/12/2015 14:58	TCM MEA 2015	x							
		10/12/2015 4:00	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS	0.203	mol/kg	10/20/2015 13:21	TCM MEA 2015			x					
		10/12/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Al_wt	3.2	mg/kg	10/16/2015 15:07	TCM MEA 2015				x				
		10/12/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ca_wt	8	mg/kg	10/16/2015 15:07	TCM MEA 2015				x				
		10/12/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Co_wt	0.5	mg/kg	10/16/2015 15:07	TCM MEA 2015				x				
		10/12/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cr_wt	2.1	mg/kg	10/16/2015 15:06	TCM MEA 2015				x				
		10/12/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cu_wt	<0.1	mg/kg	10/16/2015 15:07	TCM MEA 2015				x				
		10/12/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Fe_wt	17	mg/kg	10/16/2015 15:06	TCM MEA 2015				x				
		10/12/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	K_wt	1.1	mg/kg	10/16/2015 15:06	TCM MEA 2015				x				
		10/12/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mg_wt	5.3	mg/kg	10/16/2015 15:07	TCM MEA 2015				x				
		10/12/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mo_wt	<0.1	mg/kg	10/16/2015 15:06	TCM MEA 2015				x				

Sample No.	Id numeric	Sampled date	Sampling point	Description	Analysis	Component name	Result text	Units	Date result entered	Project id	TIC	TOT-ALK	HSS	ICP-OES	PH	Store	LC-MS	IC
		10/12/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Na_wt	6	mg/kg	10/16/2015 15:06	TCM MEA 2015				x				
		10/12/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ni_wt	5.7	mg/kg	10/16/2015 15:06	TCM MEA 2015				x				
		10/12/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Si_wt	4.7	mg/kg	10/16/2015 15:07	TCM MEA 2015				x				
		10/12/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	V_wt	<0.1	mg/kg	10/16/2015 15:07	TCM MEA 2015				x				
		10/12/2015 4:00	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Zn_wt	<0.1	mg/kg	10/16/2015 15:07	TCM MEA 2015				x				
		10/12/2015 4:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.4		10/15/2015 14:53	TCM MEA 2015					x			
		10/12/2015 4:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		10/12/2015 13:02	TCM MEA 2015						x		
157	21912	10/12/2015 14:55	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.86	mol/kg	10/13/2015 8:28	TCM MEA 2015		x						
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	3.53	mol/kg	10/13/2015 10:22	TCM MEA 2015		x						
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.434	mol/kg	10/13/2015 12:03	TCM MEA 2015	x							
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	IC	AA	215	mg/L	10/19/2015 10:14	TCM MEA 2015								x
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	IC	FA	1250	mg/L	10/19/2015 10:14	TCM MEA 2015								x
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	IC	GA	205	mg/L	10/19/2015 10:14	TCM MEA 2015								x
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	IC	NO2-	<200	mg/L	10/19/2015 10:15	TCM MEA 2015								x
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	IC	NO3-	<200	mg/L	10/19/2015 10:15	TCM MEA 2015								x
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	IC	OA	465	mg/L	10/19/2015 10:14	TCM MEA 2015								x
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	<100	mg/L	10/19/2015 10:15	TCM MEA 2015								x
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.6		10/13/2015 10:21	TCM MEA 2015					x			
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		10/13/2015 10:19	TCM MEA 2015						x		
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	IC	AA	215	mg/L	10/19/2015 10:16	TCM MEA 2015								x
158	21916	10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	IC	FA	1250	mg/L	10/19/2015 10:16	TCM MEA 2015								x
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	IC	GA	205	mg/L	10/19/2015 10:16	TCM MEA 2015								x
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	IC	NO2-	<200	mg/L	10/19/2015 10:16	TCM MEA 2015								x
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	IC	OA	465	mg/L	10/19/2015 10:16	TCM MEA 2015								x
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	<100	mg/L	10/19/2015 10:16	TCM MEA 2015								x
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cr_wt	0.6	mg/kg	11/18/2015 13:27	TCM MEA 2015				x				
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Fe_wt	6	mg/kg	11/18/2015 13:27	TCM MEA 2015				x				
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mo_wt	<0.1	mg/kg	11/18/2015 13:27	TCM MEA 2015				x				
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Na_wt	2	mg/kg	11/18/2015 13:27	TCM MEA 2015				x				
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ni_wt	1.8	mg/kg	11/18/2015 13:27	TCM MEA 2015				x				
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	V_wt	<0.1	mg/kg	11/18/2015 13:27	TCM MEA 2015				x				
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Zn_wt	<0.1	mg/kg	11/18/2015 13:28	TCM MEA 2015				x				
		10/13/2015 5:45	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS	0.1	mol/kg	11/16/2015 13:52	TCM MEA 2015			x					
		10/14/2015 4:45	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.7		10/14/2015 11:33	TCM MEA 2015					x			
		10/14/2015 4:45	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		10/14/2015 12:19	TCM MEA 2015						x		
		10/14/2015 4:45	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.376	mol/kg	10/14/2015 12:53	TCM MEA 2015	x							
		10/14/2015 4:45	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	3.52	mol/kg	10/14/2015 11:34	TCM MEA 2015		x						
		10/14/2015 4:45	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS	0.04	mol/kg	11/17/2015 14:20	TCM MEA 2015			x					
		10/14/2015 4:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cr_wt	0.3	mg/kg	11/18/2015 13:20	TCM MEA 2015				x				
159	21936	10/14/2015 4:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cu_wt	<0.1	mg/kg	11/18/2015 13:21	TCM MEA 2015				x				
		10/14/2015 4:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Fe_wt	2.5	mg/kg	11/18/2015 13:20	TCM MEA 2015				x				
		10/14/2015 4:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mo_wt	<0.1	mg/kg	11/18/2015 13:20	TCM MEA 2015				x				
		10/14/2015 4:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Na_wt	0.9	mg/kg	11/18/2015 13:20	TCM MEA 2015				x				
		10/14/2015 4:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ni_wt	5.5	mg/kg	11/18/2015 13:20	TCM MEA 2015				x				
		10/14/2015 4:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	V_wt	<0.1	mg/kg	11/18/2015 13:20	TCM MEA 2015				x				
		10/14/2015 4:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Zn_wt	<0.1	mg/kg	11/18/2015 13:20	TCM MEA 2015				x				
		10/15/2015 5:20	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.06	mol/kg	10/15/2015 10:22	TCM MEA 2015		x						
		10/15/2015 5:20	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.556	mol/kg	10/15/2015 13:23	TCM MEA 2015	x							
		10/15/2015 5:20	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.7		10/15/2015 12:28	TCM MEA 2015					x			
		10/15/2015 5:20	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		10/15/2015 13:20	TCM MEA 2015						x		
		10/15/2015 5:20	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS	0.01	mol/kg	11/19/2015 14:31	TCM MEA 2015			x					
		10/15/2015 5:20	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cr_wt	<0.1	mg/kg	11/18/2015 13:26	TCM MEA 2015				x				
160	21953	10/15/2015 5:20	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cu_wt	<0.1	mg/kg	11/18/2015 13:26	TCM MEA 2015				x				
		10/15/2015 5:20	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Fe_wt	0.7	mg/kg	11/18/2015 13:26	TCM MEA 2015				x				
		10/15/2015 5:20	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mo_wt	<0.1	mg/kg	11/18/2015 13:26	TCM MEA 2015				x				
		10/15/2015 5:20	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Na_wt	0.6	mg/kg	11/18/2015 13:26	TCM MEA 2015				x				
		10/15/2015 5:20	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ni_wt	<0.1	mg/kg	11/18/2015 13:26	TCM MEA 2015				x				
		10/15/2015 5:20	S-8611-2013	Lean amine - absorber inlet	ICP-OES	V_wt	<0.1	mg/kg	11/18/2015 13:26	TCM MEA 2015				x				
		10/15/2015 5:20	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Zn_wt	<0.1	mg/kg	11/18/2015 13:26	TCM MEA 2015				x				
		10/14/2015 15:18	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	3.85	mol/kg	10/15/2015 10:22	TCM MEA 2015		x						
161	21969	10/14/2015 15:18	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.497	mol/kg	10/15/2015 13:23	TCM MEA 2015	x							
		10/14/2015 15:18	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		10/15/2015 13:20	TCM MEA 2015						x		
		10/15/2015 9:20	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.12	mol/kg	10/15/2015 12:22	TCM MEA 2015		x						
162	21971	10/15/2015 9:20	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.651	mol/kg	10/15/2015 15:12	TCM MEA 2015	x							
		10/15/2015 9:20	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		10/15/2015 13:20	TCM MEA 2015						x		
		10/16/2015 3:45	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.95	mol/kg	10/16/2015 10:10	TCM MEA 2015		x						
		10/16/2015 3:45	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.892	mol/kg	10/19/2015 12:37	TCM MEA 2015	x							
		10/16/2015 3:45	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.6		10/16/2015 11:22	TCM MEA 2015					x			
		10/16/2015 3:45	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		10/16/2015 10:08	TCM MEA 2015						x		
		10/16/2015 3:45	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS	0.013	mol/kg	11/20/2015 14:52	TCM MEA 2015			x					
		10/16/2015 3:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cr_wt	<0.2	mg/kg	11/18/2015 13:28	TCM MEA 2015				x				
163	21976	10/16/2015 3:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cu_wt	<0.2	mg/kg	11/18/2015 13:28	TCM MEA 2015				x				
		10/16/2015 3:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Fe_wt	1	mg/kg	11/18/2015 13:28	TCM MEA 2015				x				
		10/16/2015 3:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mo_wt	<0.2	mg/kg	11/18/2015 13:28	TCM MEA 2015				x				
		10/16/2015 3:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Na_wt	0.3	mg/kg	11/18/2015 13:28	TCM MEA 2015				x				
