

## **HSHM Trip Report June 14-21, 2016**

Travelers: Vivian Reiss and Bob McCoy

The primary goal of this trip was to train as many water purification system operators that were operating solar powered in battery maintenance as possible. Ancy and his team did an incredible job of inviting and getting the people to come. The reason for doing this training was the LWW network has seen an unusually high number of battery casualties over the past year and we were becoming suspicious that lack of knowledge of the care and feeding of batteries was the root cause. After conducting the three days of training at three different locations, I am certain that we were on target with our assessment, but only time will tell if the training had a positive effect toward sustainability of battery life.

Tue – Jun 14: Vivian and I traveled to Haiti. Bertone picked us up at the airport and we went directly to NDC where we had dinner and met with Eliane, Ancy, Dr. Yanne, and Bertone to discuss a project regarding another orphanage named the JC project. A very detailed flow of events, checks and balances came from the meeting and is now beginning to be implemented. Vivian, who is Haitian, was there to purchase property next to NDC, so she stayed with Eliane two nights and went back to Huntsville on Thursday.

Wed-Jun 15: Up at 4:30 to leave at 5a with Salien, Bertone and Ancy to drive to Les Cayes for the first battery training session. We met Frantzou later in the day in Cayes who also joined the class. The drive is 3 hours and we had two stops to make along the way. The first was at Fond des Negres to visit Sister Denis and check out her new solar powered water tank system installed in April. They had updated it to include the filling of a second reservoir on top of the school building so they now had water in that building which means flushing toilets – a very big deal for the sisters. They served us a wonderful breakfast and then we were on to Cayes to meet with Water for Life to pick up more well records for our water prediction service.

Training began at noon at one of the schools with 15 attendees showing up. We limited the attendance to one operator per site, so this represented 15 sites, an excellent showing for this area. Attached to this document is an outline of the training and material that we handed to each person. Each person also received a simple battery hydrometer. The class was built around the use of this instrument to accurately understand the state of each battery. As part of the draw to the class we bought lunch for each student which was definitely appreciated.

Since my Creole is 'Move' (pronounced moov-a in Creole and means bad) Ancy translated for me. It made for a very interesting class session as Ancy and leveraged off each other. Haitians are used to receiving information in one direction in school so I made it clear from the beginning that this class would be interactive and I would call on people, but reward them for answers. Within two minutes the first question was thrown out, a student answered and was rewarded with a tootsie roll. I had a five pound bag for 3 days and it really livened up the class. The students were anxious to learn, bright, asked good questions, were very attentive and I am convinced will be much greater assets to their sites. Of the 40 we ultimately trained, only one had ever used a battery hydrometer and did not possess one at their site, so much closer attention will now be given to the core of the solar system, the battery.



I began with how a lead acid battery works (using a flip chart), and then migrated into 24VDC systems and what each of the components of the system does. Many were most grateful for the explanation of these components as no one in any of the classes really had a good grasp on the larger picture which is really ‘How many devices can I really run off this system and when should it be shut down?’ We spent a lot bit of time on why the system was configured and designed as it was and what needed to be done if they really wanted to run more than a water system without affecting the water system performance. All of the students and ICTs have a much greater understanding of the costs of the components and the burden they put on themselves, the IPs and others when a component has to be purchased and they don’t have the money. The business plan was not a part of this class, but Ancy and the Haiti ICTs are presenting a regional seminar in August and the business plan will definitely be a part of that session.



Ultimately my goal was to get each site to begin logging a battery maintenance sheet that I gave them, which records the hydrometer readings of each cell (3 per battery) each month. We are not asking the ICTs to collect this information, but we are asking them to follow up and make sure the attendees are keeping it. This information will give us great insight into the life of the battery and when it really needs to be equalized. It doesn’t take long to record and I think everyone saw the value in keeping the log.



Four hours was the right amount of time for the class. There were no breaks except to hand out water. It was constant interaction, teaching, questioning, drawing and more teaching. Certificates were given out at the end of class. By the third day we had perfected the class since it had never been done before and the comments we got really showed we had hit the mark. Several of the guys unsolicited, got up and did testimonials to how much they had learned and how much this class had helped them. They all embarrassed me and a couple began to tear me up.



Thur-Jun 16: This class was held at NDC from 9-2 with one hour for lunch which was by far the best meal because Eliane had prepared it. Ancy, Lucson, Bertone and Salien attended. There were 10 operators at this class including Manusca who is one of the young ladies at the orphanage who is responsible for the water systems. She came dressed up and was definitely serious about her role.



Fri-Jun 17: Up at 4am for this trip. Bertone and I left at 4:30p to pick up Ancy in Carrefour at 5a and then Reginald in St. Marc at 7a and to arrive in Gonaives by 8:15. This was a 9a-2p class also and held in a school. We had 16 in attendance. I was most impressed with this group. They had a good knowledgebase, however as in the previous two classes were ignorant of the

battery care and feeding. On our way home we blew out a tire, but Bertone and I still made it back about 8p. A long day, but we praise God for the success we witnessed.

Sat-Jun 18: Bertone and I spent all day at NDC building an 18' ladder so we could get to the top of the water tower. Once at the top we began installing a water sensing gauge to determine the level of water in the tanks and later in the day did some work on the garden sprinkler system. We got the ladder finished and most of the gauge installed and yes it was hot. We had to stop at 4 to get back to the monastery for 5p mass. That cold shower sure felt good.

Sun-Jun 19: We had scheduled the kids to dress up early in the morning so we could get their pictures for this year's parishioner sponsorship. This took a good bit longer than I had expected, but was finished successfully. We finished the water gauge installation and fixed a couple of other items with the water system and checked out the garden sprinkler. The garden sprinkler works great but consumes 300 gallons per 10 minutes so can't be run very long. I was also able to make measurements for the estimation of tiling the veranda, hallway and two large bedroom floors. I knew tile was readily available in Haiti, but the floors on the 2<sup>nd</sup> floor are wood as opposed to concrete, so you have to lay concrete board first. I brought a sample with me which was a mystery as to where we might find it in Port au Prince. We had checked Leogane and the answer was a resounding no. Sunday evening we got home at a respectable 5p.

