

DATE

To: The Honorable Lourdes A. Leon Guerrero
I Maga'hågan Guåhan
Ufisinan I Maga'håga
Hagåtña, Guam 96910

From: Used Oil Task Force

Subject: Used Oil Task Force Report and Recommended Next Steps

Purpose

Guam Power Authority, which currently receives and burns the island's used oil for power generation in the Cabras 1 and 2 power plants, is transitioning to ultra-low sulfur diesel (ULSD) power generation plant that is expected to be operational by October 2022. The current primary power plant will be subsequently decommissioned. Additionally, the 1 to 1.5 million gallons of used oil that is burned at these plants will not be accepted at the new ULSD power plant, thus potentially creating a waste issue, if policies and plans are not in place to address it. On June 7, 2019, the 35th Guam Legislature passed Public Law 35-24, creating a Used Oil Task Force to develop policies toward proper management of used oil.

Used Oil Task Force Duties:

- (a) Gather information concerning any and all efforts related to the management of used oil;
- (b) Receive reports and testimony from individuals, government of Guam agencies, and any other public and private organizations;
- (c) Create goals and recommendations for local policy that address the safe and proper management of used oil as defined in §51102(hh)(11) of Article 1 of Chapter 51, Division 2 of Title 10, Guam Code Annotated;
- (d) Submit a report with its recommendations to *I Maga'låhen/Maga'hågan Guåhan* and *I Liheslaturan Guåhan* by September 30, 2019. Any further recommendations shall be transmitted annually thereafter. The Task Force requested an extension from its September 30, 2019 original deadline, which had been granted to December 31, 2019.

Overview of Used Oil Task Force Work Plan:

The Task Force methodology involved gathering information from government and industry representatives within the Task Force, reviewing reports, conducting informal surveys, and sending Call for Information from local stakeholders. The criteria for proposals included the following: compliance to U.S. environmental rules and regulations, cost effectiveness, infrastructure and capacity of the community, impacts to climate change, timeliness, effects of a zero-waste policy and cons of other methods. The Task Force evaluated information during three meetings on 7/26/19, 9/16/19, and 12/13/19.

Points of consideration included the following: 1) identifying the scope of the task force based on definition of used oil and the quantity of used oil generated on Guam, and 2) identifying and evaluating different approaches to managing used oil.

Background/Data

The definition of used oil means any oil that has been refined from crude oil, or any synthetic oil, that has been used and as a result of such use is contaminated by physical or chemical impurities (40 CFR §279.1). The scope of work for this report doesn't include waste oil, hazardous waste oil and waste cooking oil.

Guam Environmental Protection Agency (GEPA) identifies, permits, and regulates storage, treatment, handling, transport, and disposal of used oil and establishes capabilities of inspection and enforcement to ensure that hazardous waste management activities shall not jeopardize human health and are carried out in an environmentally sound manner (§30101, Chapter 30, Title 20, GARR). Hazardous Waste Permits also include Notification of Hazardous Waste Activity, RCRA Part A, Underground Storage Tank (UST).

Volume of used oil on Guam is currently estimated to be 1.5 million gallons annually. 600,000 is generated by GPA. Guam Solid Waste Authority collects approximately 8,000 gallons annually at transfer stations. The remainder is most likely generated from vehicles¹ and military. At this time, we have been unable to verify the amount due to lack of responses from automobile maintenance shops, as well as, the military. In October 2022 upon operation of the new ULSD burning power plant, Guam Power Authority (GPA) expects to reduce its generation of used oil to a level from 600,000 to 10,000-50,000 gallons annually.

¹ DRT's FY2018 Citizen Centric Report shows 119,479 vehicles registered on the island.

Guam Environmental Protection Agency (GEPA) provided information that permitted collectors have increased shipping used oil due to markets opening up in South Korea. In 2018, 377,000 gallons were shipped. Concurrently, GPA has reported a reduction of used oil from local suppliers. Small scale consumption of used oil occurs with businesses equipped with boiler units for dry cleaners or other types of equipment such as HVAC units, and generators.

