

## Vehicle Idling Emissions Study at Calexico Ports of Entry: Spring 2014 Data Collection Plan

This project will be undertaking four separate (but related) data collection activities for both Passenger Occupied Vehicles (POVs) and Cargo Vehicles (Trucks) crossing northbound at the Calexico West and Calexico East Ports of Entry (POEs). Data collected under this effort will provide the basis for detailed vehicle air emission modeling related to local border delays between Mexicali, Baja California, and Calexico, California.

A description of each of the four data collection methods and the overall plan are below.

### Data Collection Activities & Formats

Understanding how current border delays may contribute to local air emissions requires the collection of field data on these specific factors:

- First, real-world data on the **characteristics of actual motor vehicles** that are crossing the Calexico-Mexicali POEs, as well as what fuel is being used by those vehicles;
- Second, **estimates of the actual delays** that those POVs and Trucks may be experiencing while idling at the POEs; and
- Third, the **approximate daily volumes** of those vehicles.

In order to best measure the above, our Team will be using the following types of data collection instruments - each with some customization for the general vehicle category (i.e.: POVs or Trucks):

1. **At-Border Vehicle Motor & Fuel Survey:** a short, 4-6 element questionnaire that will collect information on vehicle/motor model year and fuel source (US versus Mexico), as well as typical border crossing frequencies of that driver, and typical delays experienced. At-border survey applied in the field by trained, bilingual survey crews during daylight hours.



2. **License Plate “Time Stamp” Form (to measure border delays):** a simple form that allows two field crew - one at the “beginning of the queue” (where border delays begin - the “Line”), and one after the final inspection point (the end of the border delay - the “Exit”) - to each record the last 5-digits of a vehicle license plate. Data is later captured and license plate data is “matched” to calculate the vehicle’s total border crossing time.



Form: North Bound Trucks Border Delay - License Plate Sampling Sheet  
 Calexico East POE (May 2014) Date: May \_\_, 2014 Name: \_\_\_\_\_

Purpose: to sample and match license plates of northbound trucks to estimate border crossing times.  
 Instruction: Mark your location either at the end of the line ("Line") or at the point a northbound truck ends its CHP inspection ("Exit"). Approximately every 10 minutes, wait for the next two consecutive trucks with International combinations (see example above), and write down the last five digits of their BACK license plate, noting the hour, minute, time (on 12 or 24 hrs. for AM, etc.), the minute (01, 07, etc); the last (Regular/Fuel); and additional notes that may be useful for later analysis (carrier name, empty/full, etc.)

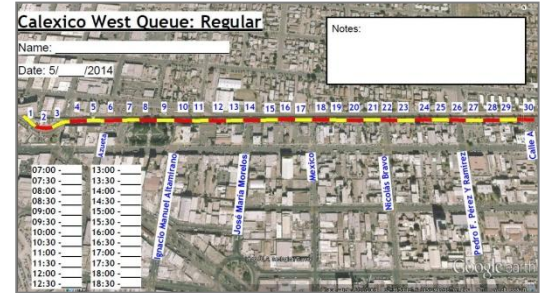
Data Collection Location (mark):  Line (start of queue) |  Exit-CHP (end of delay; end of CHP inspection)

| License# / #Place<br>(last 5-digits) without alpha; CA: K9963, CH428) | Hour/Minute<br>01: 06, 11, 16, etc) | Minute<br>(01, 06, 09, 17, 45, 58) | Type of Lane   | Notes (other field issues, etc.) |
|---|-------------------------------------|------------------------------------|----------------|----------------------------------|
|   |                                     |                                    | Regular / FUEL |                                  |
|   |                                     |                                    | Regular / FUEL |                                  |
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|   |                                     |                                    | Regular / FUEL |                                  |
|   |                                     |                                    | Regular / FUEL |                                  |

Field at Calexico Ports of Entry - Imperial County Air Pollution Control District - CH2EP - Comisión de Cooperación Ecológica Fronteriza  
 Imp. Inc. - office at 419-710-8120 - emergency call at 419-456-4437 - 3600 Airway Road, Suite B, San Diego, California 92116 USA