Mon-Jun 20: This day was scheduled to meet with Jackson at DINEPA in Port au Prince to further discuss the water prediction service they had showed interest in, but God had other plans. Because we had blown a tire on Friday, we needed two new ones on the LC and the first stop in PAP was the tire store where I managed to lock the keys in the LC. 30 minutes later with a coat hanger and a skilled Haitian it was opened. The tire purchase and mounting was uneventful and then on to the east side of PAP where we had a lead on a store that had the concrete board. We came within about a mile of the place and ground to a halt. We were on a 4 lane road with three lanes going in our direction (because we made it that way), parked cars on each side and one lane coming against us and no one was going anywhere fast. In one hour we moved about 1/2 mile. I could see the sign of the place about 2 blocks up the road so decided to park on a side road, walk the rest of the way. At least the traffic going against us was moving so we knew we could get back out. Bertone was driving and found a place to park, started to turn around and the engine died. I am certain those reading this have heard the click-click-click of a dead battery before. After raising the hood I saw that the lead on the negative battery terminal had melted to a puddle on top of the battery. It was a hot day – probably 100-105 deg and we had been sitting in traffic for the past hour, but the engine never overheated. When I moved the negative terminal on the battery the plastic on the battery was malleable, so I knew the jig was up for this battery. I was God's Grace that we had pulled off when we did as the problem would have been compounded by a dead battery in the middle of 3 lanes of traffic going nowhere. A young man whose name I later learned was Claudy from the neighborhood offered to help Bertone find a gas station where he could buy a battery while I stayed with the LC. It's not good practice to leave a vehicle like a LC in PAP unattended. Needless to say there is no AAA in PAP. \$170 and an hour later he returns with the battery which works just fine. By then the traffic jam is cleared, we go two more blocks and praise God – find the concrete board. The DINEPA appt. was canceled because Jackson had to go to Cap Haitian and couldn't see us any way. So later in the afternoon, Bertone and I make it back to PAV with one more stop at NDC to say goodbye to Eliane and the girls.

Tue-Jun 21: 5a departure from PAV with arrival in Huntsville about 9p. A good day to travel. St. Michael must have covered the eyes of the ticket agent because both my bags were over 50lbs coming home and the Haitian TSA which gave me an incredibly hard time on the April trip about my lithium battery in my backpack did not even question it or the pump alongside it on this trip. I thank God for the graces of this trip and the angels he send to keep me safe. Favè ak kè poze.

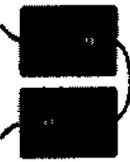
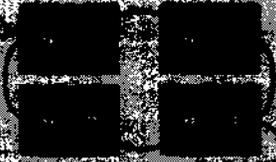
## ATTACHMENTS

## Battery Maintenance for Haitian Ops

1. Review classroom logistics
2. Review packet of information and contents
3. Battery basics
  - a. Cell voltage
  - b. Construction
  - c. Series, parallel hookups
  - d. Amp/Volts PIE, Amps/volts in series vs parallel
  - e. DC & AC
4. 24v solar components
  - a. Battery
  - b. Solar PV
  - c. Combiner box
  - d. Outback
  - e. Current meter
  - f. Inverter
  - g. Cost – what is the most expensive component?
5. Battery construction
  - a. Cells
  - b. Plates
  - c. Liquid
6. Battery Maintenance
  - a. Liquid
  - b. Hydrometer
  - c. What do the readings mean?
  - d. Battery log
  - e. Importance of keeping the log
  - f. Rapid charge – is it good?
7. Outback
  - a. What is this device?
  - b. Equalization process
    - i. Automation
    - ii. Manuel
  - c. What is equalization really doing?
8. Putting all the components together - review
  - a. What does each component do?
  - b. Why is this component important?
  - c. What happens if the batteries are not maintained properly

## Entretien de la batterie

Raccordement des batteries en série ne pas augmenter la capacité des batteries; elle augmente simplement la tension globale pour répondre aux besoins de votre système. Une fois que votre tension exigences sont remplies, et si l'espace le permet, vous pouvez doubler les piles dans une connexion parallèle - doublant ainsi la capacité de votre batterie. Voir les schémas ci-dessous.

Série Connect	Parallèle Connect	Série / Parallèle Connect
		
<p>Pour augmenter la tension, connectez les batteries en série. Cela ne va pas accroître la capacité du système.</p> <p><b>Exemple</b> Deux T-105, 6V Batteries évalué à 225AH connectés en séries <b>Tension du système</b> <math>6V + 6V = 12V</math> Système Capacité = 225AH</p> <p>Pour augmenter la tension, connectez les batteries en série.</p>	<p>Pour augmenter la capacité, connectez les batteries en parallèle. Cela ne va pas augmenter la tension du système.</p> <p><b>Exemple</b> Deux T-105, 6V Batteries rated at 225AH Connecte in Parallèle <b>Tension du système</b> 6V Système Capacité = <math>225AH + 225AH = 450AH</math></p> <p>Pour augmenter la capacité amp-heure, connectez les batteries en parallèle.</p>	<p>Pour augmenter la tension et la capacité, connectez des batteries en série/parallèle en séries.</p> <p><b>Exemple</b> Deux T-105, 6V Batteries rated at 225AH Connecte in Parallèle <b>Tension du système</b> <math>6V + 6V = 12V</math> Système Capacité = <math>225AH + 225AH = 450AH</math></p> <p>Pour augmenter la capacité à la fois de la tension et l'amp-heure, connectez les batteries en série/parallèle.</p>

## Inspection

- Il existe de nombreux outils qui peuvent aider à bien prendre soin et l'entretien des batteries. Voici une liste des éléments de base que Trojan recommande pour cette tâche:
- Équipement recommandé
- Le bicarbonate de soude Eau distillée Lunettes & Gants Hydrometer
- Poster Cleaner Vaseline voltmètre Wrench
- ATTENTION: Toujours porter des vêtements de protection, des gants et des lunettes de protection, lors de la manipulation des batteries, l'électrolyte, et charger votre batterie.
- Les piles doivent être soigneusement inspectés sur une base régulière afin de détecter et de corriger les problèmes potentiels avant qu'ils ne puissent faire du mal. Il est une bonne idée de commencer cette routine lorsque vous recevez d'abord les batteries sont d'abord reçues.

## Directives d'inspection

1. Examiner l'aspect extérieur de la batterie.

- Rechercher les fissures dans le conteneur.
- Le haut de la batterie, les messages et les connexions doivent être propres, exempts de saleté, fluides, et à la corrosion. Si les piles sont sales, reportez-vous à la section de nettoyage pour la procédure de nettoyage.
- Réparer ou remplacer les batteries endommagées.
- Les fluides sur ou autour de la batterie peut être une indication que l'électrolyte se répand, le lessivage, ou fuite.
- Les fuites de piles doivent être réparés ou remplacés.
- Vérifiez tous les câbles de batterie et leurs connexions.
- Regardez attentivement pour les pièces détachées ou endommagées.

- Les câbles de batterie doivent être intacts; câbles cassés ou effilochés peuvent être extrêmement dangereux.
- Remplacer tout câble qui semble suspect.

### Essai

Les deux tension en circuit ouvert et des lectures de gravité spécifiques peuvent donner une bonne indication de niveau de charge, l'âge et la santé de la batterie. vérifications de tension et de la gravité de routine ne sera pas seulement montrer l'état de charge, mais aussi aider à repérer des signes de mauvais entretien, comme une sous-estimation et sur-arrosage, et peut-être même localiser une batterie mauvaise ou faible. Les étapes suivantes décrivent comment effectuer correctement la tension de routine et la gravité spécifique des essais sur batteries.

### Test de gravité spécifique (batteries Inondé uniquement)

1. Ne pas ajouter de l'eau à ce moment.
2. Remplir et vider les 2 à 4 fois hydromètre avant de retirer un échantillon.
3. Il devrait y avoir suffisamment d'électrolyte de l'échantillon dans le densimètre pour soutenir complètement le flotteur.
4. Prenez une lecture, l'enregistrer, et retourner l'électrolyte à la cellule.
5. Pour vérifier une autre cellule, répétez les 3 étapes ci-dessus.
6. Vérifiez toutes les cellules de la batterie.
7. Remplacer les bouchons de ventilation et essuyer tout électrolyte qui aurait pu être renversé.
8. Comparer les lectures.
9. Vérifiez l'état de charge en utilisant le tableau 1 ci-dessous.

