Westlake US 2 Received 10/27/2023

#### TSX/PAZ Satellite Update InSAR Subsidence October 15 & 19, 2023

#### Longuist comment:

I am attaching the reports that were planned to be presented in a call earlier this week that had to be postponed to next Tuesday. As mentioned, we believe LDNR's review of the new data will benefit from a discussion that includes some TREA technical staff. I have attached for reference a memo from TREA on the purpose and method of the data reprocessing.

As mentioned in the prior update email, the TSX satellite passed by Sulphur on Sunday October 15 and that data was generated using the new baseline that TREA has developed. The point locations and counts have changed as well as the calculated trends for the AOIs. Overall, the off-trend behavior appears to have diminished in the new interpretation. The report format for this 10/15/2023 update has been kept the same as the prior TSX/PAZ updates for comparison, but there does not appear to be justification for continuing to separate the pre- and post-August trends in our evaluation/reports. The Additional AOI charts for the distant areas have also been kept for the time being for comparison.

The PAZ satellite from the TSX/PAZ constellation passed by Sulphur on Thursday October 19. We received the dataset on Saturday and noted that a below-trend point had been recorded in AOIs 1 and 2 of roughly -0.2 inches. This below trend value happens to be present in a few of the Additional AOIs as well, to the northeast. The next dataset will be received tomorrow (Saturday) and will be reviewed. The report format for the 10/19/2023 update has been changed to consider only one trend for the full dataset due to the absence of a shift in August.

In response to item 3(c) of the 3rd Supplement to Order 2022-027, a new report format will be developed in the coming weeks that incorporates additional AOI regions around all Westlake caverns, and includes contours maps of velocity and acceleration across the dome.

We have also requested that TREA begin to provide 2D data interpretations every 15 days that will calculate vertical and horizontal (east-west) displacement from triangulation of the SNT and TSX/PAZ datasets. Our first 2D dataset was received October 18 and some contour mapping from this data is also planned to be presented on our call this coming Tuesday.





To: Lonquist & Co. LLC From: TRE Altamira Inc. Date: 20 October 2023 Subject: TREA Response Regarding Reprocessed Data (New Baseline)

When setting up an InSAR monitoring service, an initial grid of InSAR measurement points is defined with a baseline analysis that uses the images available at that time. The definition of the grid of points is based on the quality of the signal backscattered from the natural radar targets (i.e. coherence of the signal and stability of their reflectivity) on the ground. Over time, some of the initially identified points may decrease in quality due to various factors (e.g. surface changes, vegetation growth). It is therefore recommended to regularly reset the baseline to maximize the quality of the measurement point grid, by leveraging the increased robustness of the statistics deriving from the larger number of images available. This procedure should be performed periodically (e.g. every 6, 12 or 24 months, depending on local conditions).

For the current monitoring program, the first baseline for the descending TSX/PAZ orbit was delivered on 2023-04-24, using the images available at that time (16 images covering the period 2023-01-24 to 2023-04-22 – this is very close to the minimum number of images required for defining an initial grid of points). To increase the quality of the results, TREA recommended to perform a baseline reset in September 2023 by reprocessing the full image stack (2023-01-24 to 2023-09-05) to define a new grid of measurement points (delivered on 2023-10-07) which will form the basis for the ongoing monitoring. The data coverage has remained consistent over the main areas of interest and decreased over areas subjected to a drop of coherence of the signal, most likely related to vegetation growth, soil moisture variations or other sources of decorrelation. The baseline reset has led to an increase in quality of the measurement points, captured by the increase in coherence (a data quality parameter) from 0.77 previously to the current value of 0.84.

# **TSX/PAZ** Satellite Update

Continuous InSAR Monitoring of Ground Displacement Near Western Caverns and Dome Flank

# **Sulphur Mines Salt Dome**

Prepared for: Westlake Chemical

Prepared by: Lonquist & Co., LLC 8591 United Plaza Blvd. Suite 280 Baton Rouge, LA 70809



Nathaniel L. Byars, P.E. Principal Engineer Louisiana License No. 40697

## Dataset

### Satellite Source

## **TerraSAR-X - PAZ Constellation**

Most Recent Image Date

## Sunday, October 15, 2023

Analysis Report Date:

## October 27, 2023

#### LONQUIST & CO. LLC





Dataset: TSXPAZ (10-15-2023).xlsx













#### LONQUIST & CO. LLC













#### LONQUIST & CO. LLC





Dataset: TSXPAZ (10-15-2023).xlsx

#### LONQUIST & CO. LLC





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Nathaniel L. Byars, P.E. Principal Engineer Louisiana License No. 40697

## Dataset

Satellite Source

## **TerraSAR-X - PAZ Constellation**

Most Recent Image Date

Thursday, October 19, 2023

Analysis Report Date:

## October 27, 2023

















#### LONQUIST & CO. LLC













#### LONQUIST & CO. LLC





#### LONQUIST & CO. LLC





Dataset: TSXPAZ (10-19-2023).xlsx



































