

Report on EPA Border 2012
Ambos Nogales Biodiesel Capacity Building Project

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On July 8, Hans Huth and Jose Rodriguez (OBEP) attended the latest quarterly meeting for the EPA Border 2012 Biodiesel Capacity Building Project. A report from the Principal Investigator (Mike Foster - Rio Rico Fire District) indicated that the US biodiesel-rendering facilities are now 90% complete. 50 gallons of waste vegetable oil had been secured for biodiesel rendering by RRFD. Mexican representatives for the biodiesel rendering facility scheduled for Nogales, Sonora (Bomberos de Nogales) were not present at the meeting. Gilberto Romero (Rio Rico Rentals) was also absent.

El Instituto Tecnológico de Nogales (ITN) confirmed its survey of maquiladora oil and grease sources in Nogales, Sonora had been completed. Respective statistics were compiled by Ms. Irma Veronica Gil (ITN). The statistics were communicated to OBEP on July 10th and are summarized below:

74 maquiladoras were surveyed by ITN. (There are approximately 95 maquiladoras currently operating in Nogales, Sonora). These 74 maquiladoras produce an average 1,510 liters (400 gallons) of waste grease per week.

82% of the maquiladoras employ a commercial outfit to collect their used waste vegetable oil. 9% dispose of it directly in a landfill, and another 9% have it stored on site. 73% of the maquiladoras use the oil for no more than three days before disposing, and 99% are willing to donate this oil to ITN for biodiesel rendering. 30% of the maquilas surveyed are willing to deliver it directly to the community college. The 30% represents a volume of 238 liters (63 gallons) of feedstock available for biodiesel rendering per week with no effort invested in collection by ITN. These statistics suggest there is sufficient volume of a very high quality feedstock to support the long term sustainability of the biodiesel project.

86% of the surveyed maquilas confirmed they had grease traps present and serviced by commercial outfits. No maquiladoras have grease collection bins outside of their facilities as is common practice in the US. Instead, maquilas store their grease in 5 gallon containers for collection by commercial outfits. These collection companies subsequently dispose of the material in the municipal landfill "as is".

One maquiladora in particular considers grease traps to be an acceptable collection mechanism for raw grease dumped down the drain. Grease traps are designed only to capture grease from washed dishes rather than waste bulk grease. Residues collected from grease traps are also disposed of in the municipal landfill.

In the U.S., grease trap residue as well as used vegetable oil is refined and marketed as a commodity.

Additional statistics collected by ITN are available, but not reflected in this report.

Although not in its scope of work for the 2012 project, ITN noted that it had waste oil on hand and was willing to render a large quantity of biodiesel provided oversight could be provided by OBEP. Since rendering was not included in ITN's scope of work, equipment to pursue this activity was originally obtained through a generous monetary donation provided by the Friends of the Santa Cruz River.

On July 9, Hans Huth and Jose Rodriguez assisted ITN in processor calibration, and then walked investigators through processing their first batch of 25 gallons of waste vegetable oil. During a follow-up meeting on July 10, OBEP returned and demonstrated procedures for draining glycerin from the biodiesel processors, and washing biodiesel of residual soap byproducts. Shade tree tests for biodiesel quality ASTM compliance have been documented for ITN by OBEP, and will be executed by ITN on the finished biodiesel next week.

Hans Huth has volunteered his own diesel vehicle to be tested with the fuel rendered by ITN. Sonora media coverage is expected. This is an opportunity to highlight the leveraging being provided by EPA Border 2012, Friends of the Santa Cruz River, and ADEQ with respect to multimedia environmental projects with binational implications.

ITN is scheduled to receive an additional 50K from EPA to develop an industrial scale biodiesel rendering facility on its campus. ITN has already prepared a 1000 square foot area for this purpose. The additional EPA funding is expected to be released by the BECC in September, 2008. On average, the Sonoran feedstock characterized to date (400 gallons per week) suggests project stakeholders in Sonora can generate at least 1300 gallons of finished biodiesel a month for use in municipal diesel vehicles and industrial diesel equipment.