Les lectures doivent être égales ou supérieures aux spécifications d'usine de 1,277 +/- 0,007. Si des lectures de gravité spécifiques enregistrent bas, puis suivez les étapes ci-dessous.

1. Vérifier et tension de niveau de l'enregistrement (s).batterie (s)
2. Mettez une charge complète.
3. Prendre à nouveau des lectures de gravité spécifique.

Si des lectures de densité enregistrent encore faible puis suivez les étapes ci-dessous.

1. Niveau de tension vérifier (s).
2. Effectuez charge d'égalisation. Reportez-vous à la section Egalisation pour la procédure appropriée.
3. Prendre à nouveau des lectures de gravité spécifique.

Si une lecture spécifique de gravité enregistre toujours inférieure à la spécification de l'usine de 1,277 +/- 0,007 alors une ou plusieurs des conditions suivantes peuvent exister:

1. La batterie est ancienne et approche de la fin de sa vie.
2. La batterie a été laissé dans un état de décharge trop longtemps.
3. Electrolyte a été perdu à cause de déversement ou de débordement.
4. Une faible ou mauvaise cellule se développe.
5. La batterie a été arrosée trop précédente à l'essai

## II. Circuit ouvert Tension d'essai

Pour les lectures de tension précises, les batteries doivent rester inactif (pas de charge, aucune décharge) pendant au moins 6 heures, de préférence 24 heures.

1. Débranchez toutes les charges des batteries.
2. Mesurer la tension à l'aide d'un voltmètre DC.
3. Vérifiez l'état de charge avec le tableau 1 ci-dessous.
4. Charger la batterie si elle enregistre 0% à 70% de charge.

Si la batterie enregistre en dessous du tableau 1 les valeurs, les conditions suivantes peuvent exister:

1. La batterie a été laissé dans un état de décharge trop longtemps.

2. La batterie a une mauvaise cellule.

Piles dans ces conditions doivent être prises à un spécialiste pour une évaluation plus poussée ou retirés du service.

## Nettoyage

Batteries semblent attirer la poussière, la saleté et la crasse. Les garder propres vous permettra de déceler des signes de problèmes quand ils apparaissent et éviter les problèmes associés à la saleté.

1. Vérifiez que tous les bouchons d'aération sont bien en place.
2. Nettoyez le dessus de la batterie avec un chiffon ou une brosse et une solution de bicarbonate de soude et de l'eau.
3. Lors du nettoyage, ne permettent pas de solution de nettoyage ou d'autres matières étrangères pour pénétrer à l'intérieur de la batterie.
4. Rincer à l'eau et sécher avec un chiffon propre.
5. Nettoyer les bornes de la batterie et l'intérieur du serre-câbles à l'aide d'un nettoyeur de poste et pince.
6. Nettoyez les bornes auront un éclat métallique brillant.
7. Rebranchez les pinces aux bornes et manteau finement eux avec un spray anti-corrosive ou de gel de silicone.
8. Gardez la zone autour de batteries propres et sèches.

## Se charge

Chargement des batteries correctement nécessite l'administration de la bonne quantité de courant à la bonne tension. La plupart des équipements de charge régule automatiquement ces valeurs. Certains chargeurs permettent à l'utilisateur de définir ces valeurs. Les deux équipements automatique et manuel peut présenter des difficultés lors de la charge. Les tableaux 2 et 3 liste la plupart des réglages de tension nécessaires on pourrait avoir besoin de programmer un chargeur. Dans les deux cas, les instructions d'origine pour votre équipement de chargement devraient également être référencés pour une charge appropriée. Voici la liste des articles utiles à retenir lors de la charge.

1. Se familiariser avec et suivre les instructions données par le fabricant du chargeur.
2. Les piles doivent être facturés après chaque période d'utilisation.
3. Les batteries au plomb ne développent pas une mémoire et ne doivent pas être complètement déchargées avant de les recharger.
4. Charge seulement dans des zones bien ventilées. Tenir les étincelles ou les flammes loin d'une charge de la batterie.
5. Vérifiez les paramètres de tension du chargeur sont corrects (tableau 2).
6. Corriger la tension de charge pour compenser les températures au-dessus et au-dessous de 80 ° F (26,6 ° C). (Ajouter 0,028 volt par cellule pour chaque 10 ° au-dessous de 80 ° F (26,6 ° C) et soustraire 0,028 volt par cellule pour chaque tranche de 10 ° C 12,2 ° C) au-dessus de 80 ° F (26,6 ° C)
7. Niveau d'eau Vérifier (voir la section d'arrosage).
8. Serrer tous les bouchons de ventilation avant de charger.
9. Empêcher la surcharge des batteries. La surcharge provoque le gazage excessif (dégradation de l'eau), l'accumulation de chaleur, et le vieillissement de la batterie.
10. Empêcher déchargerait les batteries. Un prix inférieur provoque la stratification qui peut conduire à une défaillance prématurée de la batterie.
11. Ne pas charger une batterie gelée.
12. Evitez de charger à des températures supérieures à 120 ° F (48,8 ° C).

Tableau 2

Réglages tension Chargeur pour Batteries Inondé	Tension du Système				
Charger Voltage Setting	6v	12v	24v	36v	48v
Charge en vrac	7.4	14.8	29.6	44.5	59.3
Float Charge	6.7	13.5	27	40.5	54
Egaliser charge	8.1	16.2	32.4	48.6	64.8

## Egalisation - BATTERIES INONDES SEULEMENT

Equalizing est une surcharge effectuée sur les batteries au plomb-acide inondées après avoir été complètement chargée.

Il renverse l'accumulation d'effets chimiques négatifs comme la stratification, une condition où la concentration d'acide est supérieure à la partie inférieure de la batterie que par le haut. Egalisation contribue également à éliminer les cristaux de sulfate qui pourraient se sont accumulés sur les plaques. Si rien, cette condition, appelée sulfatation, permettra de réduire la capacité globale de la batterie.

De nombreux experts recommandent que les batteries soient égalisées périodiquement, allant partout d'une fois par mois à une fois ou deux fois par an. Cependant, Trojan ne recommande égaliser lorsque bas ou vaste gravité spécifique ( $> 0,030$ ) sont détectés après une recharge complète d'une batterie.

### Step-By-Step Egalisation

1. Vérifiez la batterie (s) sont inondés de type.
2. Retirer toutes les charges des batteries.
3. Branchez le chargeur de batterie.
4. Chargeur Set pour la tension d'égalisation (voir le tableau 2 dans la section de charge). Si votre chargeur ne dispose pas d'un mode d'égalisation, vous pouvez débrancher le chargeur et rebranchez-le. Cela permettra également de procéder à la charge d'égalisation.
5. Démarrez la charge des batteries.
6. Les piles commenceront gazage et barbotage vigoureusement.
7. Prendre des lectures de gravité spécifiques à chaque heure.
1. La péréquation est terminée lorsque les valeurs spécifiques de gravité plus augmentent pendant la phase de gazage

## Arrosage - Inondé batteries ont besoin d'eau.

Mais plus important encore, l'arrosage doit être fait au bon moment et dans la bonne quantité ou la performance et la longévité de la batterie souffre.

