1. Purpose

This procedure highlights the need to ensure precautions are taken when removing oil from transformers for the purpose of dissolved gas analysis.

2. Scope

a. Identifying a free breathing transformer

3. References

a. IEC 60567 - Oil-filled electrical equipment – Sampling of gases and of oil for analysis of free and dissolved gases – Guidance
b. IEC 60599 - Mineral oil-impregnated electrical equipment in service – Guide to the interpretation of dissolved and free gases analysis
c. IEC 60422 - Mineral insulating oils in electrical equipment – Supervision and maintenance guidance
d. IEC 60044-1 – Instrument Transformers
e. AS 1767.1-1999 Insulating liquids - Specification for unused mineral insulating oils for transformers and switchgear
f. TA 00001 – Job Safety Analysis

4. Definitions /Abbreviations

JSA – Job Safety Analysis

Oil – Transformer insulating fluid – usually hydrocarbon based

PPE – Personal Protective Equipment

Tube – Tube designed for sampling oil from transformers complete with fittings

TX – Transformer

5. Health & Safety

General caution, health, safety and environmental protection.

This procedure does not purport to address all the safety problems associated with its use. It is the responsibility of the user of the standard to use appropriate health and safety practices and determine the applicability of regulatory limitations prior to use.

The mineral insulating oils which are the subject of this procedure should be handled with due regard to personal hygiene. Direct contact with the eyes may cause irritation. In the case of eye contact, irrigation with copious quantities of clean running water should be carried out and medical advice sought.

No work shall be carried out without first conducting an OHS study of the task in hand and the appropriate check sheets (TA 0001) filled out.

Transaudit Quick Check

Personal Protective Equipment (PPE) Required						
 Gloves	 Face Masks	 Eye Protection	 Welding Mask	 Appropriate Footwear	 Hearing Protection	 Protective Clothing
☐	☐	☒	☐	☒	☐	☒

This quick check does not replace Job Safety Analysis TA 0001

6. Environmental

Our commitment is to ensure that the environment is not damaged through any action that we may take now or in the future. Transaudit will provide the means to limit environmental damage through engineering, substitution or removal of and items or procedures that have the potential to impact the environment. Disposal of waste material, hazardous goods or items which have become contaminated will be done through the appropriate means or through a registered waste disposal company.

7. Procedure

Identifying free breathing transformers

a. Identify if the transformer has a breather, silica gel or other device that allows the transformer to breathe to atmosphere. For the sake of this procedure, transformers with separator bags in conservators are deemed to be free breathing
b. If the transformer has a breathing system, it is deemed as free breathing
c. Connect the tube to the transformer
d. Close the ball valve
e. Open the valve on the transformer slightly
f. Using the ball valve on the tube, slowly open and closely watch the oil in the tube for movement
g. Close ball valve
h. Wipe tube with lint free clean rag, place end of tube over collection device
i. Open ball valve allowing enough oil[1] to flow through the valve and fittings to flush clean and remove any trapped air – opening and closing of the ball valve a few helps with the process
j. Close ball valve, wipe tube again with lint free clean rag
k. Attach syringe to tube using Luer Lock connector[2]
l. With stopcock in bypass position (3 way stopcock only), bleed an additional amount of oil through bypass into collection device
m. Without stemming the oil flow, tilt syringe to 45 degrees and turn stopcock to allow oil to push into syringe. During this slow fill process, use laser to measure inflow oil temperature.

[1] If sampling point is >25mm above tank base or if the tank has an obvious sump, less oil will be required to flush verses a valve located on the very bottom of the tank.
[2] Check syringe integrity by pulling plunger back against closed stopcock.

n. Fill syringe to 5-8mm past 50ml mark. Keep syringe tilted – there will be trapped air at the top of syringe. Close valves, detach tube, and rotate the syringe until stopcock is vertical.

o. Carefully holding the plunger, open the stopcock to filling position and evict the air bubble and extra oil from syringe to the 50ml mark.

p. Store and complete paperwork.

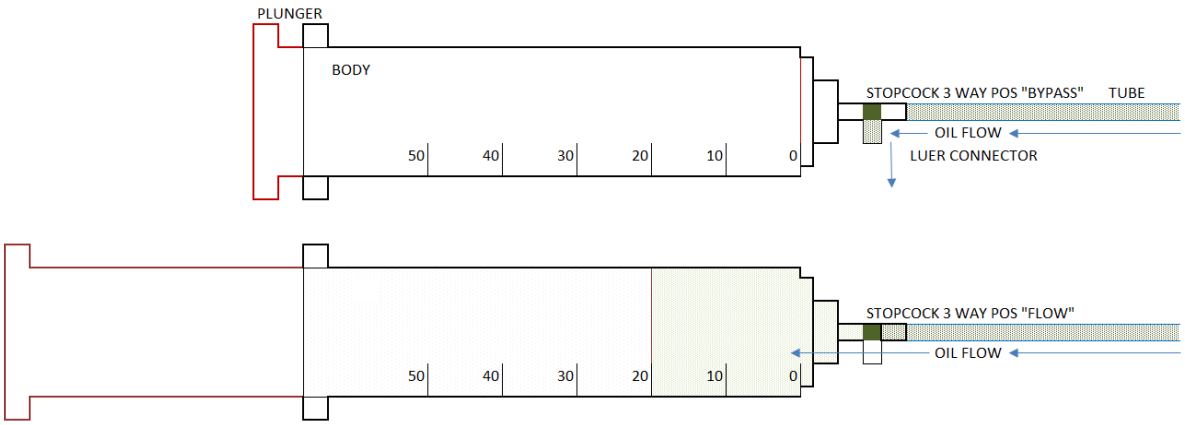

Figure 1. Syringe Stopcock