		10/16/2015 3:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ni_wt	<0.2	mg/kg	11/18/2015 13:28	TCM MEA 2015				x				
		10/16/2015 3:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	V_wt	<0.2	mg/kg	11/18/2015 13:28	TCM MEA 2015				x				
		10/16/2015 3:45	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Zn_wt	<0.2	mg/kg	11/18/2015 13:28	TCM MEA 2015				x				
		10/15/2015 21:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.763	mol/kg	10/19/2015 12:38	TCM MEA 2015	x							
164	21990	10/15/2015 21:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.58	mol/kg	10/16/2015 10:23	TCM MEA 2015		x						
		10/15/2015 21:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		10/16/2015 10:08	TCM MEA 2015						x		
		10/16/2015 7:40	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.076	mol/kg	10/19/2015 12:38	TCM MEA 2015	x							
165	21992	10/16/2015 7:40	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		10/16/2015 10:08	TCM MEA 2015						x		
		10/16/2015 7:40	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.33	mol/kg	10/16/2015 11:01	TCM MEA 2015		x						
		10/17/2015 4:35	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.07	mol/kg	10/19/2015 9:49	TCM MEA 2015		x						
		10/17/2015 4:35	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.042	mol/kg	10/19/2015 14:38	TCM MEA 2015	x							
		10/17/2015 4:35	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		10/19/2015 14:29	TCM MEA 2015						x		
		10/17/2015 4:35	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS	0.011	mol/kg	11/20/2015 14:51	TCM MEA 2015			x					

Sample No.	Id numeric	Sampled date	Sampling point	Description	Analysis	Component name	Result text	Units	Date result entered	Project id	TIC	TOT-ALK	HSS	ICP-OES	PH	Store	LC-MS	IC
166	21996	10/17/2015 4:35	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cr_wt	<0.2	mg/kg	11/18/2015 13:29	TCM MEA 2015				x				
		10/17/2015 4:35	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Cu_wt	<0.2	mg/kg	11/18/2015 13:29	TCM MEA 2015				x				
		10/17/2015 4:35	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Fe_wt	0.6	mg/kg	11/18/2015 13:29	TCM MEA 2015				x				
		10/17/2015 4:35	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Mo_wt	<0.1	mg/kg	11/18/2015 13:29	TCM MEA 2015				x				
		10/17/2015 4:35	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Na_wt	1	mg/kg	11/18/2015 13:29	TCM MEA 2015				x				
		10/17/2015 4:35	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Ni_wt	<0.2	mg/kg	11/18/2015 13:29	TCM MEA 2015				x				
		10/17/2015 4:35	S-8611-2013	Lean amine - absorber inlet	ICP-OES	V_wt	<0.2	mg/kg	11/18/2015 13:29	TCM MEA 2015				x				
		10/17/2015 4:35	S-8611-2013	Lean amine - absorber inlet	ICP-OES	Zn_wt	<0.2	mg/kg	11/18/2015 13:29	TCM MEA 2015				x				
167	22024	10/16/2015 21:00	S-8611-2013	Lean amine - absorber inlet	STORE	Store	ok		10/19/2015 14:29	TCM MEA 2015						x		
		10/16/2015 21:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.089	mol/kg	10/19/2015 14:38	TCM MEA 2015	x							
		10/16/2015 21:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.99	mol/kg	10/19/2015 14:36	TCM MEA 2015		x						

Appendix C - Measured values during the 2017 campaign

	Sampled date	Sampling point	Description	Analysis	Component name	Result text	Units	Date result entered	Project id
30190	11.06.2017 20:30	S-8611-2013	Lean amine - absorber inlet	COMMENT	Kjør FTIR-Spekter	ok		15.06.2017 10:07	TCM MEA_17
30190	11.06.2017 20:30	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.96	eq/kg	20.06.2017 08:06	TCM MEA_17
30192	12.06.2017 14:20	S-8611-2013	Lean amine - absorber inlet	COMMENT	Kjør FTIR-Spekter	ok		15.06.2017 10:07	TCM MEA_17
30192	12.06.2017 14:20	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.66	eq/kg	20.06.2017 08:08	TCM MEA_17
30199	13.06.2017 04:35	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.131	mol/kg	13.06.2017 13:16	TCM MEA_17
30199	13.06.2017 04:35	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1059.5	kg/m3	13.06.2017 11:20	TCM MEA_17
30199	13.06.2017 04:35	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.60		13.06.2017 08:45	TCM MEA_17
30199	13.06.2017 04:35	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	66.710	mN_m	13.06.2017 09:00	TCM MEA_17
30199	13.06.2017 04:35	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	295350	mg/kg	13.06.2017 10:18	TCM MEA_17
30199	13.06.2017 04:35	S-8611-2013	Lean amine - absorber inlet	IC	SO3--	<10	mg/L	20.06.2017 10:34	TCM MEA_17
30199	13.06.2017 04:35	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	<40	mg/L	20.06.2017 10:34	TCM MEA_17
30199	13.06.2017 04:35	S-8611-2013	Lean amine - absorber inlet	COMMENT	Kjør FTIR-Spekter	ok		15.06.2017 10:08	TCM MEA_17
30199	13.06.2017 04:35	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	3.470	mPa.s	13.06.2017 11:19	TCM MEA_17
30199	13.06.2017 04:35	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.01	eq/kg	19.06.2017 14:55	TCM MEA_17
30199	13.06.2017 04:35	S-8611-2013	Lean amine - absorber inlet	IC	AA	<15	mg/L	20.06.2017 10:36	TCM MEA_17
30199	13.06.2017 04:35	S-8611-2013	Lean amine - absorber inlet	IC	FA	<10	mg/L	20.06.2017 10:35	TCM MEA_17
30199	13.06.2017 04:35	S-8611-2013	Lean amine - absorber inlet	IC	GA	<10	mg/L	20.06.2017 10:35	TCM MEA_17
30199	13.06.2017 04:35	S-8611-2013	Lean amine - absorber inlet	IC	NO2-	<15	mg/L	20.06.2017 10:35	TCM MEA_17
30199	13.06.2017 04:35	S-8611-2013	Lean amine - absorber inlet	IC	NO3-	<10	mg/L	20.06.2017 10:35	TCM MEA_17
30199	13.06.2017 04:35	S-8611-2013	Lean amine - absorber inlet	IC	OA	<10	mg/L	20.06.2017 10:35	TCM MEA_17
30203	13.06.2017 15:23	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.051	mol/kg	14.06.2017 10:13	TCM MEA_17
30203	13.06.2017 15:23	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	293638	mg/kg	14.06.2017 13:55	TCM MEA_17
30203	13.06.2017 15:23	S-8611-2013	Lean amine - absorber inlet	COMMENT	Kjør FTIR-Spekter	ok		15.06.2017 10:08	TCM MEA_17
30203	13.06.2017 15:23	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.95	eq/kg	20.06.2017 08:09	TCM MEA_17
30218	13.06.2017 21:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Kjør FTIR-Spekter	ok		15.06.2017 10:08	TCM MEA_17
30218	13.06.2017 21:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.225	mol/kg	14.06.2017 12:29	TCM MEA_17
30218	13.06.2017 21:00	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	283360	mg/kg	14.06.2017 13:55	TCM MEA_17
30218	13.06.2017 21:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.83	eq/kg	19.06.2017 14:59	TCM MEA_17
30279	17.06.2017 14:47	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.131	mol/kg	20.06.2017 08:10	TCM MEA_17
30279	17.06.2017 14:47	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1063.1	kg/m3	19.06.2017 12:44	TCM MEA_17
30279	17.06.2017 14:47	S-8611-2013	Lean amine - absorber inlet	COMMENT	Kjør FTIR-Spekter	ok		19.06.2017 14:01	TCM MEA_17
30279	17.06.2017 14:47	S-8611-2013	Lean amine - absorber inlet	IC	SO3--	1140	mg/L	20.06.2017 10:26	TCM MEA_17
30279	17.06.2017 14:47	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	2360	mg/L	20.06.2017 10:25	TCM MEA_17
30279	17.06.2017 14:47	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.88	eq/kg	19.06.2017 14:56	TCM MEA_17
30282	18.06.2017 02:47	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.202	mol/kg	20.06.2017 08:09	TCM MEA_17
30282	18.06.2017 02:47	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1067.4	kg/m3	19.06.2017 14:54	TCM MEA_17
30282	18.06.2017 02:47	S-8611-2013	Lean amine - absorber inlet	COMMENT	Kjør FTIR-Spekter	ok		20.06.2017 10:22	TCM MEA_17
30282	18.06.2017 02:47	S-8611-2013	Lean amine - absorber inlet	IC	SO3--	798	mg/L	20.06.2017 10:23	TCM MEA_17
30282	18.06.2017 02:47	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	3580	mg/L	20.06.2017 10:22	TCM MEA_17
30282	18.06.2017 02:47	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.81	eq/kg	19.06.2017 14:57	TCM MEA_17
30309	17.06.2017 17:44	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.86	eq/kg	19.06.2017 12:22	TCM MEA_17
30309	17.06.2017 17:44	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.241	mol/kg	20.06.2017 08:09	TCM MEA_17
30309	17.06.2017 17:44	S-8611-2013	Lean amine - absorber inlet	COMMENT	Kjør FTIR-Spekter	ok		19.06.2017 14:01	TCM MEA_17
30309	17.06.2017 17:44	S-8611-2013	Lean amine - absorber inlet	IC	SO3--	950	mg/L	20.06.2017 10:25	TCM MEA_17
30309	17.06.2017 17:44	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	2760	mg/L	20.06.2017 10:25	TCM MEA_17
30310	17.06.2017 20:47	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.75	eq/kg	19.06.2017 12:19	TCM MEA_17
30310	17.06.2017 20:47	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.565	mol/kg	20.06.2017 08:09	TCM MEA_17
30310	17.06.2017 20:47	S-8611-2013	Lean amine - absorber inlet	COMMENT	Kjør FTIR-Spekter	ok		19.06.2017 14:01	TCM MEA_17
30310	17.06.2017 20:47	S-8611-2013	Lean amine - absorber inlet	IC	SO3--	846	mg/L	20.06.2017 10:24	TCM MEA_17
30310	17.06.2017 20:47	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	3010	mg/L	20.06.2017 10:23	TCM MEA_17
30312	17.06.2017 23:47	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.80	eq/kg	19.06.2017 12:20	TCM MEA_17
30312	17.06.2017 23:47	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.365	mol/kg	20.06.2017 08:08	TCM MEA_17
30312	17.06.2017 23:47	S-8611-2013	Lean amine - absorber inlet	COMMENT	Kjør FTIR-Spekter	ok		19.06.2017 14:02	TCM MEA_17
30312	17.06.2017 23:47	S-8611-2013	Lean amine - absorber inlet	IC	SO3--	808	mg/L	20.06.2017 10:24	TCM MEA_17
30312	17.06.2017 23:47	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	3310	mg/L	20.06.2017 10:24	TCM MEA_17
30318	18.06.2017 07:08	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.80	eq/kg	19.06.2017 12:18	TCM MEA_17
30318	18.06.2017 07:08	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.284	mol/kg	20.06.2017 08:08	TCM MEA_17
30318	18.06.2017 07:08	S-8611-2013	Lean amine - absorber inlet	COMMENT	Kjør FTIR-Spekter	ok		19.06.2017 14:02	TCM MEA_17
30318	18.06.2017 07:08	S-8611-2013	Lean amine - absorber inlet	IC	SO3--	774	mg/L	20.06.2017 10:21	TCM MEA_17
30318	18.06.2017 07:08	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	3960	mg/L	20.06.2017 10:21	TCM MEA_17
