R&G Laboratories, Inc.

Sampling Procedures

General Guidelines

- Successful oil analysis begins with proper sampling
- Maximize data density
- Minimize data disturbance
- Sample equipment at proper frequency
- Sample equipment the same way every time
- Always do what is best for the equipment

PRECAUTIONS

- Always check in with control room when entering an area. Also, check in with appropriate personnel in the immediate work area, so they are aware that you are working in their area. If applicable, get a safe work permit for each area of work.

- Extreme caution must be applied when using tubing to obtain oil samples from operating units. Some equipment may need to be shut down before sampling. Tubing can be caught by moving parts and pulled into the unit. This will necessitate disassembling the equipment to remove the tubing and might damage the unit. Always exercise care to ensure this does not occur.

- Always check the oil level to be sure there is sufficient oil in a unit and do not remove enough oil to lower the oil level below the low level mark. If oil level appears too low, or too high, notify appropriate site personnel so issue can be addressed.

- Use only approved oil sample bottles and tubing. This prevents possible contamination of the sample by the container.

- Always drain enough oil to flush sampling equipment prior to obtaining sample.

PRECAUTIONS

- Keep equipment clean at all times. Before sampling, wipe off and clean equipment. After sampling, repeat process to prevent contamination. Leak Management - Clean up any oil that may have spilled during the sample process.

- Strive to pull oil samples while the unit is at normal operating temperatures. If not possible, as soon after shutdown as possible, preferably within 30 minutes, samples should be taken.

- When finished, make sure area is left as found. Check out with control room to turn in safe work permit. Also, check out with appropriate personnel in the immediate work area, so they are aware that you have finished working in their area.

- Always notify proper personnel of any problem samples that were taken. Problem samples typically include visible water, excessive debris, or any other unusual conditions. Common notification methods are to use digital photographs and/or pull a duplicate sample for site.

Sampling Equipment Needed

Sample Pump	Sample Bottle(s)	Tubing
Mailer(s)	Label(s)	Sample List(s)
Brake Cleaner	Wire Brush	Container(s)
Minimess Valve	Towels/Rags	Tools

Personal Protective Equipment (PPE)

Sampling Equipment Care

- Do not overfill sample bottles. This can cause oil to be pulled into the pump.
- If oil is pulled into the pump, it must be disassembled and thoroughly cleaned.
- Keep tubing clean prior to use.
- Keep sample bottles clean. Store with lids on bottles.
- Store sampling equipment to ensure contamination does not occur. Utilize containers (bins, backpack, drums, etc) with sealed lids and, if applicable, a bed cover on the truck to protect sampling equipment from outside contamination.
- Utilize appropriate Personal Protective Equipment (PPE) for the working environment encountered during the sampling process.

Sample Procedures

- Start by getting the proper sampling equipment for the sample route. Sampling equipment can include any of the equipment listed above. Personnel should select enough equipment to ensure the sampling route can be completed without restocking. Pickup and verify sample list and labels for site.

- Once on site, utilizing sample list and labels, identify correct equipment to be sampled. Also, cross-reference sample label info (asset name, PID, etc) to equipment info (equipment tag, start/stop button, etc) thereby ensuring correct equipment is being sampled.

- For each asset, maintain cleanliness. Before beginning sampling, use brake cleaner, wire brush, and clean rags to ensure sample ports and/or minimess valve are clean. After sampling, repeat process to ensure all sampling equipment and operating equipment are kept as clean as possible. Also, remove any trash generated during sample process.

Sample Port Sampling

1. Clean sample port.
2. Place minimess valve on sample port.
3. Place tubing in sample pump and minimess valve. Utilize a new piece of tubing every time. *Never Reuse Tubing.*
4. Start sample flow by using oil pump.
5. Flush sample port, minimess valve, and tubing for enough time to ensure the dead space volume has been accounted for. Utilize a waste sample container to collect any fluid generated during the flushing process.
6. After flushing, insert a new sample bottle into sample pump. Fill sample bottle to no more than 3/4 of the bottle volume.
7. Once sample bottle is full, immediately cap to keep foreign contamination out.
8. Leak Management - Clean up any oil that may have spilled during the sample process.

Drop Tube Sampling

1. Remove oil filter plug, vent pipe, or cap. Be sure this is above the oil level of unit. On some equipment it may be possible to use the oil level pipe.
2. Insert tubing into oil reservoir and sample pump. Utilize a new piece of tubing every time. *Never Reuse Tubing.*
3. Start sample flow by using oil pump.
4. Flush the tubing for enough time to ensure the dead space volume has been accounted for. Utilize a waste sample container to collect any fluid generated during the flushing process.
5. After flushing, insert a new sample bottle into sample pump. Fill sample bottle to no more than 3/4 of the bottle volume.
6. Once sample bottle is full, immediately cap to keep foreign contamination out.
7. Leak Management - Clean up any oil that may have spilled during the sample process.

For this sampling method, variations can sometimes be seen at different locations in the reservoir. Therefore, the following actions are recommended and should be practiced:

- Avoid sampling from the absolute top or bottom of reservoir.
- Always use the same sampling technique.
- Pull the oil sample from the same relative location in the reservoir.

Labeling and Sample Delivery

- Labels should be placed on samples immediately after sampling to prevent possible confusion. Where applicable, verify/match sample label info (i.e. asset name, PID, etc) to equipment info (i.e. equipment tag, start/stop button, etc).
- Labels should contain all pertinent information including, but not limited, to the following:
    1. Equipment Identification
    2. Equipment Description
    3. Date of sample
    4. Plant or location
    5. Operating hours (if applicable)
    6. Point Identification (PID) Number
- If delivering samples, store samples properly to ensure contamination stays out. Utilize containers (bins, backpack, drums, etc) with sealed lids and, if applicable, a bed cover on the truck to protect samples from outside contamination. Always forward samples to laboratory as soon as possible.
- If shipping samples, pack samples into mailer or box. Fill empty space with absorbent or packing materials. Seal box and place return label prominently on top. Make sure a return address is on label or mailer.