Assuming one gallon of petroleum diesel generates 22.26 lbs of CO₂ emissions, ITN could potentially offset 175 tons of CO₂ emissions through the production and use of biodiesel rendered from the feedstock characterized to date. This figure does not reflect additional feedstock sources available from commercial and residential units, modest energy inputs for the rendering of biodiesel, or increased efficiencies from pursuing a two stage acid-esterification method. It also does not take into account other potential environmental benefits (i.e. decreased sanitary sewer overflows, proper disposal of a waste product, decreases in sulfur emissions from petroleum diesel, etc).

The project may be sustained through the marketing and sale of products rendered from the residual glycerin generated by the process. A photo log of the ITN visit (July 9, 10) is attached.



Hans Huth and Jose Rodriguez demonstrating the filtration of waste vegetable oil through a 200-micron barrel filter. ITN stakeholders also participated in the filtration.



Hans Huth demonstrating preparation of sodium methoxide solution. 6 gallons of solution were prepared for processing 25 gallons of oil.



Jose Rodriguez adding filtered waste vegetable oil into a processor donated by Friends of the Santa Cruz River. ITN stakeholders also participated in processor loading.



Jose Rodriguez adding sodium methoxide to the processor. Perfecto Barragán (ITN project stakeholder) is shown in the background.



ITN stakeholder draining glycerin from the processor.



Total glycerin drained from biodiesel processor is shown in 1 gallon containers (about 6 gallons total once separation of biodiesel is finalized). This was produced from a 25 gallon batch of oil.



Biodiesel pumped from processor to wash tank. The initial yield is approximately 21 gallons of biodiesel from 25 gallons of medium-quality feedstock (85% yield).



Unwashed biodiesel in washtank.



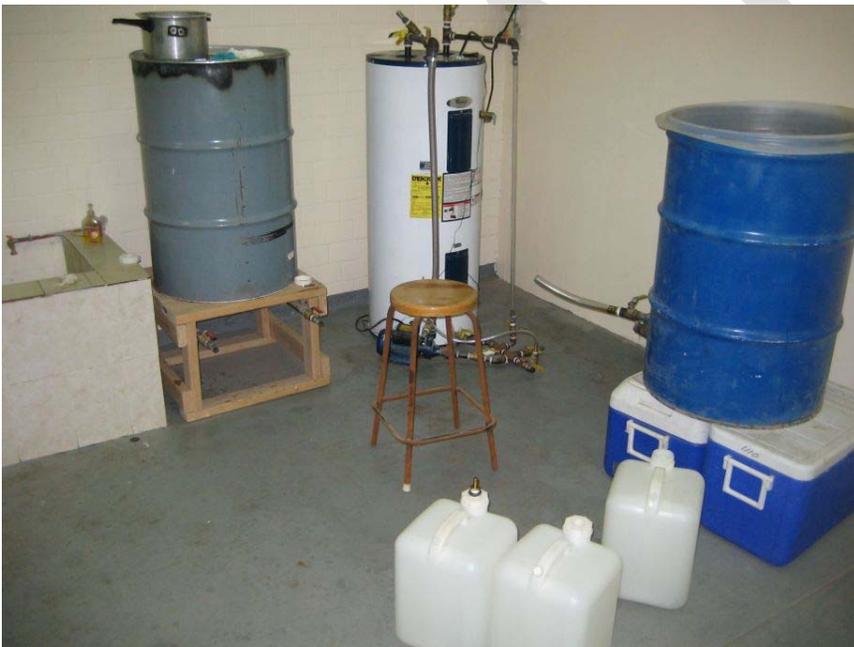
Adding water to biodiesel for first wash.



First wash discharged to drain. Wash water is simply soapy water.



First bubble wash of biodiesel. Three additional bubble washes will take place before biodiesel is ready for drying and filtering.



Current ITN biodiesel rendering setup facilitated through a monetary donation provided by the Friends of the Santa Cruz River. This setup can generate about 35 gallons of biodiesel every 3-4 days. Additional injection of capital promised by EPA will expand capacity significantly.



Initial ITN experiments in soap making from residual glycerin. There are other commercial venues for marketing glycerin byproduct not yet considered by ITN.