30319	18.06.2017 10:13	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.83	eq/kg	19.06.2017 12:18	TCM MEA_17
30319	18.06.2017 10:13	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.344	mol/kg	20.06.2017 08:08	TCM MEA_17
30319	18.06.2017 10:13	S-8611-2013	Lean amine - absorber inlet	COMMENT	Kjør FTIR-Spekter	ok		19.06.2017 14:02	TCM MEA_17

	Sampled date	Sampling point	Description	Analysis	Component name	Result text	Units	Date result entered	Project id
30319	18.06.2017 10:13	S-8611-2013	Lean amine - absorber inlet	IC	SO3--	775	mg/L	20.06.2017 10:21	TCM MEA_17
30319	18.06.2017 10:13	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	4210	mg/L	20.06.2017 10:20	TCM MEA_17
30320	18.06.2017 13:51	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.76	eq/kg	19.06.2017 12:18	TCM MEA_17
30320	18.06.2017 13:51	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.248	mol/kg	20.06.2017 08:07	TCM MEA_17
30320	18.06.2017 13:51	S-8611-2013	Lean amine - absorber inlet	COMMENT	Kjør FTIR-Spekter	ok		19.06.2017 14:02	TCM MEA_17
30320	18.06.2017 13:51	S-8611-2013	Lean amine - absorber inlet	IC	SO3--	740	mg/L	20.06.2017 10:20	TCM MEA_17
30320	18.06.2017 13:51	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	4520	mg/L	20.06.2017 10:20	TCM MEA_17
30320	18.06.2017 13:51	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS_ION	<0.010	eq/kg	27.06.2017 13:46	TCM MEA_17
30325	20.06.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.71	eq/kg	20.06.2017 09:24	TCM MEA_17
30325	20.06.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.123	mol/kg	20.06.2017 11:53	TCM MEA_17
30325	20.06.2017 04:00	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1066.9	kg/m3	20.06.2017 11:34	TCM MEA_17
30325	20.06.2017 04:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.50		20.06.2017 08:23	TCM MEA_17
30325	20.06.2017 04:00	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	2.599	mPa.s	20.06.2017 11:34	TCM MEA_17
30325	20.06.2017 04:00	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	66.590	mN_m	20.06.2017 10:05	TCM MEA_17
30325	20.06.2017 04:00	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	284473	mg/kg	20.06.2017 15:23	TCM MEA_17
30325	20.06.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	SO3--	518	mg/L	27.06.2017 08:04	TCM MEA_17
30325	20.06.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	6120	mg/L	27.06.2017 08:04	TCM MEA_17
30325	20.06.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Kjør FTIR-Spekter	ok		23.06.2017 09:56	TCM MEA_17
30338	20.06.2017 09:25	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.76	eq/kg	20.06.2017 11:31	TCM MEA_17
30338	20.06.2017 09:25	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.134	mol/kg	21.06.2017 10:27	TCM MEA_17
30338	20.06.2017 09:25	S-8611-2013	Lean amine - absorber inlet	COMMENT	Kjør FTIR-Spekter	ok		23.06.2017 09:55	TCM MEA_17
30349	19.06.2017 21:30	S-8611-2013	Lean amine - absorber inlet	COMMENT	Kjør FTIR-Spekter	ok		23.06.2017 09:55	TCM MEA_17
30349	19.06.2017 21:30	S-8611-2013	Lean amine - absorber inlet	IC	SO3--	518	mg/L	23.06.2017 08:13	TCM MEA_17
30349	19.06.2017 21:30	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	5830	mg/L	23.06.2017 08:13	TCM MEA_17
30370	20.06.2017 19:45	S-8611-2013	Lean amine - absorber inlet	COMMENT	Kjør FTIR-Spekter	ok		23.06.2017 09:55	TCM MEA_17
30370	20.06.2017 19:45	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.67	eq/kg	21.06.2017 11:03	TCM MEA_17
30370	20.06.2017 19:45	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.986	mol/kg	21.06.2017 13:39	TCM MEA_17
30370	20.06.2017 19:45	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	280587	mg/kg	21.06.2017 13:53	TCM MEA_17
30372	21.06.2017 01:52	S-8611-2013	Lean amine - absorber inlet	COMMENT	Kjør FTIR-Spekter	ok		23.06.2017 09:55	TCM MEA_17
30372	21.06.2017 01:52	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.68	eq/kg	21.06.2017 10:26	TCM MEA_17
30372	21.06.2017 01:52	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.104	mol/kg	21.06.2017 12:19	TCM MEA_17
30372	21.06.2017 01:52	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	279075	mg/kg	21.06.2017 13:53	TCM MEA_17
30372	21.06.2017 01:52	S-8611-2013	Lean amine - absorber inlet	IC	SO3--	528	mg/L	23.06.2017 08:13	TCM MEA_17
30372	21.06.2017 01:52	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	6790	mg/L	23.06.2017 08:13	TCM MEA_17
30375	21.06.2017 13:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.55	eq/kg	21.06.2017 13:27	TCM MEA_17
30375	21.06.2017 13:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.174	mol/kg	22.06.2017 12:11	TCM MEA_17
30375	21.06.2017 13:00	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	275523	mg/kg	22.06.2017 14:25	TCM MEA_17
30375	21.06.2017 13:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Kjør FTIR-Spekter	ok		23.06.2017 09:55	TCM MEA_17
30382	22.06.2017 02:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.79	eq/kg	22.06.2017 09:26	TCM MEA_17
30382	22.06.2017 02:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.110	mol/kg	22.06.2017 12:16	TCM MEA_17
30382	22.06.2017 02:00	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1069.4	kg/m3	22.06.2017 10:04	TCM MEA_17
30382	22.06.2017 02:00	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	66.790	mN_m	22.06.2017 09:48	TCM MEA_17
30382	22.06.2017 02:00	S-8611-2013	Lean amine - absorber inlet	IC	AA	<15	mg/L	23.06.2017 08:11	TCM MEA_17
30382	22.06.2017 02:00	S-8611-2013	Lean amine - absorber inlet	IC	FA	38.2	mg/L	23.06.2017 08:08	TCM MEA_17
30382	22.06.2017 02:00	S-8611-2013	Lean amine - absorber inlet	IC	GA	<10	mg/L	23.06.2017 09:59	TCM MEA_17
30382	22.06.2017 02:00	S-8611-2013	Lean amine - absorber inlet	IC	NO2-	34.1	mg/L	23.06.2017 08:10	TCM MEA_17
30382	22.06.2017 02:00	S-8611-2013	Lean amine - absorber inlet	IC	NO3-	34.1	mg/L	23.06.2017 08:11	TCM MEA_17
30382	22.06.2017 02:00	S-8611-2013	Lean amine - absorber inlet	IC	OA	<10	mg/L	23.06.2017 10:00	TCM MEA_17
30382	22.06.2017 02:00	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	289259	mg/kg	22.06.2017 12:52	TCM MEA_17
30382	22.06.2017 02:00	S-8611-2013	Lean amine - absorber inlet	IC	SO3--	445	mg/L	23.06.2017 08:06	TCM MEA_17
30382	22.06.2017 02:00	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	8750	mg/L	23.06.2017 08:06	TCM MEA_17
30382	22.06.2017 02:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Kjør FTIR-Spekter	ok		23.06.2017 09:54	TCM MEA_17
30393	22.06.2017 12:45	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.85	eq/kg	22.06.2017 14:16	TCM MEA_17
30393	22.06.2017 12:45	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.074	mol/kg	23.06.2017 09:53	TCM MEA_17
30393	22.06.2017 12:45	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	292225	mg/kg	22.06.2017 14:48	TCM MEA_17
30393	22.06.2017 12:45	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		22.06.2017 14:16	TCM MEA_17
30395	21.06.2017 20:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		22.06.2017 14:24	TCM MEA_17
30397	22.06.2017 08:30	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		22.06.2017 14:24	TCM MEA_17
30410	23.06.2017 05:04	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.78	eq/kg	23.06.2017 08:52	TCM MEA_17
30410	23.06.2017 05:04	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.246	mol/kg	23.06.2017 11:57	TCM MEA_17
30410	23.06.2017 05:04	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1077.2	kg/m3	23.06.2017 09:48	TCM MEA_17
30410	23.06.2017 05:04	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	55.590	mN_m	23.06.2017 09:34	TCM MEA_17
30410	23.06.2017 05:04	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	290463	mg/kg	23.06.2017 10:01	TCM MEA_17

	Sampled date	Sampling point	Description	Analysis	Component name	Result text	Units	Date result entered	Project id
30410	23.06.2017 05:04	S-8611-2013	Lean amine - absorber inlet	IC	SO3--	770	mg/L	26.06.2017 07:58	TCM MEA_17
30410	23.06.2017 05:04	S-8611-2013	Lean amine - absorber inlet	IC	SO4--	9730	mg/L	26.06.2017 07:59	TCM MEA_17
30410	23.06.2017 05:04	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		23.06.2017 09:00	TCM MEA_17
30422	23.06.2017 11:50	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.79	eq/kg	23.06.2017 12:35	TCM MEA_17
30422	23.06.2017 11:50	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.078	mol/kg	23.06.2017 14:33	TCM MEA_17
30422	23.06.2017 11:50	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	292233	mg/kg	23.06.2017 13:33	TCM MEA_17
30422	23.06.2017 11:50	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		23.06.2017 12:01	TCM MEA_17
30424	22.06.2017 19:07	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		23.06.2017 10:18	TCM MEA_17
30426	22.06.2017 23:59	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		23.06.2017 10:18	TCM MEA_17
30428	24.06.2017 09:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.87	eq/kg	26.06.2017 08:14	TCM MEA_17
30428	24.06.2017 09:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.105	mol/kg	26.06.2017 13:24	TCM MEA_17
30428	24.06.2017 09:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		26.06.2017 07:52	TCM MEA_17
30428	24.06.2017 09:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	12800	mg/kg	29.06.2017 07:51	TCM MEA_17
30428	24.06.2017 09:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	896	mg/kg	29.06.2017 07:51	TCM MEA_17
30431	25.06.2017 02:40	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.79	eq/kg	26.06.2017 08:13	TCM MEA_17
30431	25.06.2017 02:40	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.523	mol/kg	26.06.2017 12:25	TCM MEA_17
30431	25.06.2017 02:40	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		26.06.2017 07:53	TCM MEA_17
30460	26.06.2017 12:10	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.84	eq/kg	26.06.2017 13:28	TCM MEA_17
30460	26.06.2017 12:10	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.543	mol/kg	27.06.2017 08:31	TCM MEA_17
30460	26.06.2017 12:10	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	299949	mg/kg	26.06.2017 14:43	TCM MEA_17
30460	26.06.2017 12:10	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		26.06.2017 12:46	TCM MEA_17
30460	26.06.2017 12:10	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	16900	mg/kg	29.06.2017 07:50	TCM MEA_17