Re-refining² and processing used oil locally is being studied by GPA as part of their Integrated Resource Plan. The draft report is scheduled to be released to the PUC in June 2020. One potential goal is conversion of used oil to diesel that meets specifications of power plant. Alternatively, GEPA can consult with Jacob's regarding Zero Waste Implementation Plan to determine reduction strategies and scalable markets for used oil.

Several refining options were discussed as a result of the Call for Information proposal by Pacific Revolution. The proposal includes the possibility for local processing with local infrastructures in place, namely, the decommissioned Cabras 1 and 2 power plants. Guam Economic Development Authority (GEDA) has a recycling QC program that would need to be amended to include used oil to promote local processing.

Discussion/Preliminary Findings

Executive Summary

In order to address the issue at hand, members discussed possible solutions for preventative measure (electric vehicles and using synthetic oil). Currently the disposal of used oil is determined by the industry. Guam EPA permits the holding and transferring of used oil but beyond that the information rest with the industry. Currently there is the option for used oil to be burned at GPA however with the consent decree and the new power plant approaching this option will no longer be available. There was a point in time when GPA stopped collecting used oil and that forced the local industry to find an alternative means. Local stakeholders have been able to find an outside market for used oil. Members also discovered that used oil can always be shipped back to the United States should the current market close.

² Collected oils that are tested and certified as being non-hazardous may end up in one of three main recycling routes: 1) recycled fuel oil (RFO) production, wherein the used oil is filtered and dewatered and sold as a fuel oil or cutter stock, 2) distillation into a distillate fuel oil, usually blended with other fuels to be burned in marine engines and therefore often referred to as marine distillate oil (MDO), or 3) re-refining, in which the used oil is processed back into a base oil.

The Task Force discussed the reduction of used oil generated would occur through the operation of the new ULSD power plant from 600,000 to 10,000-50,000 gallons annually. Other opportunities involve switching to electric vehicles, which do not require oil changes, or switching to synthetic oil, which results in 50% reduction of used oil generated due to less oil changes.

The Task Force also discussed the option of shipping, in which the cost is dependent on the price of oil. If oil is \$100/barrel, there is a greater demand for used oil and local businesses can gain more profit. Used oil may go directly to end-user, but it is more likely sent to a regional facility that, then, markets the feedstock. There will always be a place to send used oil to the United States, but the cost is approximately 300% greater than shipping it to Asian markets with the customer paying more for the shipping/disposal cost. In the past, GRESCO was able to store oil until markets became favorable. GSWA accepts used oil from residents, which is then picked up by a Guam EPA registered operator. It costs GSWA \$2.60 a gallon (8,000 gallons total) with a 3% increase per year.

The amount of used oil on Guam is not sufficient to support a local processing plant, unless the prospective business accepts used oil from other jurisdictions to make it feasible. Largest market for used oil locally is GPA, which is transitioning toward consumption of ULSD. Processing used oil to ultra-low sulfur diesel is cost prohibitive. A cautionary approach toward developing processor/refinery on Guam may be needed due to the environmental hazards and the problems associated with accepting used oil from other jurisdictions.

Members discussed the option of burning as fuel. Waste to energy is not an option due to lawsuit. GPA is looking at newer technology for used oil conversion as part of their 2020 Integrated Resource Plan, which involves conversion of used oil followed by burning the processed oil as fuel for power generation. Other waste considered were the use of biosolids to produce energy. Some businesses burn used oil using small boiler units (water heaters, HVAC systems, dry cleaners, hospital laundries), which are exempt from clean air standards. Concerns were raised of the effects of collective burning releasing sulfur resulting in acid rain and adverse health effects.

