When I bought my project Corvette in 1999, I considered myself lucky. After all, the carcass had an original steering wheel that was in excellent condition (minimal wear and without cracks) and what appeared to be a fairly new and clean replacement fuel pump tagged 6440083. Everything else about the car's condition evoked my worst nightmare. Since I was going whole hog with this, I decided to make a couple of upgrades while being faithful to NCRS publications and its knowledge base for a high quality restoration. I resolved to make the fuel pump the single exception to my rebuild-everything rule by giving it a quick wash and installing it on the rebuilt engine. W-r-o-o-n-g!

Upon completion of the project, the engine seemed to run well, considering that I was not racing the car at the time. As time went by though, on a couple of excursions into the 6500 RPM-plus zone, I noticed what appeared to be a fuel-starvation condition. I replaced the fuel filter, put a pressure gauge on the fuel inlet to the Holley 2818, and measured the inlet pressure at 2.5 PSIG at 850 RPM!! Measuring again while underway yielded 2 PSIG at 3000 RPM and 1 PSIG at 5000 RPM. The shop manual states that the fuel inlet pressure should be 6.5—7.5 PSIG at idle, and there should be very little drop off all the way up to redline.

I removed the pulsator cover and diaphragm and immediately saw the cause of the problem (figs. 1 & 2): one of the two poppet valves staked into the pump body (the outlet valve) had become dislodged, was interfering with other moving parts, and had damaged the pump casting! So now that the replacement pump was junk, I set about locating an original 6440083 for my L76.

The 6440083 fuel pump was used for 1964-65 327 Special High Performance Corvettes and for all 1966 327 Corvettes before being replaced by the sealed type pump in 1967. This is a unique piece in that the upper section (diaphragm housing) is cast from magnesium, rather than cheaper and heavier pot metal alloys, which contain variable amounts of aluminum, tin, cadmium, lead, copper and zinc. Indeed, the difference in weight can easily be felt by hefting a replacement in one hand and the real McCoy in the other!

I tapped the vast knowledge base on the Technical Discussion Board and received some vital information from Bill Clupper on how to identify an original pump. Most of us know about the "AC" cast into the top of the pump plunger housing and the 40083 with a two-character alpha code stamped into the mount flange. There are however three characteristics on original fuel pumps and service replacements not present on even the best reproduction piece. These are the double-stepped lever pin boss (fig. 3), the crows-foot reinforcements at the forward sector of the base of the plunger rod housing where it meets the diaphragm case (fig. 4), and the unique "X" and staked markings of original lever retainer pins (figs. 3, 5 & 6). There are other identifiers present such as the "S" marks on the pulsator cover-to-body and body-to-diaphragm housing screws (fig. 7), the cotton-reinforced neoprene rubber diaphragm (fig. 8), and the alpha code stamped into the mount flange (fig. 3), but of course these can be added at any time and in no way identify an original. (Alpha codes are another subject unto itself, and some vital information may be found on the NCRS TDB under the following threads: "Internally Cast

Fuel Pump Date Code" and "Fuel Pump Date Code? David Liukkonen." Both appeared in late February and early March 2010.)

Armed with the knowledge gleaned from the TDB, I located a virgin pump from NCRS member Gary Seymour in Towanda, PA. I also wanted to use a high quality rebuild kit, and I found that with Hal Houghton, owner of the Classic Preservation Coalition (www.classicpreservation.com). His kit differs from all others in that it requires the press off and re-use of the original diaphragm stem, thrust washer, and diaphragm retention saucers (figs. 9 & 10). You will not find the heavy cotton reinforcement within his replacement pump diaphragm, nor will you find it on any other. What you will find is an opaque nylon mesh, which is much more durable that the original cotton. Yes, it is noticeable during judging, but that's the price we have to pay for modern durability and compatibility.

Some have said that the C.P.C. rubber components are more durable than the others from some of the larger parts houses. The original stem and link are case hardened and are longer wearing than the replacement parts found in many of the other kits. The downside to using this kit is that one must disassemble the original stem from the saucers, thrust washer and diaphragm and reassemble. The care taken during this process is absolutely critical. No sweat though, because if you'd rather not do the this yourself, Hal will do it if you ship him the diaphragm/rod assembly. He also offers a full rebuild service at an excellent price if that's what floats your boat.