Instructions générales d'arrosage:

- Ajouter l'eau, jamais l'acide, à des cellules (eau distillée recommandé)
- NE PAS Pilotis
- Pour les batteries profondes de cycle standards à pleine charge, ajouter de l'eau au niveau de 1/8 sous le bas du vent bien (voir schéma à droite)
- Si les batteries sont déchargées, seulement ajouter de l'eau si les plaques sont exposées. Ajouter juste assez d'eau pour couvrir les plaques, puis charger les batteries. Une fois complètement chargée, ajouter de l'eau au niveau approprié indiqué ci-dessus
- Après arrosage, bouchons de ventilation sécurisés sur les batteries



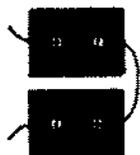
## Conseils pour la vie Maximisation de la batterie

- Stocker et utiliser vos batteries dans un endroit frais et sec.
- Pour chaque 18 ° F (10 ° C) élever au-dessus de la température ambiante (77 ° F ou 25 ° C), la vie de la batterie diminue de 50%.
- Rechargez vos batteries complètement après chaque période d'utilisation.
- Permettre à vos batteries pour siéger dans un état de charge faible pendant une période prolongée va diminuer leur capacité et leur vie.
- Surveiller la tension de la batterie et la gravité spécifique de l'électrolyte régulièrement pour vérifier une recharge complète. En règle générale, le total des ampères de vos panneaux photovoltaïques doivent être dimensionnés entre 10% et 20% des ampères-heures totales (Ah) de la batterie.
- De nombreux régulateurs de charge ont des paramètres d'égalisation que vous pouvez définir pour aider à assurer la santé de vos batteries. Egaliser vos batteries au moins une fois par mois pour 2 à 4 heures, plus si vos batteries ont été constamment montant insuffisant.
- Arrosez régulièrement vos batteries.
- Flooded ou piles humides nécessitent un arrosage périodiquement. Vérifiez vos piles une fois par mois après l'installation pour déterminer le calendrier d'arrosage adéquat. Ajouter de l'eau après une recharge complète de la batterie et d'utiliser de l'eau distillée.

## Battery Maintenance

Connecting batteries in series does not increase the capacity of the batteries; it simply increases the overall voltage to meet your system requirements. Once your voltage requirements are met, and if space allows, you can double the batteries in a parallel connection — thereby doubling your battery capacity. See diagrams below.

Parallel Connect



To increase voltage, connect batteries in series. This will not increase the system capacity.

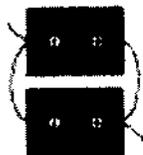
**Example**

Two T-105, 6V Batteries rated at 225AH Connected in Series

**System Voltage**

$6V + 6V = 12V$  System Capacity = 225AH

To increase voltage, connect batteries in series.



To increase capacity, connect batteries in parallel. This will not increase the system voltage.

**Example**

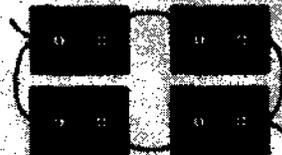
Two T-105, 6V Batteries rated at 225AH Connected in Parallel

**System Voltage**

6V System Capacity =  $225AH + 225AH = 450AH$

To increase amp-hour capacity, connect batteries in parallel.

Series/Parallel Connect



To increase both voltage and capacity, connect additional batteries in series and parallel.

**Example**

Four T-105, 6V Batteries rated at 225AH Connected in Series/Parallel

**System Voltage**

$6V + 6V = 12V$  System Capacity =  $225AH + 225AH = 450AH$

To increase both voltage and amp-hour capacity, connect batteries in series/parallel.

## Inspection

There are many tools that may help in properly caring for and maintaining batteries. Below is a list of basic items that Trojan recommends for this task:

Recommended Equipment

Baking Soda

Distilled Water

Goggles & Gloves

Post Cleaner

Vaseline

Voltmeter

**CAUTION:** Always wear protective clothing, gloves and goggles, when handling batteries, electrolyte, and charging your battery.

Batteries should be carefully inspected on a regular basis in order to detect and correct potential problems before they can do harm. It is a great idea to start this routine when you first receive the batteries are first received.

## Inspection Guidelines

1. Examine the outside appearance of the battery.

- Look for cracks in the container.
- The top of the battery, posts, and connections should be clean, free of dirt, fluids, and corrosion. If batteries are dirty, refer to the Cleaning section for the proper cleaning procedure.
- Repair or replace any damaged batteries.
- Any fluids on or around the battery may be an indication that electrolyte is spilling, leaching, or leaking out.
- Leaking batteries must be repaired or replaced.
- Check all battery cables and their connections.
- Look closely for loose or damaged parts.
- Battery cables should be intact, broken or frayed cables can be extremely hazardous.
- Replace any cable that looks suspicious.

## Testing

Both open-circuit voltage and specific gravity readings can give a good indication of the battery's charge level, age, and health. Routine voltage and gravity checks will not only show the state of charge but also help spot signs of improper care, such as undercharging and over-watering, and possibly even locate a bad or weak battery. The following steps outline how to properly perform routine voltage and specific gravity testing on batteries.

### **Specific Gravity Test** (Flooded batteries only)

1. Do not add water at this time.
2. Fill and drain the hydrometer 2 to 4 times before pulling out a sample.
3. There should be enough sample electrolyte in the hydrometer to completely support the float.
4. Take a reading, record it, and return the electrolyte back to the cell.
5. To check another cell, repeat the 3 steps above.
6. Check all cells in the battery.
7. Replace the vent caps and wipe off any electrolyte that might have been spilled.
8. Compare the readings.
9. Check the state of charge using Table 1 below.

The readings should be at or above the factory specification of 1.277 +/- 0.007. If any specific gravity readings register low, then follow the steps below.

1. Check and record voltage level(s).
2. Put battery(s) on a complete charge.
3. Take specific gravity readings again.

If any specific gravity readings still register low then follow the steps below.

1. Check voltage level(s).
2. Perform equalization charge. Refer to the Equalizing section for the proper procedure.
3. Take specific gravity readings again.

If any specific gravity reading still registers lower than the factory specification of 1.277 +/- 0.007 then one or more of the following conditions may exist:

1. The battery is old and approaching the end of its life.
2. The battery was left in a state of discharge too long.
3. Electrolyte was lost due to spillage or overflow.
4. A weak or bad cell is developing.
5. Battery was watered excessively previous to testing.

## **II. Open-Circuit Voltage Test**

For accurate voltage readings, batteries must remain idle (no charging, no discharging) for at least 6 hrs, preferably 24 hrs.

1. Disconnect all loads from the batteries.
2. Measure the voltage using a DC voltmeter.
3. Check the state of charge with Table 1 below.
4. Charge the battery if it registers 0% to 70% charged.