30460	26.06.2017 12:10	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	995	mg/kg	29.06.2017 07:49	TCM MEA_17
30463	24.06.2017 18:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		26.06.2017 12:09	TCM MEA_17
30465	23.06.2017 19:33	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		26.06.2017 12:09	TCM MEA_17
30473	27.06.2017 04:02	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.82	eq/kg	27.06.2017 08:06	TCM MEA_17
30473	27.06.2017 04:02	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.483	mol/kg	27.06.2017 10:24	TCM MEA_17
30473	27.06.2017 04:02	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	65.480	mN_m	27.06.2017 09:24	TCM MEA_17
30473	27.06.2017 04:02	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	306766	mg/kg	27.06.2017 10:04	TCM MEA_17
30473	27.06.2017 04:02	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	18500	mg/kg	27.06.2017 12:28	TCM MEA_17
30473	27.06.2017 04:02	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	1140	mg/kg	27.06.2017 12:29	TCM MEA_17
30473	27.06.2017 04:02	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		27.06.2017 08:06	TCM MEA_17
30495	28.06.2017 12:30	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.68	eq/kg	28.06.2017 14:21	TCM MEA_17
30495	28.06.2017 12:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.406	mol/kg	29.06.2017 07:26	TCM MEA_17
30495	28.06.2017 12:30	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1096.2	kg/m3	28.06.2017 14:13	TCM MEA_17
30495	28.06.2017 12:30	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	58.030	mN_m	29.06.2017 10:27	TCM MEA_17
30495	28.06.2017 12:30	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	288991	mg/kg	29.06.2017 07:32	TCM MEA_17
30495	28.06.2017 12:30	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	19300	mg/kg	29.06.2017 07:54	TCM MEA_17
30495	28.06.2017 12:30	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	758	mg/kg	29.06.2017 07:53	TCM MEA_17
30495	28.06.2017 12:30	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		28.06.2017 13:48	TCM MEA_17
30515	29.06.2017 04:05	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.75	eq/kg	29.06.2017 09:16	TCM MEA_17
30515	29.06.2017 04:05	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.867	mol/kg	29.06.2017 11:24	TCM MEA_17
30515	29.06.2017 04:05	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	60.020	mN_m	29.06.2017 10:10	TCM MEA_17
30515	29.06.2017 04:05	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	293628	mg/kg	29.06.2017 11:18	TCM MEA_17
30515	29.06.2017 04:05	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	20600	mg/kg	29.06.2017 14:31	TCM MEA_17
30515	29.06.2017 04:05	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	1110	mg/kg	29.06.2017 14:31	TCM MEA_17
30515	29.06.2017 04:05	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		29.06.2017 09:16	TCM MEA_17
30525	29.06.2017 12:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.77	eq/kg	29.06.2017 12:54	TCM MEA_17
30525	29.06.2017 12:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.946	mol/kg	29.06.2017 15:02	TCM MEA_17
30525	29.06.2017 12:00	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	274566	mg/kg	29.06.2017 14:42	TCM MEA_17
30525	29.06.2017 12:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		29.06.2017 12:47	TCM MEA_17
30533	30.06.2017 04:10	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.57	eq/kg	30.06.2017 07:40	TCM MEA_17
30533	30.06.2017 04:10	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.059	mol/kg	30.06.2017 09:43	TCM MEA_17
30533	30.06.2017 04:10	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1084.8	kg/m3	30.06.2017 10:06	TCM MEA_17
30533	30.06.2017 04:10	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	2.817	mPa.s	30.06.2017 10:06	TCM MEA_17
30533	30.06.2017 04:10	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	65.260	mN_m	30.06.2017 09:23	TCM MEA_17
30533	30.06.2017 04:10	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	287315	mg/kg	30.06.2017 09:31	TCM MEA_17
30533	30.06.2017 04:10	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	21600	mg/kg	17.07.2017 12:19	TCM MEA_17
30533	30.06.2017 04:10	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	1270	mg/kg	17.07.2017 12:20	TCM MEA_17
30533	30.06.2017 04:10	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		30.06.2017 08:17	TCM MEA_17
30545	30.06.2017 11:55	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.57	eq/kg	30.06.2017 12:29	TCM MEA_17
30545	30.06.2017 11:55	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.877	mol/kg	05.07.2017 13:07	TCM MEA_17
30545	30.06.2017 11:55	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	288618	mg/kg	30.06.2017 12:53	TCM MEA_17

	Sampled date	Sampling point	Description	Analysis	Component name	Result text	Units	Date result entered	Project id
30545	30.06.2017 11:55	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		30.06.2017 12:08	TCM MEA_17
30548	01.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	24500	mg/kg	17.07.2017 12:37	TCM MEA_17
30548	01.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	633	mg/kg	17.07.2017 12:37	TCM MEA_17
30548	01.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		03.07.2017 08:44	TCM MEA_17
30550	02.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	25100	mg/kg	17.07.2017 12:57	TCM MEA_17
30550	02.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	485	mg/kg	17.07.2017 12:38	TCM MEA_17
30550	02.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		03.07.2017 08:49	TCM MEA_17
30558	03.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.33	eq/kg	03.07.2017 11:37	TCM MEA_17
30558	03.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.721	mol/kg	05.07.2017 13:08	TCM MEA_17
30558	03.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1073.8	kg/m3	03.07.2017 11:37	TCM MEA_17
30558	03.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS_ION	0.358	eq/kg	18.07.2017 14:06	TCM MEA_17
30558	03.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.60		03.07.2017 13:46	TCM MEA_17
30558	03.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	2.555	mPa.s	03.07.2017 11:38	TCM MEA_17
30558	03.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Sample to CP-LAB	ok		03.07.2017 13:32	TCM MEA_17
30558	03.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	62.950	mN_m	03.07.2017 14:16	TCM MEA_17
30558	03.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Acetic acid	<15	mg/kg	17.07.2017 12:35	TCM MEA_17
30558	03.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Formic acid	112	mg/kg	17.07.2017 12:33	TCM MEA_17
30558	03.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Glycolic acid	12	mg/kg	17.07.2017 12:33	TCM MEA_17
30558	03.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Nitrate	95.5	mg/kg	17.07.2017 12:35	TCM MEA_17
30558	03.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Nitrite	41.6	mg/kg	17.07.2017 12:35	TCM MEA_17
30558	03.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Oxalic acid	<15	mg/kg	17.07.2017 12:35	TCM MEA_17
30558	03.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	280270	mg/kg	04.07.2017 10:30	TCM MEA_17
30558	03.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	28900	mg/kg	17.07.2017 12:36	TCM MEA_17
30558	03.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	426	mg/kg	17.07.2017 12:36	TCM MEA_17
30558	03.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		03.07.2017 13:24	TCM MEA_17
30558	03.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Collect sample to Sintef	ok		03.07.2017 12:02	TCM MEA_17
30582	03.07.2017 12:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.27	eq/kg	03.07.2017 13:11	TCM MEA_17
30582	03.07.2017 12:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.779	mol/kg	05.07.2017 13:09	TCM MEA_17
30582	03.07.2017 12:00	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	273574	mg/kg	04.07.2017 10:29	TCM MEA_17
30582	03.07.2017 12:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		03.07.2017 13:05	TCM MEA_17
30589	04.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.41	eq/kg	04.07.2017 08:50	TCM MEA_17
30589	04.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.794	mol/kg	05.07.2017 13:10	TCM MEA_17
30589	04.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1080.9	kg/m3	04.07.2017 10:33	TCM MEA_17
30589	04.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	3.607	mPa.s	04.07.2017 10:34	TCM MEA_17
30589	04.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	65.700	mN_m	04.07.2017 10:13	TCM MEA_17
30589	04.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	27600	mg/kg	20.07.2017 09:54	TCM MEA_17
30589	04.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	1390	mg/kg	20.07.2017 09:54	TCM MEA_17
30589	04.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		04.07.2017 09:09	TCM MEA_17
30602	04.07.2017 12:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.53	eq/kg	04.07.2017 12:34	TCM MEA_17
30602	04.07.2017 12:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.839	mol/kg	05.07.2017 13:10	TCM MEA_17
30602	04.07.2017 12:00	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	293354	mg/kg	04.07.2017 14:49	TCM MEA_17
30602	04.07.2017 12:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		04.07.2017 12:28	TCM MEA_17
30604	04.07.2017 14:15	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.57	eq/kg	04.07.2017 14:53	TCM MEA_17
30610	05.07.2017 03:30	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.64	eq/kg	05.07.2017 09:45	TCM MEA_17
30610	05.07.2017 03:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.891	mol/kg	05.07.2017 13:33	TCM MEA_17
30610	05.07.2017 03:30	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	26000	mg/kg	17.07.2017 13:03	TCM MEA_17
30610	05.07.2017 03:30	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	2310	mg/kg	17.07.2017 13:04	TCM MEA_17
30610	05.07.2017 03:30	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		05.07.2017 10:01	TCM MEA_17
30610	05.07.2017 03:30	S-8611-2013	Lean amine - absorber inlet	COMMENT	Comment	krystallisering i anlegg		05.07.2017 10:01	TCM MEA_17
30629	06.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.57	eq/kg	06.07.2017 08:44	TCM MEA_17
30629	06.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	TIC	TIC	1.151	mol/kg	06.07.2017 11:40	TCM MEA_17