3. **POV and Truck Tally Sheets (to estimate border crossing volumes):** In lieu of more accurate loop count or CBP hourly vehicle crossing data, Tally Sheets (broken into 15-minute increments) will be used to estimate the total volume and general vehicle categories that crossed northbound at Calexico West (POVs) and Calexico East (Trucks) throughout the course of the project’s daylight data collection efforts; and

4. **Queue Maps (to also estimate border crossing volumes):** Field crews will also note the approximate “length of the border queue” for POVs and Trucks in half-hour increments, utilizing aerial maps of each POE - with pre-measured markers indicated on each map (in 50m increments for POVs, and 100m increments for Trucks) - as seen in the example at right.



### Field Data Collection Plan - Trucks at Calexico East POE

Similar to past cargo vehicle border wait time studies and origination/destination surveys Crossborder has conducted at Calexico East POE, our field crew will primarily work in two locations:

- In Mexicali, field crews will be stationed in various locations along the Northbound Line (“NB Line” on map at right), depending on where the beginning of delays (i.e.: queues) occur. In all cases, our team will operate in safe areas in City of Mexicali jurisdiction, on the northbound truck route of Calzada Abelardo Rodriguez.

At the beginning of the queue (i.e.: end of the line), field crews will perform three data collection efforts: first, every 30 minutes, they will notate the approximate location of the end of the line on the standardized Truck Queue Map; second, they will continuously use the Truck Tally Sheet to count the number of various truck types that are approaching the northbound POE (and, in most cases, queuing up outside of Aduanas’ facility); third, every 10 minutes, field crew will randomly select the two most recently-arrived trucks with Intermodal Containers and sample the last five-digits of their license plates for our License Plate Time Stamp (approximately 25% of trucks crossing at Calexico East POE have intermodal containers, so this subset of vehicles will be used as a



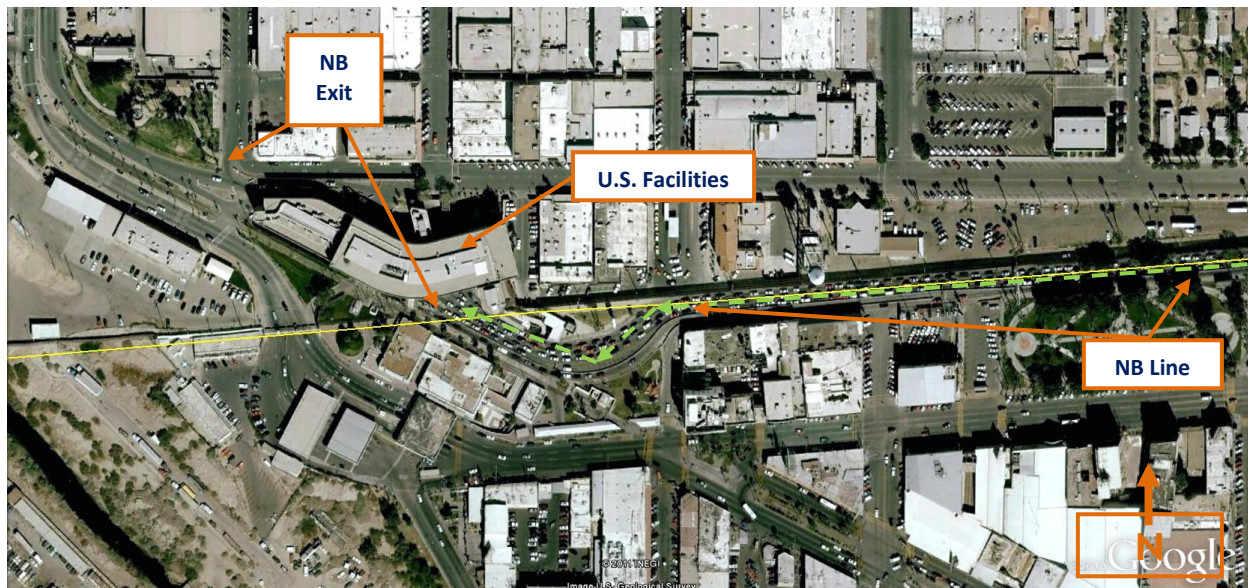
“proxy” for border crossing times of all trucks that cross throughout the day - while also allowing us to have higher “match rates” since staff on both sides of the border will only be sampling from this easy-to-identify, and randomly distributed, group).