During disassembly, retain all original parts for re-use, except for the two poppet valves and gaskets, main diaphragm, pulsator cover seal/diaphragm, stem seal, rocker arm pin bushing and engine mount flange gasket. Take note of orientation of everything

as you proceed, especially the orientation of the body to the diaphragm/stem housing. Remove the two pulsator cover screws, cover and diaphragm. Remove the ten body attaching screws and remove body from upper casting. YOU WILL REUSE THE ORIGINAL ROCKER PIN IF YOU HAVE ONE. If the pump has been rebuilt before, then chances are it already has the newer style retainer with the cotter pin. Cautiously squeeze the distorted end of original pins together as much as possible. Using a Dremel tool, carefully remove only enough material from the deformed end so that the pin can be driven out of the pin boss. It may be necessary to use a small cutoff wheel on the Dremel in order to slice through the retaining washer to facilitate removal. If you do so, you will be able to fabricate a duplicate of the original from a small flat washer. Drive the two staked poppet valves out of the pump body using a 5/8" deep socket while supporting the underside on a flat surface. Be sure to remove the old gaskets.

One of the more difficult steps is the removal of the rocker arm/bushing/rocker arm link/diaphragm/stem assembly from the upper housing once you have driven out the retainer pin. Pull outward on the rocker arm/bushing/link while pushing down on the diaphragm/stem assembly. This will disengage the hook in the end of the link from the slot in the upper section of the diaphragm stem. If you have trouble with this after a few attempts, then put it down for a while. Go inside the house and kick the dog. Have a coupla brewskis and return to trying to drive the diaphragm stem seal out of the housing.

Use a wire wheel on internal parts that will be reused, such as springs, rod, rocker, etc. Dress the link hook surfaces flat with a file. Wash all parts in a solvent such as gasoline, lacquer thinner, benzene, or Stoddard sol-

vent. Be sure to clear the two diaphragm vent holes in the upper section with a small drill bit or needle file. Use a toothbrush to remove heavy deposits. Blow dry with compressed air. There were two types of pulsator covers used for this model pump—the cast pot metal and a cadmium-plated/dichromate-washed stamped steel. The stamped steel type requires washing, surfacing and finally either plating or painting with artificial cad-dichromate finishes.

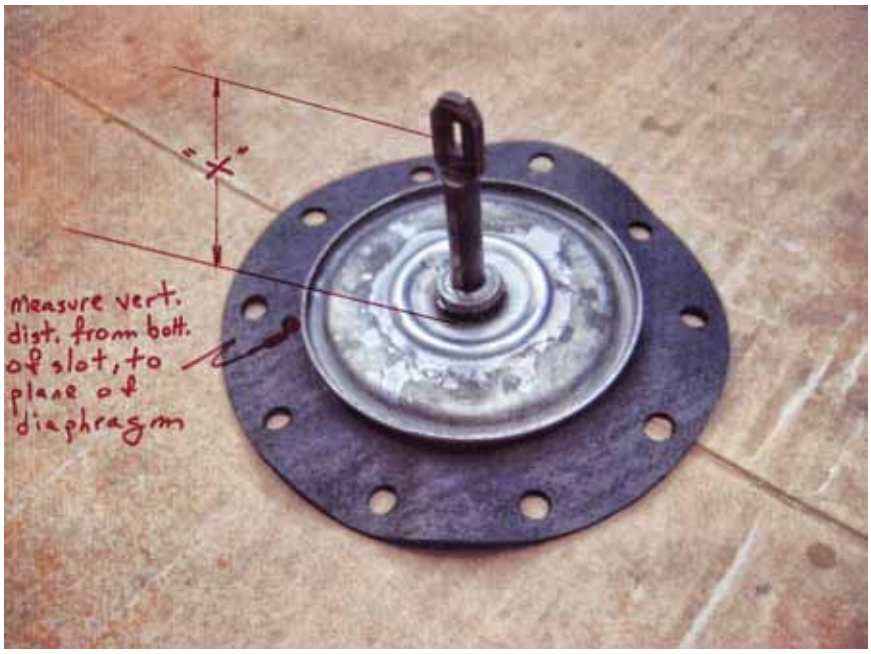
The pot metal main body section, the magnesium upper section, and the pulsator cover (if pot metal) require special handling after they have been washed as above, except for applying the wire wheel. A clean, unprotected magnesium surface develops an ugly gray-white, powdery patina of magnesium oxide. If you prefer not to have this return to the upper section, then you should wash it in a dilute solution of muriatic acid, along with the body and cover (if cast). DO NOT IMMERSE ALUMINUM PARTS INTO MURIATIC ACID. Follow directions on acid container. Wearing eye protection, long sleeves, and rubber gloves, gently cleanse with a stiff bristle brush or toothbrush. Do not leave parts immersed for more than a few minutes at a time. If effervescence is notable, then further dilute solution. This treatment blends and removes any surface mottling and leaves behind a handsome, gray-black finish similar to zinc phosphate. If left clean and unprotected, it does not degrade and prevents reappearance of the white magnesium oxide. Wash with soapy water, rinse, and blow dry with compressed air.