30629	06.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	DENSITY	DEN20	1140.0	kg/m3	06.07.2017 09:58	TCM MEA_17
30629	06.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	VISCOSITY	ViscT1	3.200	mPa.s	06.07.2017 12:27	TCM MEA_17
30629	06.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	61.830	mN_m	06.07.2017 09:47	TCM MEA_17
30629	06.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	IC	Sulfate	31400	mg/kg	17.07.2017 13:13	TCM MEA_17
30629	06.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	IC	Sulfite	681	mg/kg	17.07.2017 13:13	TCM MEA_17
30629	06.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		06.07.2017 08:44	TCM MEA_17
30629	06.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	COMMENT	Comment	Prøven er ikkje homog		06.07.2017 07:55	TCM MEA_17
30640	06.07.2017 13:48	S-8611-2017	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.23	eq/kg	06.07.2017 14:22	TCM MEA_17
30640	06.07.2017 13:48	S-8611-2017	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		06.07.2017 14:05	TCM MEA_17
30640	06.07.2017 13:48	S-8611-2017	Lean amine - absorber inlet	COMMENT	Comment	siste prøve før reclaimi		06.07.2017 13:59	TCM MEA_17
30648	07.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	TOT_ALK	Tot Alk	3.43	eq/kg	07.07.2017 11:42	TCM MEA_17
30648	07.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	TIC	TIC	0.739	mol/kg	07.07.2017 11:41	TCM MEA_17

	Sampled date	Sampling point	Description	Analysis	Component name	Result text	Units	Date result entered	Project id
30648	07.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	DENSITY	DEN20	1053.4	kg/m3	07.07.2017 14:47	TCM MEA_17
30648	07.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	VISCOSITY	ViscT1	1.844	mPa.s	07.07.2017 14:47	TCM MEA_17
30648	07.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	64.610	mN_m	07.07.2017 11:42	TCM MEA_17
30648	07.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	IC	Sulfate	11910	mg/kg	17.07.2017 13:14	TCM MEA_17
30648	07.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	IC	Sulfite	73.3	mg/kg	17.07.2017 13:15	TCM MEA_17
30648	07.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		07.07.2017 11:17	TCM MEA_17
30667	07.07.2017 12:40	S-8611-2017	Lean amine - absorber inlet	TOT_ALK	Tot Alk	3.93	eq/kg	07.07.2017 14:46	TCM MEA_17
30667	07.07.2017 12:40	S-8611-2017	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		07.07.2017 12:55	TCM MEA_17
30670	08.07.2017 03:48	S-8611-2017	Lean amine - absorber inlet	IC	Sulfate	9320	mg/kg	13.07.2017 07:48	TCM MEA_17
30670	08.07.2017 03:48	S-8611-2017	Lean amine - absorber inlet	IC	Sulfite	320	mg/kg	13.07.2017 07:48	TCM MEA_17
30670	08.07.2017 03:48	S-8611-2017	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		10.07.2017 09:52	TCM MEA_17
30672	09.07.2017 04:07	S-8611-2017	Lean amine - absorber inlet	IC	Sulfate	9680	mg/kg	11.07.2017 12:23	TCM MEA_17
30672	09.07.2017 04:07	S-8611-2017	Lean amine - absorber inlet	IC	Sulfite	475	mg/kg	11.07.2017 12:23	TCM MEA_17
30672	09.07.2017 04:07	S-8611-2017	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		10.07.2017 09:52	TCM MEA_17
30680	10.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.75	eq/kg	10.07.2017 08:11	TCM MEA_17
30680	10.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	TIC	TIC	0.926	mol/kg	10.07.2017 14:05	TCM MEA_17
30680	10.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	DENSITY	DEN20	1066.5	kg/m3	10.07.2017 12:01	TCM MEA_17
30680	10.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	HSS_ION	HSS_ION	0.172	eq/kg	18.07.2017 14:59	TCM MEA_17
30680	10.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	PH	pH	10.60		10.07.2017 14:06	TCM MEA_17
30680	10.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	VISCOSITY	ViscT1	3.602	mPa.s	10.07.2017 13:18	TCM MEA_17
30680	10.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	COMMENT	Sample to CP-LAB	ok		10.07.2017 10:05	TCM MEA_17
30680	10.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	63.800	mN_m	10.07.2017 10:15	TCM MEA_17
30680	10.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	IC	Acetic acid	<15	mg/kg	18.07.2017 08:46	TCM MEA_17
30680	10.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	IC	Formic acid	111	mg/kg	18.07.2017 08:45	TCM MEA_17
30680	10.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	IC	Glycolic acid	11.7	mg/kg	18.07.2017 08:45	TCM MEA_17
30680	10.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	IC	Nitrate	<20	mg/kg	18.07.2017 08:49	TCM MEA_17
30680	10.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	IC	Nitrite	<15	mg/kg	18.07.2017 08:49	TCM MEA_17
30680	10.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	IC	Oxalic acid	<10	mg/kg	18.07.2017 08:46	TCM MEA_17
30680	10.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	290295	mg/kg	10.07.2017 14:51	TCM MEA_17
30680	10.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	IC	Sulfate	11120	mg/kg	11.07.2017 12:21	TCM MEA_17
30680	10.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	IC	Sulfite	510	mg/kg	11.07.2017 12:22	TCM MEA_17
30680	10.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		10.07.2017 09:39	TCM MEA_17
30680	10.07.2017 04:00	S-8611-2017	Lean amine - absorber inlet	COMMENT	Collect sample to Sintef	ok		10.07.2017 10:04	TCM MEA_17
30695	10.07.2017 12:10	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.83	eq/kg	10.07.2017 13:05	TCM MEA_17
30695	10.07.2017 12:10	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.899	mol/kg	10.07.2017 14:06	TCM MEA_17
30695	10.07.2017 12:10	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	293998	mg/kg	10.07.2017 14:33	TCM MEA_17
30695	10.07.2017 12:10	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		10.07.2017 13:02	TCM MEA_17
30703	11.07.2017 05:45	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.82	eq/kg	11.07.2017 08:57	TCM MEA_17
30703	11.07.2017 05:45	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.915	mol/kg	11.07.2017 14:00	TCM MEA_17
30703	11.07.2017 05:45	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1068.4	kg/m3	11.07.2017 13:31	TCM MEA_17
30703	11.07.2017 05:45	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	2.758	mPa.s	11.07.2017 13:32	TCM MEA_17
30703	11.07.2017 05:45	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	65.800	mN_m	11.07.2017 13:28	TCM MEA_17
30703	11.07.2017 05:45	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	294332	mg/kg	11.07.2017 14:28	TCM MEA_17
30703	11.07.2017 05:45	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	11900	mg/kg	12.07.2017 08:03	TCM MEA_17
30703	11.07.2017 05:45	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	494	mg/kg	12.07.2017 08:03	TCM MEA_17
30703	11.07.2017 05:45	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		11.07.2017 10:17	TCM MEA_17
30720	11.07.2017 12:04	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.99	eq/kg	11.07.2017 12:44	TCM MEA_17
30720	11.07.2017 12:04	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.968	mol/kg	11.07.2017 14:01	TCM MEA_17
30720	11.07.2017 12:04	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	304108	mg/kg	11.07.2017 14:28	TCM MEA_17
30720	11.07.2017 12:04	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		11.07.2017 12:43	TCM MEA_17
30727	12.07.2017 08:10	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.44	eq/kg	12.07.2017 08:55	TCM MEA_17
30727	12.07.2017 08:10	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ustabilt anlegg		12.07.2017 08:35	TCM MEA_17
30740	12.07.2017 12:10	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.10	eq/kg	12.07.2017 13:09	TCM MEA_17
30740	12.07.2017 12:10	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.715	mol/kg	12.07.2017 14:05	TCM MEA_17
30740	12.07.2017 12:10	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	309938	mg/kg	12.07.2017 14:08	TCM MEA_17
30740	12.07.2017 12:10	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		12.07.2017 13:07	TCM MEA_17
30740	12.07.2017 12:10	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	12100	mg/kg	13.07.2017 07:49	TCM MEA_17
30740	12.07.2017 12:10	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	403	mg/kg	13.07.2017 07:49	TCM MEA_17
30745	13.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.02	eq/kg	13.07.2017 09:02	TCM MEA_17
30745	13.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.569	mol/kg	13.07.2017 13:33	TCM MEA_17
30745	13.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1098.8	kg/m3	13.07.2017 12:42	TCM MEA_17
30745	13.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	3.215	mPa.s	13.07.2017 12:42	TCM MEA_17
30745	13.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	66.900	mN_m	13.07.2017 09:47	TCM MEA_17

	Sampled date	Sampling point	Description	Analysis	Component name	Result text	Units	Date result entered	Project id
30745	13.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	307670	mg/kg	13.07.2017 10:29	TCM MEA_17
30745	13.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	12130	mg/kg	13.07.2017 13:55	TCM MEA_17
30745	13.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	304	mg/kg	13.07.2017 13:55	TCM MEA_17
30745	13.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		13.07.2017 08:22	TCM MEA_17
30756	13.07.2017 12:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.06	eq/kg	13.07.2017 12:32	TCM MEA_17
30756	13.07.2017 12:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.363	mol/kg	13.07.2017 13:33	TCM MEA_17
30756	13.07.2017 12:00	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	315620	mg/kg	13.07.2017 14:01	TCM MEA_17
30756	13.07.2017 12:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		13.07.2017 12:32	TCM MEA_17
30766	14.07.2017 07:50	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.20	eq/kg	14.07.2017 08:24	TCM MEA_17
30766	14.07.2017 07:50	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.190	mol/kg	14.07.2017 11:48	TCM MEA_17
30766	14.07.2017 07:50	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1163.6	kg/m3	14.07.2017 08:56	TCM MEA_17
30766	14.07.2017 07:50	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	3.879	mPa.s	14.07.2017 08:56	TCM MEA_17
30766	14.07.2017 07:50	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	65.800	mN_m	14.07.2017 08:56	TCM MEA_17