- In Calexico, field crews will be stationed at the “last inspection point” along a commercial vehicles route: the State CHP facility (“NB Exit” on the previous map, just north of US Customs and Border Protection). From safe locations identified in coordination with CHP staff, staff will undertake two data collection activities: first, from a position close to the weigh scales, one surveyor will sample and record every 10 minutes the last five-digits of the four most-recently arriving trucks with intermodal containers (to ensure a higher probability of matching the data collected in Mexicali); second, two surveyors will randomly select every 3<sup>rd</sup> or 5<sup>th</sup> vehicle (depending on lower- or higher hourly vehicle volumes) and - using flags and signage - invite the truck driver to participate in the At-Border Vehicle Motor & Fuel Survey.

In the event that truck drivers are not familiar with the model year of their motor (or its country of manufacture), staff will request business contacts of the truck owner to verify such information at a later time via phone.



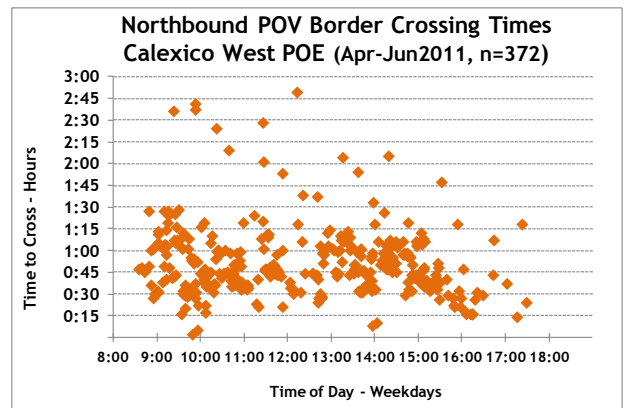
### Field Data Collection Plan - POVs at Calexico West POE



Similar to past POV border wait time studies and at-border surveys Crossborder has conducted at Calexico West POE, our field crew will primarily work in two general locations in Mexicali - with a “backup” location in Calexico (should we be unable to secure Federal permissions in Mexico for the data collection point adjacent to the SENTRI lane immediately south of the US-Mexico border and the US Facility noted in the map above):

- In Mexicali, field crews will be stationed in varying locations along the Northbound Line (“NB Line” on map above, proceeding page), depending on where the beginning of delays (i.e.: queues) occur (queues have been reported as short as dozens of cars long during rare low points, and as long as 1.5 miles from the Port of Entry during extreme peaks). At-border survey workers are generally located in the middle of queues, while those collecting data for Tally Sheets, Queue Maps and License Plates are located where vehicles lines are forming.

At the beginning of the queue (i.e.: end of the “NB Line”), field crews will perform three data collection efforts: first, every 30 minutes, they will notate the approximate location of the end of the line on the standardized POV Queue Map; second, they will continuously use the POV Tally Sheet to count the number of various car types that are approaching the northbound POE (vehicle types to be finalized in consultation with the TAC); third, every 5 minutes, field crew will randomly select and record the last five digits of the license plates on the License Plate “Time Stamp” Form from White Cars Only (a selection procedure we have used in previous border wait times studies - see sample of 2011 data from Calexico West POE at right. Similar to our approach with trucks, White Cars are used as a “proxy” for border crossing times of all vehicles crossing at that time - while allowing us to increase “match rates” from staff collecting data at the end of the inspection process).



