



### 1 SCOPE

The scope of this SOP covers the use of a neutron probe including:

- Transport and storage requirements
- Activity requirements
- Emergency procedures

### 2 DESCRIPTION

Name: CPN503DR Hydroprobe

Serial Number: H39078993

Common name: Neutron Probe

Radioactive Source: Americium-241/Beryllium

Activity: 1.85 GBq

Expected radiation levels whilst working:  
< 1mSv per year

Weight of gauge: 14.2kg

Weight of gauge and case: 17kg

Intended Application: soil moisture measurements

Principle of operation: radioactive source (probe) is lowered into an access tube for the meter to take readings.

Instrument limitations: battery operated

UoM Radiation Store: Parkville

### 3 TRAINING/LICENSING

#### Authorised User

The Authorised User shall have the following training and licensing:

- Safe Radiation Practices – Ionising
- Safe Radiation practices – Neutron
- Department of Health “Radiation Protection in the “Use of Nuclear Density Moisture Gauges”
- Competency to use and supervise Authorised Assistants participating in portable density/moisture gauge activities
- Use Licence

#### Authorised Assistant

The Authorised Assistant shall have the following training and licensing:

- Safe Radiation Practices – Ionising
- Safe Radiation practices – Neutron
- Department of Health “Radiation Protection in the Use of Nuclear Density Moisture Gauges”
- Competency to use portable density/moisture gauge
- Use Licence

#### Passenger

Passengers who travel in the car with an Authorised User/Authorised Assistant and are not trained or licenced to use a portable density/moisture gauge shall have the following:

- Briefed/inducted on the emergency procedures and requirements

### 4 INSTRUMENT CONTROLS

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As per Manufacturer/Supplier Operating Manual

### 5 PERSONAL PROTECTIVE EQUIPMENT

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Personal protective equipment that meets relevant Australian Standards:

- steel capped safety boots
- sunglasses (if working during summer)
- wide brimmed hat (if working during summer)
- long sleeved shirt
- sunscreen (if working during summer)
- wet weather clothing (if working during inclement weather)

### 6 TRANSPORT

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Neutron probe is locked in carry case, with shutter mechanism facing away from vehicle occupants.

Stored as far away from occupants as possible and in separate compartment.

Secured with chain and padlock to the vehicle.

Correct placarding on the vehicle – position placards on each side and back of vehicle (3 placards). Placards will be supplied with the probe.

### 7 OPERATION

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This activity should normally be undertaken by a minimum of two authorised personnel. At least one must be an Authorised User.

A documented risk assessment and SOP should be completed where the activity is

undertaken by only one person. This person must be an Authorised User.

#### Pre Start Up

- Review Risk Assessment onsite
- Park vehicle close to activity site to minimise manual handling
- Ensure all personnel wear personal badge
- Cordon off/mark out work area
- Display radiation signs
- Ensure only personnel undertaking the activity are within the immediate area
- Inspect cables for wear and tear and ensure probe is intact/attached
- **Check probe entry point to ensure that there is no water and that probe won't become trapped/lost** (do not insert probe if water is present)
- Record location and start time on log sheet (log sheet can be UoM template or other suitable document – eg map showing times and locations)

#### Start Up

- Turn on the gauge and ensure it is operational before use
- Only unlock probe from shielded position when in place to take measurements

#### Running Samples

- Place probe directly over hole before releasing from housing
- Only move probe from housing when taking measurement
- Take measurements quickly to reduce operator exposure
- Periodically check probe for dirt

#### Shut Down

- Check for dirt on probe
- Ensure probe is fully retracted into housing and that it is locked
- Monitor probe with survey meter to ensure that probe is fully retracted

- Monitor hole to ensure that probe has not been left in the ground

### Storage

- Place gauge back in the case and lock
- Place case back into the vehicle, secure with padlock and key and lock boot

## 8 MAINTENANCE

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To ensure reliable and trouble free operation, it is the Supervisor's/Manager's responsibility to maintain the gauge in good working order.

### In the Field

Before use check the cables for wear and tear.

After use check the cables for wear and tear

Report any damage to the UoM Radiation Safety Advisor or delegate immediately.

Ensure battery is fully charged.

Dirt can be removed from cabling and housing using a rag/cloth. If probe is covered in dirt and can not be fully retracted into the housing commence emergency procedures.

### Scheduled Maintenance

Scheduled maintenance shall be undertaken in accordance with Manufacturer's/Supplier's requirements and the UoM Radiation Management Plan.

### Annually

Wipe tests

## 9 EMERGENCY

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Immediate action taken to reduce/mitigate the risk of exposure

- secure area – at least 5 meters
- secure gauge from further damage
- prevent unauthorised access
- keep supervised until appropriate help arrives
- provide shielding if required
- provide first aid if required
- report immediately to the emergency contact: 03 8344 6666
- contact local area Department Radiation Safety Officer (DRSO) and UoM Radiation Safety Advisor (0411 111 265)

In addition to the above where the emergency involves a vehicle accident:

- call the emergency services
- advise the emergency services there is a radioactive source

## 10 TROUBLE SHOOTING

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With regards to measurement instrumentation refer directly to the trouble shooting section of the Manufacturer's/Supplier's operating manual.

## 11 REFERENCES

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### Legislation

- Radiation Act 2005
- Radiation Regulations 2007
- Occupational Health and Safety Act 2004
- Occupational Health and Safety Regulations 2007

### Codes

- Code of Practice and Safety Guide: Portable Density/Moisture Gauges Containing Radioactive Sources
- Code of Practice for the Safe Transport of Radioactive Material

### Standards

- AS/NZS 1067: Sunglasses and Fashion Spectacles

- AS/NZS 2210.1-9 Series: Occupational Protective Footwear
- AS/NZS 2604: Sunscreen Products – Evaluation and Classification
- AS/NZS 4399: Sun Protective Clothing – Evaluation and Classification

### University of Melbourne Procedures and Plans

- Ionising Radiation Risk Management (UOM 324)
- Portable Density/Moisture Gauge Radiation Management Plan
- University of Melbourne Radiation Management Plan

### Other

- Plant Risk Assessment – CPN503DR Hydroprobe H39078993
- Manufacturer's/Supplier's operating manual

## 12 ADDITIONAL EQUIPMENT

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Additional equipment supplied with probe:

- Manufacturer's/Supplier's operating manual
- UoM risk assessment;
- UoM standard operating procedure;
- portable density/moisture gauge log sheet (or equivalent);
- survey meter;
- personal monitoring badge(s);
- portable density/moisture gauge charger;
- chain and padlock;
- placards (3);
- radiation signs;
- tag out labels; and
- emergency equipment (hazard tape).

Authorised User/Authorised Assistant is required to supply first aid kit.

## 13 CONTACTS

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Parkville Radiation Store: 8344 2218  
Radiation Safety Advisor: 0411 111 265  
Emergency: 8344 6666