30766	14.07.2017 07:50	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	310205	mg/kg	14.07.2017 11:59	TCM MEA_17
30766	14.07.2017 07:50	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	13700	mg/kg	19.07.2017 13:24	TCM MEA_17
30766	14.07.2017 07:50	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	313	mg/kg	19.07.2017 13:25	TCM MEA_17
30766	14.07.2017 07:50	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		14.07.2017 08:56	TCM MEA_17
30778	14.07.2017 11:52	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.05	eq/kg	14.07.2017 13:14	TCM MEA_17
30778	14.07.2017 11:52	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	2.381	mol/kg	14.07.2017 14:10	TCM MEA_17
30778	14.07.2017 11:52	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	320868	mg/kg	17.07.2017 11:59	TCM MEA_17
30778	14.07.2017 11:52	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		14.07.2017 13:02	TCM MEA_17
30780	15.07.2017 04:15	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	13900	mg/kg	19.07.2017 13:25	TCM MEA_17
30780	15.07.2017 04:15	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	524	mg/kg	19.07.2017 13:25	TCM MEA_17
30780	15.07.2017 04:15	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		17.07.2017 07:40	TCM MEA_17
30782	16.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	13000	mg/kg	19.07.2017 13:27	TCM MEA_17
30782	16.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	508	mg/kg	19.07.2017 13:27	TCM MEA_17
30782	16.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		17.07.2017 07:40	TCM MEA_17
30790	17.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.41	eq/kg	17.07.2017 08:50	TCM MEA_17
30790	17.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.941	mol/kg	17.07.2017 11:52	TCM MEA_17
30790	17.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1073.5	kg/m3	17.07.2017 11:25	TCM MEA_17
30790	17.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS_ION	0.252	eq/kg	18.07.2017 15:00	TCM MEA_17
30790	17.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.50		17.07.2017 09:25	TCM MEA_17
30790	17.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	2.398	mPa.s	17.07.2017 11:25	TCM MEA_17
30790	17.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Sample to CP-LAB	ok		17.07.2017 07:41	TCM MEA_17
30790	17.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	66.900	mN_m	17.07.2017 09:25	TCM MEA_17
30790	17.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Acetic acid	17.5	mg/kg	18.07.2017 08:13	TCM MEA_17
30790	17.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Formic acid	379	mg/kg	18.07.2017 08:12	TCM MEA_17
30790	17.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Glycolic acid	52.5	mg/kg	18.07.2017 08:12	TCM MEA_17
30790	17.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Nitrate	35.7	mg/kg	18.07.2017 08:13	TCM MEA_17
30790	17.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Nitrite	<10	mg/kg	18.07.2017 08:13	TCM MEA_17
30790	17.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Oxalic acid	65.9	mg/kg	18.07.2017 08:13	TCM MEA_17
30790	17.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	269691	mg/kg	17.07.2017 12:04	TCM MEA_17
30790	17.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	13800	mg/kg	18.07.2017 08:13	TCM MEA_17
30790	17.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	492	mg/kg	18.07.2017 08:14	TCM MEA_17
30790	17.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		17.07.2017 07:41	TCM MEA_17
30790	17.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Collect sample to Sintef	ok		17.07.2017 07:41	TCM MEA_17
30808	17.07.2017 11:39	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.977	mol/kg	17.07.2017 14:02	TCM MEA_17
30808	17.07.2017 11:39	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	274060	mg/kg	17.07.2017 14:09	TCM MEA_17
30812	17.07.2017 23:15	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	2.265	mol/kg	18.07.2017 15:11	TCM MEA_17
30812	17.07.2017 23:15	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	260358	mg/kg	18.07.2017 11:58	TCM MEA_17
30818	18.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.49	eq/kg	18.07.2017 08:01	TCM MEA_17
30818	18.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.047	mol/kg	18.07.2017 11:43	TCM MEA_17
30818	18.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1081.1	kg/m3	18.07.2017 09:07	TCM MEA_17
30818	18.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	2.534	mPa.s	18.07.2017 09:07	TCM MEA_17
30818	18.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	67.200	mN_m	18.07.2017 09:06	TCM MEA_17
30818	18.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	276146	mg/kg	18.07.2017 11:56	TCM MEA_17
30818	18.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	15000	mg/kg	18.07.2017 14:36	TCM MEA_17
30818	18.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	539	mg/kg	18.07.2017 14:37	TCM MEA_17
30818	18.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		18.07.2017 08:01	TCM MEA_17
30830	17.07.2017 17:20	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	277551	mg/kg	18.07.2017 11:57	TCM MEA_17
30830	17.07.2017 17:20	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.063	mol/kg	29.09.2017 14:19	TCM MEA_17
30831	17.07.2017 15:27	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	271821	mg/kg	18.07.2017 15:23	TCM MEA_17
30831	17.07.2017 15:27	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.923	mol/kg	18.07.2017 15:10	TCM MEA_17

		Sampled date	Sampling point	Description	Analysis	Component name	Result text	Units	Date result entered	Project id
	30833	18.07.2017 12:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.023	mol/kg	18.07.2017 15:08	TCM MEA_17
	30833	18.07.2017 12:00	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	270591	mg/kg	18.07.2017 15:22	TCM MEA_17
	30835	18.07.2017 09:30	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	273697	mg/kg	18.07.2017 15:22	TCM MEA_17
	30835	18.07.2017 09:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.029	mol/kg	18.07.2017 15:09	TCM MEA_17
	30837	19.07.2017 21:20	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.243	mol/kg	19.07.2017 11:20	TCM MEA_17
	30837	19.07.2017 21:20	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	269806	mg/kg	19.07.2017 11:28	TCM MEA_17
	30843	19.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.50	eq/kg	19.07.2017 07:57	TCM MEA_17
	30843	19.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.761	mol/kg	19.07.2017 11:19	TCM MEA_17
	30843	19.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1069.3	kg/m3	19.07.2017 09:12	TCM MEA_17
	30843	19.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	2.411	mPa.s	19.07.2017 09:12	TCM MEA_17
	30843	19.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	66.400	mN_m	19.07.2017 09:01	TCM MEA_17
	30843	19.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	275183	mg/kg	19.07.2017 11:28	TCM MEA_17
	30843	19.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	16200	mg/kg	19.07.2017 13:28	TCM MEA_17
	30843	19.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	506	mg/kg	19.07.2017 13:28	TCM MEA_17
	30843	19.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		19.07.2017 07:57	TCM MEA_17
	30843	19.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS_ION	0.362	eq/kg	19.07.2017 13:26	TCM MEA_17
	30857	19.07.2017 12:09	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	262443	mg/kg	19.07.2017 14:09	TCM MEA_17
	30857	19.07.2017 12:09	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.568	mol/kg	19.07.2017 14:12	TCM MEA_17
	30862	20.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.57	eq/kg	20.07.2017 08:13	TCM MEA_17
	30862	20.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.722	mol/kg	20.07.2017 10:19	TCM MEA_17
	30862	20.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1068.4	kg/m3	20.07.2017 10:21	TCM MEA_17
	30862	20.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	2.410	mPa.s	20.07.2017 10:21	TCM MEA_17
	30862	20.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	66.000	mN_m	20.07.2017 09:15	TCM MEA_17
	30862	20.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	276996	mg/kg	20.07.2017 10:27	TCM MEA_17
	30862	20.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	17300	mg/kg	21.07.2017 08:41	TCM MEA_17
	30862	20.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	462	mg/kg	21.07.2017 08:41	TCM MEA_17
	30862	20.07.2017 03:55	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		20.07.2017 08:13	TCM MEA_17
	30874	19.07.2017 14:30	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	258028	mg/kg	20.07.2017 11:26	TCM MEA_17
	30874	19.07.2017 14:30	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.848	mol/kg	20.07.2017 11:22	TCM MEA_17
	30874	19.07.2017 14:30	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		20.07.2017 09:55	TCM MEA_17
	30875	19.07.2017 23:15	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	275010	mg/kg	20.07.2017 11:38	TCM MEA_17
	30875	19.07.2017 23:15	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.098	mol/kg	20.07.2017 11:39	TCM MEA_17
	30875	19.07.2017 23:15	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		20.07.2017 08:14	TCM MEA_17
	30875	19.07.2017 23:15	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.47	eq/kg	20.07.2017 08:14	TCM MEA_17
	30876	20.07.2017 11:43	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	2.020	mol/kg	20.07.2017 12:57	TCM MEA_17
	30876	20.07.2017 11:43	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	255432	mg/kg	20.07.2017 12:54	TCM MEA_17
	30876	20.07.2017 11:43	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		20.07.2017 12:31	TCM MEA_17
	30878	20.07.2017 18:43	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.708	mol/kg	21.07.2017 12:03	TCM MEA_17
	30878	20.07.2017 18:43	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	277936	mg/kg	21.07.2017 12:13	TCM MEA_17
	30878	20.07.2017 18:43	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		21.07.2017 12:03	TCM MEA_17
	30885	21.07.2017 03:21	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.48	eq/kg	21.07.2017 09:17	TCM MEA_17
	30885	21.07.2017 03:21	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.678	mol/kg	21.07.2017 12:02	TCM MEA_17