If battery registers below the Table 1 values, the following conditions may exist:

1. The battery was left in a state of discharge too long.
2. The battery has a bad cell.

Batteries in these conditions should be taken to a specialist for further evaluation or retired from service.

## **Cleaning**

Batteries seem to attract dust, dirt, and grime. Keeping them clean will help spot signs of trouble when they appear and avoid problems associated with grime.

1. Check that all vent caps are tightly in place.

2. Clean the battery top with a cloth or brush and a solution of baking soda and water.  
When cleaning, do not allow any cleaning solution or other foreign matter to get inside the battery.
3. Rinse with water and dry with a clean cloth.
4. Clean battery terminals and the inside of cable clamps using a post and clamp cleaner.  
Clean terminals will have a bright metallic shine.
5. Reconnect the clamps to the terminals and thinly coat them with an anti-corrosive spray or silicon gel.
6. Keep the area around batteries clean and dry.

## Charging

Charging batteries properly requires administering the right amount of current at the right voltage. Most charging equipment automatically regulates these values. Some chargers allow the user to set these values. Both automatic and manual equipment can present difficulties in charging. Tables 2 & 3 list most of the necessary voltage settings one might need to program a charger. In either case the original instructions for your charging equipment should also be referenced for proper charging. Here is list of helpful items to remember when charging.

1. Become familiar with and follow the instructions issued by the charger manufacturer.
2. Batteries should be charged after each period of use.
3. Lead acid batteries do not develop a memory and do need not be fully discharged before recharging.
4. Charge only in well-ventilated areas. Keep sparks or flames away from a charging battery.
5. Verify charger voltage settings are correct (Table 2).
6. Correct the charging voltage to compensate for temperatures above and below 80° F (26.6°C). (Add .028 volt per cell for every 10° below 80° F (26.6°C) and subtract 0.028 volt per cell for every 10° F (12.2°C) above 80° F (26.6° C))
7. Check water level (see the Watering section).
8. Tighten all vent caps before charging.
9. Prevent overcharging the batteries. Overcharging causes excessive gassing (water breakdown), heat buildup, and battery aging.
10. Prevent undercharging the batteries. Undercharging causes stratification which can lead to premature battery failure.
11. Do not charge a frozen battery.
12. Avoid charging at temperatures above 120° F (48.8° C).

Charger Voltage Settings for Flooded Batteries	System Voltage				
Charger Voltage Setting	6v	12v	24v	36v	48v
Bulk Charge	7.4	14.8	29.6	44.5	59.3
Float Charge	6.7	13.5	27	40.5	54
Equalize Charge	8.1	16.2	32.4	48.6	64.8

## Equalizing

### BATTERIES ONLY

Equalizing is an overcharge performed on flooded lead acid batteries after they have been fully charged.

It reverses the buildup of negative chemical effects like stratification, a condition where acid concentration is greater at the bottom of the battery than at the top. Equalizing also helps to remove sulfate crystals that might have built up on the plates. If left unchecked, this condition, called sulfation, will reduce the overall capacity of the battery.

Many experts recommend that batteries be equalized periodically, ranging anywhere from once a month to once or twice per year. However, Trojan only recommends equalizing when low or wide ranging specific gravity (>0.030) are detected after fully charging a battery.

### Step-By-Step Equalizing

1. Verify the battery(s) are flooded type.

2. Remove all loads from the batteries.
3. Connect battery charger.
4. Set charger for the equalizing voltage (See Table 2 in the Charging section). If your charger doesn't have an equalization mode, you can unplug the charger and re-plug it back in. This also will conduct the equalization charge.
5. Start charging batteries.
6. Batteries will begin gassing and bubbling vigorously.
7. Take specific gravity readings every hour.
8. Equalization is complete when specific gravity values no longer rise during the gassing stage.

## Watering Diagram

Flooded batteries need water.

But more importantly, watering must be done at the right time and in the right amount or the battery's performance and longevity suffers.

### General Watering Instructions:

- Add water, never acid, to cells (*distilled water recommended*)
- DO NOT OVERWATER
- For fully charged standard deep-cycle batteries, add water to the level of 1/8 below bottom of vent well (*see diagram A below*)
- For fully charged Plus Series batteries, add water to the maximum water level indicator (*see diagram B below*)
- If the batteries are discharged, only add water if the plates are exposed. Add just enough water to cover the plates, then charge the batteries. Once fully charged, add water to the proper level indicated above
- After watering, secure vent caps on batteries



## Tips for Maximizing Battery Life

**Store and operate your batteries in a cool, dry place.**

For every 18° F (10° C) rise above room temperature (77° F or 25° C), battery life decreases by 50%.

**Charge your batteries fully after each period of use.**

Allowing your batteries to sit in a low state of charge for extended periods will decrease their capacity and life.

If you store your batteries for an extended period of time, be sure to charge them fully every 3 to 6 months. Lead acid batteries will self-discharge 5% to 15% per month, depending on the temperature of the storage conditions.

Monitor battery voltage and specific gravity of the electrolyte regularly to verify full recharging. As a general rule of thumb, the total amps from your PV panels should be sized between 10% and 20% of the total amp-hours (Ah) of the battery pack.

Many charge controllers have equalization settings that you can set to help ensure the health of your batteries. Equalize your batteries at least once per month for 2 to 4 hours, longer if your batteries have been consistently undercharged.

	System Voltage				
Voltage Settings	6V	12V	24V	36V	48V
Daily Charge	7.4	14.8	29.6	44.5	59.3
Float Charge	6.7	13.5	27	40.5	54
Equalize Charge	8.1	16.2	32.4	48.6	64.8

**Water your batteries regularly.**

Flooded, or wet cell batteries require watering periodically. Check your batteries once a month after installation to determine the proper watering schedule. Add water after fully charging the battery and use distilled water.

**For procedures on watering, checking battery voltage and other maintenance instructions, refer to our battery maintenance section for more details.**

Battery Maintenance, by Bob McCoy  
Jesyon Batri

Trojan T105 6V 225 AH lead acid batri se batri ke SUTS rekomande. Jere batri se yn bagay ki fasil men ki mande anpil dilijens( avek swen)

1. Batri yo dwe cheke chak 2 semen pou nivo dlo a e yo pa dwe tro plen poul debode. Batri yo dwe plen avek dlo Distilled ( en Haiti ki rele dlo batterie- dlo distile). Dlo normal ( dlo ke nou itilize chak jou) ap mache tou men li gen tro mineral ladan e sa ap bouche plat yo.

2. Chak mwa dwe gen yon tes hydrometer ki fet nan batri yo e mete nan yon fey rapor, sa yo dwe mete yon kote. Mwen bay chak ICT yon hydrometer men wap vle ke Louis gen yon tou. Gen anpil sou mache a men mwen itilize yon ki sorti NAPA ki gen 4 boul ladan li. Li pa tro gwo e li vini nan yn bwat plastik.