There are five surfaces which must be made perfectly flat (figs. 11-15). The pulsator cover, both sides of the body, and the lower and upper flanges of the diaphragm housing. Use a surface plate or a hard flat surface, a full sheet of 320-grit wet/dry paper and WD-40,

kerosene, or light machine oil as lubricant. Place the wet abrasive on the surface, hold your work evenly and firmly, and with medium pressure work the parts in a figure-eight pattern until the abrasion pattern appears evenly across all mating surfaces. Rotate the work in your hand after every few cycles and keep the abrasive lubricated.

If you decide to restore the diaphragm assembly yourself, then the most critical part of the assembly process is the main diaphragm free height or the distance from the bottom of the stem slot to the plane of the diaphragm when it is relaxed. I cannot emphasize this enough. THIS DISTANCE DETERMINES PRELOAD ON THE DIAPHRAGM SPRING, WHICH IN TURN DETERMINES PUMP OUTPUT PRESSURE. Remember, you want the pressure to be between 6.5 and 7.5 PSIG at idle. Anything less will lead to fuel starvation and anything more will lead to non-seating of carburetor float valves. If you use the kit which I recommended, be sure to measure this distance (dimension X, Fig. 16) before disassembling the diaphragm and duplicate it upon re-assembly. Full instructions for diaphragm/stem removal and restoration are too lengthy to reprint here but are included with the kit from C.P.C.

Install new diaphragm stem oil seal into upper housing (figs. 14 & 17) using a thin coating of Permatex 2 as a lubricant and sealer. Tap in with a socket until it bottoms. Staking should not be necessary. Loctite Sleeve Retainer or something similar may be used in place of the Permatex 2. Install the new poppet valves into the body using a socket and put in new gaskets. Apply an even coating of Permatex 2 to both gasket surfaces, tap poppets into place until they bottom firmly against the gaskets and re-stake (figs. 18 & 19). Install pulsator cover with new diaphragm and use Permatex 2 on cover flanges.



Re-use original link, main spring, and rocker arm along with new bushing and rebuilt diaphragm/stem assembly as shown in Fig. 20. Apply moly grease or chassis grease to all sliding surfaces, fit hook of link into slot of stem with open end of hook facing up. Insert bushing onto link/rocker arm articulation point. Use the same pulling/twisting procedure used for disassembly. This may require you to go back into the house, kick the dog again, and have a coupla more brewskis.

Insert the original retainer pin and washer in the same orientation as it was when you re-

moved it. Place the X marked end onto an anvil or vise, and, using a small cold chisel and light hammer, gently deform the pin by re-spreading the same grooves that you squeezed together upon disassembly (fig. 21). Insert small return spring between rocker arm and upper casting (fig. 22).

Go inside, have a coupla brewskis, and apologize to the dog because your rebuild is completed. Come back into the garage and admire your new pump (figs. 23–25).