	30885	21.07.2017 03:21	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1068.7	kg/m3	21.07.2017 09:17	TCM MEA_17
	30885	21.07.2017 03:21	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	2.418	mPa.s	21.07.2017 09:17	TCM MEA_17
	30885	21.07.2017 03:21	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	66.000	mN_m	21.07.2017 09:26	TCM MEA_17
	30885	21.07.2017 03:21	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	279505	mg/kg	21.07.2017 12:15	TCM MEA_17
	30885	21.07.2017 03:21	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	17900	mg/kg	24.07.2017 11:33	TCM MEA_17
	30885	21.07.2017 03:21	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	536	mg/kg	24.07.2017 11:33	TCM MEA_17
	30885	21.07.2017 03:21	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		21.07.2017 09:17	TCM MEA_17
	30897	21.07.2017 00:29	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	278468	mg/kg	21.07.2017 13:55	TCM MEA_17
	30897	21.07.2017 00:29	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.651	mol/kg	21.07.2017 12:05	TCM MEA_17
	30897	21.07.2017 00:29	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		21.07.2017 12:05	TCM MEA_17
	30899	21.07.2017 05:50	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	279815	mg/kg	21.07.2017 13:54	TCM MEA_17
	30899	21.07.2017 05:50	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.731	mol/kg	21.07.2017 13:45	TCM MEA_17
	30899	21.07.2017 05:50	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		21.07.2017 13:45	TCM MEA_17
	30902	21.07.2017 11:55	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.060	mol/kg	24.07.2017 07:29	TCM MEA_17
	30902	21.07.2017 11:55	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	262269	mg/kg	24.07.2017 07:48	TCM MEA_17
	30902	21.07.2017 11:55	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		21.07.2017 14:30	TCM MEA_17
	30904	21.07.2017 08:43	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	273386	mg/kg	21.07.2017 14:35	TCM MEA_17
	30904	21.07.2017 08:43	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.942	mol/kg	21.07.2017 14:29	TCM MEA_17
	30904	21.07.2017 08:43	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		21.07.2017 14:29	TCM MEA_17
	30907	21.07.2017 20:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.074	mol/kg	24.07.2017 14:39	TCM MEA_17
	30907	21.07.2017 20:00	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	272380	mg/kg	24.07.2017 13:52	TCM MEA_17

	Sampled date	Sampling point	Description	Analysis	Component name	Result text	Units	Date result entered	Project id
30907	21.07.2017 20:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		24.07.2017 12:34	TCM MEA_17
30911	22.07.2017 03:51	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	17700	mg/kg	25.07.2017 12:29	TCM MEA_17
30911	22.07.2017 03:51	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	532	mg/kg	25.07.2017 12:29	TCM MEA_17
30911	22.07.2017 03:51	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		24.07.2017 12:34	TCM MEA_17
30913	22.07.2017 12:42	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.030	mol/kg	25.07.2017 07:24	TCM MEA_17
30913	22.07.2017 12:42	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	272445	mg/kg	24.07.2017 13:53	TCM MEA_17
30913	22.07.2017 12:42	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		24.07.2017 12:34	TCM MEA_17
30915	22.07.2017 20:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.047	mol/kg	25.07.2017 07:25	TCM MEA_17
30915	22.07.2017 20:00	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	262617	mg/kg	24.07.2017 13:54	TCM MEA_17
30915	22.07.2017 20:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		24.07.2017 12:34	TCM MEA_17
30919	23.07.2017 04:06	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	18100	mg/kg	25.07.2017 12:26	TCM MEA_17
30919	23.07.2017 04:06	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	463	mg/kg	25.07.2017 12:29	TCM MEA_17
30919	23.07.2017 04:06	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		24.07.2017 12:35	TCM MEA_17
30921	23.07.2017 11:44	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.084	mol/kg	25.07.2017 07:26	TCM MEA_17
30921	23.07.2017 11:44	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	260978	mg/kg	25.07.2017 07:20	TCM MEA_17
30921	23.07.2017 11:44	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		24.07.2017 12:35	TCM MEA_17
30923	28.07.2017 07:10	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.82	eq/kg	28.07.2017 08:01	TCM MEA_17
30923	28.07.2017 07:10	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	20500	mg/kg	31.07.2017 13:21	TCM MEA_17
30923	28.07.2017 07:10	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	441	mg/kg	31.07.2017 13:22	TCM MEA_17
30930	24.07.2017 04:40	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.37	eq/kg	24.07.2017 08:27	TCM MEA_17
30930	24.07.2017 04:40	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.915	mol/kg	24.07.2017 13:28	TCM MEA_17
30930	24.07.2017 04:40	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1081.3	kg/m3	24.07.2017 09:17	TCM MEA_17
30930	24.07.2017 04:40	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS_ION	0.421	eq/kg	01.08.2017 13:56	TCM MEA_17
30930	24.07.2017 04:40	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.50		24.07.2017 09:00	TCM MEA_17
30930	24.07.2017 04:40	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	2.664	mPa.s	24.07.2017 09:17	TCM MEA_17
30930	24.07.2017 04:40	S-8611-2013	Lean amine - absorber inlet	COMMENT	Sample to CP-LAB	ok		24.07.2017 09:17	TCM MEA_17
30930	24.07.2017 04:40	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	67.000	mN_m	24.07.2017 10:09	TCM MEA_17
30930	24.07.2017 04:40	S-8611-2013	Lean amine - absorber inlet	IC	Acetic acid	25.1	mg/kg	25.07.2017 12:24	TCM MEA_17
30930	24.07.2017 04:40	S-8611-2013	Lean amine - absorber inlet	IC	Formic acid	654	mg/kg	25.07.2017 12:23	TCM MEA_17
30930	24.07.2017 04:40	S-8611-2013	Lean amine - absorber inlet	IC	Glycolic acid	91	mg/kg	25.07.2017 12:23	TCM MEA_17
30930	24.07.2017 04:40	S-8611-2013	Lean amine - absorber inlet	IC	Nitrate	165	mg/kg	25.07.2017 12:24	TCM MEA_17
30930	24.07.2017 04:40	S-8611-2013	Lean amine - absorber inlet	IC	Nitrite	<12	mg/kg	25.07.2017 12:25	TCM MEA_17
30930	24.07.2017 04:40	S-8611-2013	Lean amine - absorber inlet	IC	Oxalic acid	143	mg/kg	25.07.2017 12:24	TCM MEA_17
30930	24.07.2017 04:40	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	270541	mg/kg	24.07.2017 10:21	TCM MEA_17
30930	24.07.2017 04:40	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	19700	mg/kg	25.07.2017 12:22	TCM MEA_17
30930	24.07.2017 04:40	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	475	mg/kg	25.07.2017 12:23	TCM MEA_17
30930	24.07.2017 04:40	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		24.07.2017 08:22	TCM MEA_17
30930	24.07.2017 04:40	S-8611-2013	Lean amine - absorber inlet	COMMENT	Collect sample to Sintef	ok		24.07.2017 09:17	TCM MEA_17
30949	25.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.24	eq/kg	25.07.2017 08:07	TCM MEA_17
30949	25.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.979	mol/kg	25.07.2017 09:14	TCM MEA_17
30949	25.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1086.2	kg/m3	25.07.2017 08:56	TCM MEA_17
30949	25.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	2.707	mPa.s	25.07.2017 09:10	TCM MEA_17
30949	25.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	67.400	mN_m	25.07.2017 09:47	TCM MEA_17
30949	25.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	268119	mg/kg	25.07.2017 10:10	TCM MEA_17
30949	25.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	21500	mg/kg	25.07.2017 12:19	TCM MEA_17
30949	25.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	351	mg/kg	25.07.2017 12:19	TCM MEA_17
30949	25.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		25.07.2017 08:07	TCM MEA_17
30979	26.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.15	eq/kg	26.07.2017 07:44	TCM MEA_17
30979	26.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.839	mol/kg	26.07.2017 09:36	TCM MEA_17
30979	26.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1080.6	kg/m3	26.07.2017 08:00	TCM MEA_17
30979	26.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	2.577	mPa.s	26.07.2017 08:00	TCM MEA_17
30979	26.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	67.000	mN_m	26.07.2017 08:49	TCM MEA_17
30979	26.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	263055	mg/kg	26.07.2017 09:43	TCM MEA_17
30979	26.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	22000	mg/kg	31.07.2017 13:20	TCM MEA_17
30979	26.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	540	mg/kg	31.07.2017 13:21	TCM MEA_17
30979	26.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		26.07.2017 07:44	TCM MEA_17
30992	26.07.2017 08:30	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.14	eq/kg	26.07.2017 09:03	TCM MEA_17
31022	28.07.2017 12:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.93	eq/kg	28.07.2017 12:20	TCM MEA_17
31022	28.07.2017 12:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	19800	mg/kg	31.07.2017 13:21	TCM MEA_17
31022	28.07.2017 12:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	410	mg/kg	31.07.2017 13:21	TCM MEA_17
31032	31.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.94	eq/kg	31.07.2017 08:54	TCM MEA_17
31032	31.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.565	mol/kg	01.08.2017 13:03	TCM MEA_17
31032	31.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1115.7	kg/m3	31.07.2017 09:48	TCM MEA_17

	Sampled date	Sampling point	Description	Analysis	Component name	Result text	Units	Date result entered	Project id
31032	31.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS_ION	0.476	eq/kg	01.08.2017 13:57	TCM MEA_17
31032	31.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.30		31.07.2017 08:54	TCM MEA_17
31032	31.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	3.900	mPa.s	31.07.2017 09:48	TCM MEA_17
31032	31.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Sample to CP-LAB	ok		31.07.2017 09:38	TCM MEA_17
31032	31.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	65.000	mN_m	31.07.2017 10:03	TCM MEA_17
31032	31.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Acetic acid	23.2	mg/kg	01.08.2017 12:04	TCM MEA_17