3. Mwen renmen li paske li senp e m pa bezwen konnen gravite spesifik de yon bateri en nanometer. 0, 25%, 50%, 75% e 100% yo normal. Wap plen hydrometer a avek dlo ki sorti nan chak selil epi mete nimero a nan yon fey de rapor. Pou komanse wap nimerote chak batri 1, 2, 3...etc. Apresa nan selil pou batri 1 pou avril wap mete 3/4/3 par ezanp paske selil 1 an fe 3 ti boul ret sou dlo, selil 2 fe 4 ti boul ret sou dlo e selil 3 fe 3 ti boul ret sou dlo. Le 4 boul ret sou dlo sa 100% charje. Lew mete sa nan fey de rapor a wap ka swiv li. Ou dwe mande operater a poul voye yon kopi de fey rapor a ba ou chak mwa pou ka analize li.

4. Lot pati nan jere baterie a se ke moun yo pa prete atansyon a Battery Monitor Meter ( Monitor konter batri a). Se bwat Bogart Engineering TM2030 a. Konter sa a dwe toujou rete plen % . Sa se rapor eta de tou batri yo e SUTS rekomande ke sistem yo pa dwe itilize si li anba 80%. Sa se yon bon nimerò men pafwa ou ka kitel rive nan 70% men nimerò ki bon an se 80%. Lead acid batri (batterie acid de plomb) pa menm jan ak batri konpiter (ordinate) ke yo desine poul dichaj konple epi recharje. Lead acid batri (batterie acid de plomb) dwe toujou genyen charj ki rekomande a an toutan, si sa pa fet, plat yo ap kouvri ak sulfur e evantyelman pap bay elektrisite.

5. Yon lot bagay se ke batri yo dwe egalize chak mwa dapres SUTS men li paret ke 3 mwa se yon tan sifi. Sa jis vle di ke yo dwe recharje. Se mete kontrol Flemax normal pou fe si ki li mache nan yon sik EQ. Gen yon prosesis pou fe sa avek Outback charge controller a ki nan manyel la. Oubyen achter yon bon 24V charjer batri ki ka bay 10 amps nan kouran an. Batri Trojan T105 ke nou itilize a se yon batri 225A, sa ap fel pran 22.5h de tan poul recharjer avek yon 10A charjer. Avek yon pi gwo charjer lap pran mwens tan men sa ou PA VLE FE se pote batri a yon kote pou yo chajer epi pou yo mete yon gwo amperaj sou li paske sa a ap gate batri a. Koman wap fe konnen ke yon batri bezwen egalize? Lekti hydrometer a ap indike ou. Le lekti hydrometer a pa normal nan yon batri, tankou 0/4/2 oubyen 1/3/2 sa vle di ke batri a bezwen egalize. Sa se yon nan rezon ke fe ou dwe kenbe fye papye rapor a e revize li pou remak konsa.





## EQ – Battery Equalize

Equalization is a controlled overcharge that is part of regular battery maintenance. Equalization brings the batteries to a much higher voltage than usual and “simmers” them for a period of time. This has the result of removing inert compounds from the battery plates and reducing stratification in the electrolyte. Equalization follows the same pattern as standard three-stage charging. However, instead of the Absorption voltage set points, it is controlled by the **Battery Equalize Volts** settings. The time is controlled by the **Battery Equalize Time** setting.

Equalization is normally performed only on flooded lead-acid batteries. The schedule for equalization varies with battery use and type, but it is usually performed every few months. If performed correctly, this process can extend battery life by a considerable amount.



### CAUTION: Battery Damage

- Do not equalize any sealed battery types (VRLA, AGM, Gel, or other) unless approved by the manufacturer. Some batteries may suffer severe damage from equalization.
- Contact the battery manufacturer for recommendations on equalization voltage, duration, schedule, and/or advisability. Always follow manufacturer recommendations for equalization.

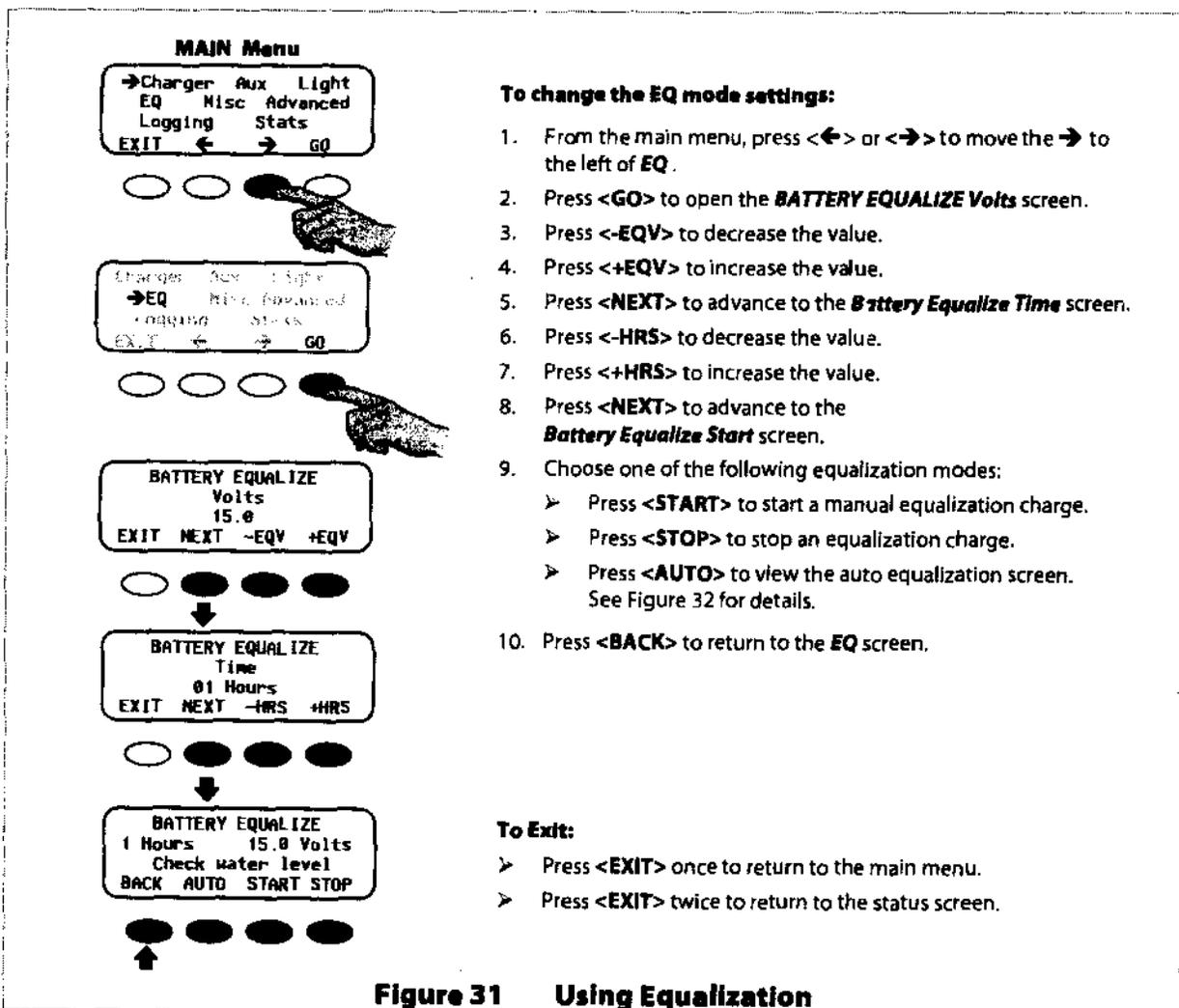
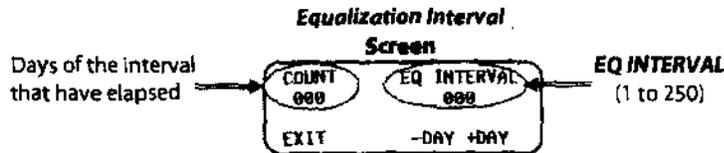