The Call for Information by the Task Force yielded one proposal by Pacific Revolution. The proposal included the following:

- Local processing of used oil by coupling emulsified fuel oil with a desulphurization & wastewater management process to bring down the sulfur

content of the emulsified fuel product to 1,000 ppm (or 0.1%) or less. 0.1% or less is the spot to make this process economical. In addition to the prior recommendation, the waste bottom oil sludge that is too viscous to go through the fuel process will be processed with a separate system.

- Build-Own-Operate agreement utilizing the footprint and existing infrastructure at Cabras 1 and 2 to refine, re-process used oil. The burners would have to be taken out as part of the consent decree. It is questionable if GPA would be able to consume this re-processed oil because their strategic plan is transitioning towards the use of ultra-low sulfur diesel and the process to convert the used oil to ultra-low sulfur diesel is cost-prohibitive.
- To operate additionally as an independent power producer requiring a substation & transmission lines. Project can be operational from 6 month to 1 year.
- GovGuam may want to consider keeping one of the HFO burners in Cabras 1&2 open solely for the purpose of disposing of these oils.
- This proposal would be feasible if government mandated all used oil be managed by this facility.

Concept is based on waste management rather than as a revenue stream in order to remove the incentive to generate more used oil. However, there is a possibility that this proposal could potentially create a market to generate more waste if it pays.

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The following list are key finding from the Task Force's research:

- Reduction of used oil
- Shipping (cost and destination)
- Local processing

Task Force Proposals:

Based on the Task Force's workplan and key findings, we propose the following:

Proposal #1: Reduction of Used Oil – Significant reduction of used oil and the island's dependence on fossil fuel can be addressed through policies promoting consumer choices toward switching to electric vehicles or synthetic fuels. Mandates for GovGuam electric vehicles purchases and providing rebates for businesses, nonprofits, and individuals coupled with automobile industry's trend toward greater production of electric vehicles gives the island the reinforcement needed to move in the direction of reduction. Community outreach gives information to consumers to make smart purchases that extend product life such as choosing synthetic oil. Reducing used oil is the immediate response.

Proposal #2: Shipping – The shipping of used oil off-island will always be an option. The local industry has currently found a market for used oil in South Korea. Should that market close, the option to ship back to the U.S. is always available. This longer distance and other regulations will increase cost for the consumer. Used oil will always have a market, but it is the cost to bring the product to the market that is concerning.

Proposal #3: Local Processing – The single suggestion received by the Task Force from its Call for Information was on this idea. Pacific Revolution presented on the idea that used oil can be processed to bring down the sulfur content. There are several forms of refining that was presented to the members – emulsification, thermal cracking or distillation, transesterification, base lube oil recovery or re-refining and direct combustion. All processing forms have its pro and cons in relation to creating more waste and/or requiring more of infrastructure. The proposal encompassed the idea of used oil being “refined” and burned at GPA. This suggested Cabras as a model because of its current layout and infrastructure. GPA will however need to adjust its new power plant to accommodate a new waste oil facility and small heavy fuel oil burner in its design. This proposal or idea should be presented to GPA and Guam EPA where their input should determine if the proposal works into their plans and is feasible.

No recommendations are presented at this time. The Task Force is requesting extension of the report to gather and evaluate information from the GPA 2020 Integrated Resource Plan and Guam EPA Jacob recommendations.

Thank you for your consideration.

List of the Task Force Members:

Senator Sabina Flores Perez, Used Oil Task Force Chairperson

Senator Telo T. Taitague, Designee of the Speaker of *I Liheslaturan Guåhan*

Senator Clyton E. Ridgell, Legislative Committee Chairperson with jurisdiction on power and energy utilities

Paul Packbier, Designee of *I Maga'hågan Guåhan*

Walter Leon Guerrero, Administrator of the Guam Environmental Protection Agency

Larry Gast, General Manager of the Guam Solid Waste Authority

Matthew Baza, Designee from the Guam Economic Development Authority

Greg Hartkopf, General Public Member

Attachments: Used Oil Task Force Meeting Minutes

“Life Cycle Assessment of Used Oil Management” summary report

Call for Information

Pacific Revolution Proposal and Presentation

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