31032	31.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Formic acid	607	mg/kg	01.08.2017 12:03	TCM MEA_17
31032	31.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Glycolic acid	90.1	mg/kg	01.08.2017 12:03	TCM MEA_17
31032	31.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Nitrate	196	mg/kg	01.08.2017 12:04	TCM MEA_17
31032	31.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Nitrite	<8	mg/kg	01.08.2017 12:06	TCM MEA_17
31032	31.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Oxalic acid	139	mg/kg	01.08.2017 12:03	TCM MEA_17
31032	31.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	309766	mg/kg	31.07.2017 11:44	TCM MEA_17
31032	31.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	23300	mg/kg	01.08.2017 11:58	TCM MEA_17
31032	31.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	443	mg/kg	01.08.2017 11:58	TCM MEA_17
31032	31.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		31.07.2017 08:48	TCM MEA_17
31032	31.07.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Collect sample to Sintef	ok		31.07.2017 08:48	TCM MEA_17
31055	01.08.2017 04:10	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.29	eq/kg	01.08.2017 08:31	TCM MEA_17
31055	01.08.2017 04:10	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.343	mol/kg	01.08.2017 13:03	TCM MEA_17
31055	01.08.2017 04:10	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1109.9	kg/m3	01.08.2017 08:59	TCM MEA_17
31055	01.08.2017 04:10	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	4.199	mPa.s	01.08.2017 08:59	TCM MEA_17
31055	01.08.2017 04:10	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	62.200	mN_m	01.08.2017 10:02	TCM MEA_17
31055	01.08.2017 04:10	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	331084	mg/kg	01.08.2017 10:10	TCM MEA_17
31055	01.08.2017 04:10	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	23900	mg/kg	01.08.2017 11:57	TCM MEA_17
31055	01.08.2017 04:10	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	449	mg/kg	01.08.2017 11:57	TCM MEA_17
31055	01.08.2017 04:10	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		01.08.2017 08:31	TCM MEA_17
31088	02.08.2017 03:50	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.21	eq/kg	02.08.2017 09:01	TCM MEA_17
31088	02.08.2017 03:50	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.038	mol/kg	02.08.2017 12:10	TCM MEA_17
31088	02.08.2017 03:50	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1096.9	kg/m3	02.08.2017 12:12	TCM MEA_17
31088	02.08.2017 03:50	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	3.917	mPa.s	02.08.2017 12:11	TCM MEA_17
31088	02.08.2017 03:50	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	60.600	mN_m	02.08.2017 13:51	TCM MEA_17
31088	02.08.2017 03:50	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	351264	mg/kg	02.08.2017 12:17	TCM MEA_17
31088	02.08.2017 03:50	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	25300	mg/kg	02.08.2017 13:00	TCM MEA_17
31088	02.08.2017 03:50	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	611	mg/kg	02.08.2017 13:01	TCM MEA_17
31088	02.08.2017 03:50	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		02.08.2017 08:54	TCM MEA_17
31088	02.08.2017 03:50	S-8611-2013	Lean amine - absorber inlet	COMMENT	Comment	bunnfall		02.08.2017 10:16	TCM MEA_17
31105	02.08.2017 13:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	25400	mg/kg	03.08.2017 08:51	TCM MEA_17
31105	02.08.2017 13:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	665	mg/kg	03.08.2017 08:52	TCM MEA_17
31110	03.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.13	eq/kg	03.08.2017 08:36	TCM MEA_17
31110	03.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.989	mol/kg	03.08.2017 10:03	TCM MEA_17
31110	03.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1096.3	kg/m3	03.08.2017 10:00	TCM MEA_17
31110	03.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	3.823	mPa.s	03.08.2017 10:00	TCM MEA_17
31110	03.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	60.300	mN_m	03.08.2017 11:21	TCM MEA_17
31110	03.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	335467	mg/kg	03.08.2017 10:11	TCM MEA_17
31110	03.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	24900	mg/kg	04.08.2017 07:13	TCM MEA_17
31110	03.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	714	mg/kg	04.08.2017 07:13	TCM MEA_17
31110	03.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		03.08.2017 09:00	TCM MEA_17
31142	04.08.2017 04:08	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	5.03	eq/kg	04.08.2017 07:52	TCM MEA_17
31142	04.08.2017 04:08	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.953	mol/kg	04.08.2017 08:52	TCM MEA_17
31142	04.08.2017 04:08	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1095.4	kg/m3	04.08.2017 08:31	TCM MEA_17
31142	04.08.2017 04:08	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	3.742	mPa.s	04.08.2017 08:32	TCM MEA_17
31142	04.08.2017 04:08	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	62.400	mN_m	04.08.2017 08:30	TCM MEA_17
31142	04.08.2017 04:08	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	318351	mg/kg	04.08.2017 08:57	TCM MEA_17
31142	04.08.2017 04:08	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	25100	mg/kg	07.08.2017 12:55	TCM MEA_17
31142	04.08.2017 04:08	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	763	mg/kg	07.08.2017 12:55	TCM MEA_17
31142	04.08.2017 04:08	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		04.08.2017 07:46	TCM MEA_17
31535	28.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.85	eq/kg	28.08.2017 08:29	TCM MEA_17
31535	28.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.009	mol/kg	06.09.2017 08:21	TCM MEA_17
31535	28.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1055.8	kg/m3	28.08.2017 10:26	TCM MEA_17
31535	28.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	HSS_ION	HSS_ION	0.032	eq/kg	13.09.2017 12:09	TCM MEA_17
31535	28.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	PH	pH	10.60		28.08.2017 09:46	TCM MEA_17
31535	28.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	2.527	mPa.s	28.08.2017 10:27	TCM MEA_17
31535	28.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	66.200	mN_m	28.08.2017 11:31	TCM MEA_17
31535	28.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Acetic acid	<15	mg/kg	30.08.2017 11:44	TCM MEA_17

	Sampled date	Sampling point	Description	Analysis	Component name	Result text	Units	Date result entered	Project id
31535	28.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Formic acid	32.8	mg/kg	30.08.2017 11:43	TCM MEA_17
31535	28.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Glycolic acid	<10	mg/kg	30.08.2017 11:43	TCM MEA_17
31535	28.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Nitrate	31.9	mg/kg	30.08.2017 11:44	TCM MEA_17
31535	28.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Nitrite	16.6	mg/kg	30.08.2017 11:44	TCM MEA_17
31535	28.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Oxalic acid	<10	mg/kg	30.08.2017 11:44	TCM MEA_17
31535	28.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	282725	mg/kg	06.09.2017 09:13	TCM MEA_17
31535	28.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	1710	mg/kg	30.08.2017 11:44	TCM MEA_17
31535	28.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	31.3	mg/kg	30.08.2017 11:44	TCM MEA_17
31535	28.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		28.08.2017 09:15	TCM MEA_17
31535	28.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Collect sample to Sintef	ok		28.08.2017 09:16	TCM MEA_17
31557	29.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.86	eq/kg	29.08.2017 09:31	TCM MEA_17
31557	29.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	0.984	mol/kg	06.09.2017 08:22	TCM MEA_17
31557	29.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1055.9	kg/m3	29.08.2017 09:31	TCM MEA_17
31557	29.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	2.570	mPa.s	29.08.2017 09:32	TCM MEA_17
31557	29.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Sample to CP-LAB	ok		29.08.2017 09:13	TCM MEA_17
31557	29.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	63.070	mN_m	31.08.2017 09:07	TCM MEA_17
31557	29.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	294607	mg/kg	01.09.2017 14:19	TCM MEA_17
31557	29.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		29.08.2017 09:13	TCM MEA_17
31588	30.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.77	eq/kg	30.08.2017 08:52	TCM MEA_17
31588	30.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.091	mol/kg	06.09.2017 08:23	TCM MEA_17
31588	30.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1062.3	kg/m3	30.08.2017 09:19	TCM MEA_17
31588	30.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	2.636	mPa.s	30.08.2017 09:19	TCM MEA_17
31588	30.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Sample to CP-LAB	ok		30.08.2017 12:32	TCM MEA_17
31588	30.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	58.020	mN_m	31.08.2017 08:45	TCM MEA_17
31588	30.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	289937	mg/kg	04.09.2017 09:37	TCM MEA_17
31588	30.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		30.08.2017 09:19	TCM MEA_17
31606	31.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TOT_ALK	Tot Alk	4.66	eq/kg	31.08.2017 08:24	TCM MEA_17
31606	31.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	TIC	TIC	1.197	mol/kg	05.09.2017 14:05	TCM MEA_17
31606	31.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	DENSITY	DEN20	1067.2	kg/m3	31.08.2017 09:16	TCM MEA_17
31606	31.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	VISCOSITY	ViscT1	2.642	mPa.s	31.08.2017 09:15	TCM MEA_17
31606	31.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	SURF_TENS	SURF_TENS_25	57.960	mN_m	31.08.2017 08:57	TCM MEA_17
31606	31.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	AMINE_GC	Am1_mg/kg	285092	mg/kg	01.09.2017 14:20	TCM MEA_17
31606	31.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfate	3410	mg/kg	05.09.2017 11:44	TCM MEA_17
31606	31.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	IC	Sulfite	52.4	mg/kg	05.09.2017 11:44	TCM MEA_17
31606	31.08.2017 04:00	S-8611-2013	Lean amine - absorber inlet	COMMENT	Ta ut prøve til FTIR spekter	ok		31.08.2017 09:16	TCM MEA_17