Red, below are tests I would do to fully check my EVAP system without tools like a smoke machine. Some of the tests might need a second person present to help you out. These tests are assuming you don't have any trouble codes and the MIL is not lit. It is possible that you are dealing with more than one problem and an additional issue may not be related to the EVAP system. But as I stated earlier, the raw fuel smell you notice I believe is most likely EVAP related. We get that solved, then we can further diagnose other problems. When you plug/seal different termination points, make sure you plug/seal them well so there is not a possibility of leak.

First I would check for leaks from VAPOR CANISTER to the EVAP VACUUM DIAGNOSTIC SWITCH:

1. Disconnect the line that runs into the EVAP VACUUM DIAGNOSTIC SWITCH at point "E".

2. Go to the VAPOR CANISTER disconnect the line at point "G" and plug/seal the nipple (stamped on VAPOR CANISTER as "TANK") . For safety, you should also plug the line you've removed as that line goes directly to the fuel tank and you don't want fuel vapors opened to the atmosphere that could be inhaled or cause an explosion. If you smoke, I wouldn't while doing these tests. Especially at the VAPOR CANISTER.

3. Remove the line at point "H" and plug/seal the nipple (stamped "AIR" on VAPOR CANISTER).

4. Now you should only have one line connected to the VAPOR CANISTER (at point "F", stamped "PURGE" on the VAPOR CANISTER). The other two connection points should be completely sealed off.

5. Connect your hand vacuum pump to the line you disconnected in step 1. Make sure you have a good seal. The MityVac comes with rubber cones that work nicely. Operating the MityVac you want to create enough vacuum until you reach ~10inHg of vacuum. Watch the gauge. Vacuum should not decay. If it decays, or if you cannot create any vacuum, there is a leak. It will take several pumps on the MityVac to create the vacuum.

6. If you cannot create or hold the vacuum, go back to VAPOR CANISTER, disconnect line at point "F"(stamped "PURGE" on VAPOR CANISTER) and plug/seal the line.

7. Go back to the MityVac and attempt to create and hold the vacuum (see step 5). If you cannot create and hold the vacuum, there is leak in that line. Double check your sealing at the MityVac end and the other end and try again. If no vacuum can be created/held, you have a leak in the line and you'll have to try and find it.

8. If the line holds vacuum, then the VAPOR CANISTER must be the culprit. Remove it and inspect for cracks or damage. But it probably needs to be replaced. You can use the MityVac to test it at the "PURGE" location with the other two nipples sealed if you want to verify.

9. If the vacuum in step 5 can be created and held, this is where you will need the help of someone else. Remove the plug/seal at the VAPOR CANISTER at the nipple stamped “AIR” (point “H”).

10. While having the assistant seal the “AIR” nipple on the VAPOR CANISTER, create the vacuum as noted in step 5. While watching the MityVac gauge, have the assistant un-seal the “AIR” nipple (a finger with should work). The vacuum should rapidly drop to 0 inHg. If the vacuum does not drop rapidly, either the line or the VAPOR CANISTER is obstructed. If it is the VAPOR CANISTER (which it probably would be), I would replace the canister.

Testing the EVAP PURGE SOLENOID & EVAP PURGE VACUUM SWITCH

Take a real close look at the EVAP PURGE VACUUM SWITCH. You had stated previously that there were only two ports, but in one of your pictures it appears there is a line going under the electrical connector where a third port would be. Please double check that and if there is a third port, where is that line going to?

A couple notes about your system. First, on a correctly operating system the EVAP PURGE SOLENOID will not open (purging the VAPOR CANISTER) until coolant temperature is above 113F. It will also not open when the engine is at idle. One caveat, I did find an OEM note that the PURGE SOLENOID will open if the VCM detects an extreme lean air/fuel mixture. Just keep those things in the back of your mind as you do these tests.

1. I think we should start with a baseline. First clean the carbon I saw in the pic off of the throttle body and plate. Then disconnect the line at point “A” (at the throttle body). For this it doesn’t matter if the engine is cold or at operating temp. I don’t know your setup exactly, but I would connect a hose to point “A” and blow through it to see if the port on the throttle body is clogged with carbon. Whether it is or not, I would look at cleaning the port with a pipe cleaner soak with carb cleaner. Then, connect your Mity Vac. You’re not going to pump at all, just watch the gauge. Note & record the inHG at idle. Have your helper hold the RPM at ~2500…note and record the inHG on the MityVac. It is important that everything else is left connected, to include the air intake, air filter cover, etc. You might also need to use a rubber hose to connect the MityVac to the throttle body, just insure there is a tight seal on the connections. This should give us a baseline to be used in the rest of the testing.

2. Now that you have a baseline to know how much vacuum is being produced, let’s see if the PURGE VALVE SOLENOID is open when it shouldn’t be. I would consider doing this test both after an overnight cold soak and when the engine is above 113F. With everything else connected (to include at the throttle body), disconnect the line at point “C” (or “D”) and connect your MityVac. Don’t pump, just watch the gauge with engine cold and at idle. There should be NO vacuum. If there is vacuum disconnect the electrical connector (while leaving the MityVac attached) and watch the gauge. If the vacuum stops, then we could probably discern that there is a problem in the circuit for that solenoid or the VCM itself. If the vacuum remains with connector unplugged, I would feel good about calling the PURGE VALVE SOLENOID as bad.

3. With engine at operating temp and at idle, PURGE VALVE SOLENOID electrical connector connected, and with the MityVac still attached as in step 2 above, look at the gauge to see if there is any vacuum. If there is, you stated you had an OBD reader that showed live data, look at the B1S1 O2 sensor data to see if it is pegged low (100mv) indicating an EXTREME lean condition. That will be a separate issue to resolve. If there is no vacuum, raise RPM >2500 and hold to see if vacuum is produced.