In the middle of the queue, two bilingual survey workers will apply the POV At-Border Vehicle Motor & Fuel Survey, ideally using hand-held tablets (with paper formats as an optional backup). The methodology used for at-border field surveys is similar to that of an exit poll: oncoming survey targets are randomly selected using each 3<sup>rd</sup> potential sample unit (i.e.: an initial vehicle is identified, and then the third target following that vehicle becomes the “randomly selected” survey target - to reduce bias). When survey targets are non-responsive, survey workers target each successive vehicle until participation occurs. It should be noted that for safety purposes, Crossborder staff is only able to survey vehicles crossing during daylight hours; staff breaks away from vehicles are required every 15-20 minutes (due to carbon monoxide levels); and additional safety protocols are taken (particularly during high-heat environments like Mexicali/Calexico).



- In one of two locations - either just south of the “US Facilities” noted on the map (previous page), or just north of those facilities - additional staff will use the License Plate “Time Stamp” Form to collect data approximating when the “end of the inspection” process takes place near the “NB Exit”. Staff at this position will also apply the POV At-Border Vehicle Motor & Fuel Survey to SENTRI vehicles (as these queues occur only infrequently, and only in close proximity to the Calexico West POE).

## Field Data Collection Timing - Spring 2014

Crossborder expects that data collection may be completed in approximately seven days - not including one partial training day (Saturday, May 24), and one potential backup day (Saturday, May 31 - if needed). Staff is typically working during one of two 6-hour shifts, split between approximately 7:00am and 7:00pm. While data collection often starts 10-15 minutes after the start of a shift (to allow for quick briefings and safety reminders), the planned flow of data collection for Spring 2014 is as follows:

|  | Saturday, May 24, 2014 | Sunday, May 25, 2014 | Monday, May 26, 2014 | Tuesday, May 27, 2014 | Wednesday, May 28, 2014 | Thursday, May 29, 2014 | Friday, May 30, 2014 | Saturday, May 31, 2014 |
|--|------------------------|----------------------|----------------------|-----------------------|-------------------------|------------------------|----------------------|------------------------|
| <b>Calexico West - POV Data Collection</b>   |                        |                      |                      |                       |                         |                        |                      |                        |
| <i>Morning Shift (7:00am-13:00pm)</i>        |                        |                      |                      |                       |                         |                        |                      |                        |
| <i>Afternoon Shift (13:00pm-19:00pm)</i>     |                        |                      |                      |                       |                         |                        |                      |                        |
| <b>Calexico East - Truck Data Collection</b> |                        |                      |                      |                       |                         |                        |                      |                        |
| <i>Morning Shift (7:00am-13:00pm)</i>        |                        |                      |                      |                       |                         |                        |                      |                        |
| <i>Afternoon Shift (13:00pm-19:00pm)</i>     |                        |                      |                      |                       |                         |                        |                      |                        |

**Legend:**

- field training
- POV data collection
- Truck data collection

## Data Processing and Validation

While in the field, survey supervisors monitor survey staff to ensure proper application of surveys, and proper recording of other data (as well as enforce a zero-tolerance policy if false data is collected [a rare occurrence, but such data is always discarded and reported]). Following each shift, paper forms are collected and reviewed for possible errors, with immediate feedback provided. Electronic data is also collected at the end of each shift, with a nightly review by Crossborder's research staff to assess quality and production. Data collected via paper formats will be entered during the week following the field work, with sample checks done during the process to ensure accuracy.



## Data Delivery

Usually within 2-3 days following field work, initial estimates are provided of the approximate number of samples that have been collected in a project. Following subsequent data entry, cleansing, and matching, final formatted data sets are delivered in Excel and SPSS formats for subsequent analysis - typically within 2-4 weeks, depending on the quantity of data entry needed for a project.

***Drafts of the Sample Questionnaires and Data Collection Formats are provided in the following pages. Please note that these formats are considered a work in progress, with input requested from the Imperial County APCD and the Technical Advisory Committee.***