Figure 31 Using Equalization

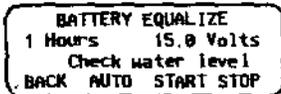
**Automatic Equalization Mode**

To enable an automatic equalization mode, an interval must be set for the number of days to pass between equalization cycles. This interval can be between 1 to 250 days. The default equalization interval setting is 000 which disables this feature.

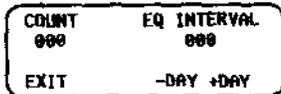
The Equalization Interval screen allows the user to set the interval between equalization cycles. It also displays how many days of the interval has passed. The **COUNT** value will be cleared to 000 when an equalization cycle is started, manually stopped, or if the charge controller has been powered off.



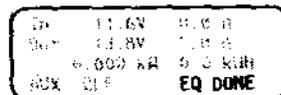
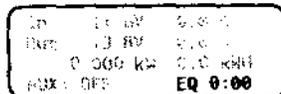
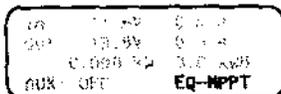
**BATTERY EQUALIZE START Screen**



**Equalization Interval Screen**



**Status Screen**



**To enable an automatic EQ cycle:**

1. Press <AUTO> to display the equalization interval screen.
2. Use <-DAY> or <+DAY> to set the number of days between each equalization cycle.
3. Press <BACK> to return to the status screen.

**To Exit:**

- > Press <EXIT> once to return to the EQ screen.

**On the Status Screen:**

- > **EQ-MPPT** will display to indicate the FLEXmax is trying to reach the target equalize set point.
- > **EQ 0:00** in Hours:Minutes will display after the equalize set point is reached.
- > After recharging, an **EQ DONE** message displays and a Float cycle begins. **EQ DONE** is displayed until (1) any soft key is pressed, or (2) a new day occurs for systems using an OutBack system display.

The incomplete equalization cycle continues into the next day unless the FLEXmax is powered off or manually stopped. The remaining EQ time can be viewed in the **End-of-day Summary** screen (see page 18).

**Figure 32 Setting the EQ AUTO Interval**

## EQ - Batterie Egaliser

La péréquation est un surcoût contrôlé qui fait partie de l'entretien régulier de la batterie. Égalisation amène les piles à une tension beaucoup plus élevée que d'habitude "mijote" eux pendant une période de temps. Ce qui a pour résultat d'éliminer les composés inertes à partir des plaques de la batterie et de réduire la stratification l'électrolyte. La péréquation suit le même schéma que la charge standard de trois étages. cependant, au lieu de la tension d'absorption points de consigne, il est contrôlé par les paramètres de la batterie Egaliser Volts. Le temps est contrôlé par le paramètre Battery Egaliser Time.

La péréquation est normalement effectuée que sur les batteries au plomb-acide inondées. Le calendrier pour l'égalisation varie selon l'utilisation de la batterie et le type, mais il est habituellement effectué tous les quelques mois. Si effectué correctement,

ce processus peut prolonger la vie de la batterie par une quantité considérable.

### ATTENTION: Les dommages Batterie

☒ Ne pas égaliser tous les types de batteries étanches (VRLA, AGM, Gel, ou autres), à moins approuvé par le fabricant. Certaines batteries peuvent souffrir de graves dommages à partir égalisation.

☒ Contactez le fabricant de la batterie pour les recommandations sur la tension d'égalisation, la durée, le calendrier, et / ou de l'opportunité. Toujours suivre fabricant recommandations pour l'égalisation.

### Figure 31 Utilisation de la péréquation

☒Charger Aux Lumière

EQ Misc avancée

Statistiques de journalisation

EXIT ☒ ☒ GO

Menu principal

BATTERIE EQUALIZE

Volts

15.0

EXIT SUIVANT -EQV + EQV

Chargeur Aux Lumière

☒EQ Misc avancée

Statistiques de journalisation

EXIT ☒ ☒ GO

BATTERIE EQUALIZE

Temps

01 Heures

NEXT EXIT -HRS + HRS

Pour modifier les paramètres du mode EQ:

1. Dans le menu principal, appuyez sur <←> ou <→> pour déplacer le  à la gauche de EQ.
  2. Appuyez sur <GO> pour ouvrir l'écran BATTERIE EQUALIZE Volts.
  3. Appuyez sur <-EQV> pour diminuer la valeur.
  4. Appuyez sur <+ EQV> pour augmenter la valeur.
  5. Appuyez sur <NEXT> pour passer à l'écran Batterie Egaliser Time.
  6. Appuyez sur <-HRS> pour diminuer la valeur.
  7. Appuyez sur <+ HRS> pour augmenter la valeur.
  8. Appuyez sur <NEXT> pour passer à la  
écran Batterie Egaliser Start.
  9. Choisissez l'un des modes d'égalisation suivants:
    - Appuyez sur <START> pour lancer une charge manuelle de péréquation.
    - Appuyez sur <STOP> pour arrêter une charge d'égalisation.
    - Appuyez sur <AUTO> pour afficher l'écran d'égalisation automatique.
- Voir Figure 32 pour plus de détails.
10. Appuyez sur <BACK> pour revenir à l'écran EQ.

BATTERIE EQUALIZE

1 Heures 15,0 Volts

Vérifier le niveau de l'eau

RETOUR AUTO START STOP

Pour quitter:

- Appuyez sur <EXIT> une fois pour revenir

Mode égalisation automatique

Pour activer un mode d'égalisation automatique, un intervalle doit être réglé pour le nombre de jours à passer entre cycles de péréquation. Cet intervalle peut être compris entre 1 à 250 jours. L'égalisation réglage de l'intervalle par défaut est 000

qui désactive cette fonctionnalité.

L'écran de péréquation Intervalle permet à l'utilisateur de définir l'intervalle entre les cycles de péréquation. Il affiche également

combien de jours de l'intervalle est écoulé. La valeur COUNT sera autorisé à 000 quand un cycle d'égalisation est commencé, arrêté manuellement, ou si le régulateur de charge a été mis hors tension.

Pour activer un cycle d'égalisation automatique:

1. Appuyez sur <AUTO> pour afficher l'écran d'intervalle d'égalisation.
2. Utilisez <-DAY> ou <+ JOUR> pour définir le nombre de jours entre chaque cycle de péréquation.
3. Appuyez sur <BACK> pour revenir à l'écran d'état.

#### EQ INTERVALLE

(1 à 250)

Jours de l'intervalle

qui se sont écoulés

Intervalle de péréquation

Écran

Pour quitter:

☒ Appuyez sur <EXIT> une fois pour revenir à l'écran EQ.

Sur l'écran d'état:

☒ EQ-MPPT affiche pour indiquer le FLEXmax cherche à atteindre la cible égaliser point de consigne.

☒ EQ 0:00 Heures: Minutes affichera après le point de consigne d'égalisation est atteint.

☒ Après la recharge, un EQ DONE message apparaît et un flotteur cycle commence. EQ DONE est affiché jusqu'à ce que (1) une touche douce est pressé, ou (2) un nouveau jour se produit pour les systèmes utilisant un OutBack affichage du système.

Le cycle d'égalisation incomplète continue dans le lendemain, sauf si

l'FLEXmax est éteint ou arrêté manuellement. L'EQ restante

le temps peut être affiché dans l'écran de fin de journée Résumé (voir page 18).

Google Translate for Business:Translator ToolkitWebsite TranslatorGlobal Market Finder



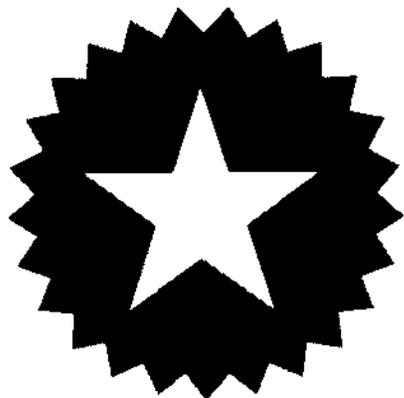
**CERTIFICAT**

*de*

**PARTICIPATION**

Est-a remercié pour votre participation à

**LWW L'ENTRETIEN DES BATTERIES**



PRESENTED BY:

*Bob McCoy*

ON THIS DAY:

*June 16, 2016*

wpn	fn	ln	phone	community class	Location
828	Bellabe	Denison		Savanette	Battery Ma Cayes
827	Wilner	Augustin		Cayes	Battery Ma Cayes
780	Adrass	Marie Roselie		Aniquet	Battery Ma Cayes
827	Fanfan	Jean Arold		Cayes	Battery Ma Cayes
661	Dorestan	Nadia		Torbeck	Battery Ma Cayes
818	Benitte	Sanon		Vernet1	Battery Ma Cayes
	Poincilma	Ketto		Cambry	Battery Ma Cayes
602	Dormeus	Piere Francois		Darivagee	Battery Ma Cayes
1004	Molin	Lineda		Cavaillon g	Battery Ma Cayes
771	Remarais	Jude		Camp Perir	Battery Ma Cayes
723	Duckson	Arise		Chaveneau	Battery Ma Cayes
780	Michel	Ofecial		Aniquet	Battery Ma Cayes
818	Carole	Piere		Vernet1	Battery Ma Cayes
629	Amazan	Joseph Gildas		Cayes	Battery Ma Cayes
685	Louis	Odigeno	32957718	fond Pierre	Battery Ma NDC Leogane
654	Vane	Wilson	36946110	Mirebalais	Battery Ma NDC Leogane
997	Naud	Garry	36908037	Lavallee	Battery Ma NDC Leogane
849	Pascal	Vilcimus	37372740	Trouin	Battery Ma NDC Leogane
909	Michelet	Joseph	38878842	St Etienne	Battery Ma NDC Leogane
909	Marc Elie	Joseph	36442625	St Etienne	Battery Ma NDC Leogane
63	Wedner	Jeanty	36237431	Cherident	Battery Ma NDC Leogane
711	Jean Milot	Mathieu	32625242	Dumay	Battery Ma NDC Leogane
	Dupin	Jean Herold	36581223	Carrefour N	Battery Ma NDC Leogane
481	Neohralie	St Duc		NDC Leoga	Battery Ma NDC Leogane
722	Fleundor	Ronald	37265574	Limbe	Battery Ma Gonaives
691	Joseph	Watlin	44528280	Balan	Battery Ma Gonaives
843	Louis	Lucksin	34456786	Port au Pai	Battery Ma Gonaives
842	Demosther	Even	31874268	Beraca	Battery Ma Gonaives
761	Charles	Pinder	43889342	Carrenage	Battery Ma Gonaives
1041	Louisilieb	Louis	36485377	Port Depail	Battery Ma Gonaives
814	Pierrot	Antenor	38381310	Bas Limbe	Battery Ma Gonaives
655	Jean-Ville	Eronel	36227439	Grand Bois	Battery Ma Gonaives
763	Paul	Fauker	37215061	Conservatrice	Gonaives
804	Jean	Guillaume	37990918	Laveau	Gonaives
654	Roland	Frantz	38475583	Ecole de Choix	Gonaives
1013	Petit-frere	Fr Wilken	37168982	Port au Paix	Gonaives
371	Accime	Sergio	33532395	Arcahaie	Gonaives
862	Jean	Marcelin	33410414	Coreluc	Gonaives
488	Mervil	Romane	46122048	Limbe	Gonaives
691	Augustin	Mylove		Balan	Gonaives

6/15/2016  
in Cayes

WATER  
PROJ  
OP

	Name	Last Name	Community	
1,	Bellabe	DENISON	Savanette	828
2,	Wilner	AUGUSTIN	Cayes	.827
3,	Adress	Marie Roselie	ANIGUET	.780
4,	FANFAN	Jean Arold	Cayes	.627
5,	DORRESTAN	Nadia	TORBECK	.661
6	BENISTE	SANON	VerNet 1	.818
7,	PAINCILMA	Ketto (Cambry close to Darivages)		
8,	DOORMEUS	Pièra FRANÇOIS	Darivages	.602
9,	MOLIN	Lineda Cavaillon		.1004
10	Dody	EVENS Cavaillon	(grandier 2) (grandiera)	
11	<del>Remois</del> Remarais	Jude	Camp perin	771
12	Durkeson	RISE	Chaveneau	723
13	Michel	Ote Cial	ANIGUET	780
14	Carole	pièra	VerNet 1	818
15	Amazon	Joseph	Gildas Cayes	629
	→ Amazon	Joseph	Gildas	

6/16/2016  
in Leogane

p 1	Louis	Odiene	Fond-Pierre 685 (3295771)
p 2	Vane	Wilson	Mirrebalais 654 (369461)
3	Naud	Garry	La Vallée 997 (36908032)
4	Pascal	Volcimus	Trouin 849 (37372740)
5	Michelet	Joseph	St Etienne 909 (38878842)
6	Marc-Elie	Joseph	St Etienne 909 (3644262)
7	Wedner	Jean Ty	Cherident 63 (3623743)
8	Jean Milot	Mathieu	Dumay 711 (3262524)
9	Dupin	Jean Herold	Carrefour feuille (365812)
10	Nephtalie	St Duc	close to Matissant) Notre Dame 481

11

6/17/2016  
IN FONDIRVES

p 1	Fleurdor	RONALD Limbe 722 (37265574)
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