

Specific Additional Provisions for Well Logging Sources towards

Safe Work Practices for Handling Well Logging Sources in addition to those specified for all Nucleonic gauges.

Personnel monitoring:

- a) Individuals involved in well logging or other tasks that involve the use of neutron sources should wear dosimeters that will measure both gamma and neutron radiations so that the total cumulative exposure to these radiations can be assessed. The neutron sources used in well logging, typically ^{241}Am -Be, emit both gamma and neutron radiations that cannot be measured using a single instrument.
- b) Well logging service companies shall therefore use both gamma and neutron dose rate meters and to sum the separate measurements to fully determine external exposure.

Safe work practices:

- a) A radioactive source which has exceeded its recommended working life, as specified by the manufacturer, should not be used in well logging tools.
- b) The manufacturers' specifications and recommended operational limits for the well logging tools should not be exceeded (e.g. cables and cable tension measuring devices, should be in good operating condition).
- c) Any parts of the logging configuration necessary for normal retrieval of the source from the hole, which have exceeded their recommended working life, as specified by the manufacture, should not be used.
- d) Logging measurements should not be conducted unless the workers directly involved with using the tools are correctly wearing appropriate personnel monitors and are in possession of a suitable, functioning and calibrated survey meter.
- e) It should be ensured that radiation monitors are in good working order.
- f) Workers should be provided with appropriate gamma and neutron personnel monitors for their exclusive use whilst using, calibrating, storing, transporting or working with well logging sources.
- g) Personnel radiation monitors should be promptly returned for assessment at the end of the monitoring period.
- h) Personnel dose records should be analysed to ensure that there are no abnormal exposure trends.
- i) Personnel radiation monitors worn by persons known or reasonably suspected to have received an effective dose in excess of 10 mSv in a monitoring period, should be assessed promptly and investigated and reported to the Competent Authority.
- j) For ensuring the security of the equipment during transport, appropriate arrangements should be made for securing the source assembly in the approved transport container.

- k) Persons not required to assist with the logging measurements should be excluded from the vicinity of the equipment prior to removing any source from its shielded transport container.
- l) The number of persons assisting with the operation of the logging should be kept to a minimum.
- m) The container housing the source should not be placed where it is likely to be damaged by vehicles or other heavy objects.
- n) The source(s) should not be removed from the transport container except to make a measurement or to carry out essential servicing.
- o) The time taken while transferring the source to and from the transport container and the tool should be kept to a minimum.
- p) The source should not be approached except when it is necessary to transfer the source.
- q) A tool incorporating radioactive sources should not be lowered into the borehole unless the condition of the borehole has been well established.
- r) Radioactive sources should be removed safely from the borehole as soon as logging is completed.
- s) The source(s) should be kept locked in the transport container when not in use.
- t) The borehole(s) should be kept covered at all times while source transfers are carried out above or nearby the borehole(s) to prevent the loss of a source down a borehole.
- u) Instructions should be displayed regarding appropriate techniques for the care of logging cables, including avoidance of kinking and corrosion, renewal of cable head termination, identification of various cable fault conditions; and inspection and replacement intervals and arrangements for the safe calibration, repair and maintenance of the equipment.

Security for Well Logging Sources

Security measures should take into account the security threat perceptions at the location of the well logging tools and should include the following elements. The physical security arrangements of well logging operations.

- (a) Access control (e.g. biometric access); formal multiple barriers (e.g. sealed box for storage with lock and key arrangement).
- (b) Video surveillance of storage area.
- (c) In case of field operations in threatening geographical locations: availability of alert system (e.g. cameras for investigation and follow-up) as well as the procedure for communication in such cases.
- (d) Separate threat analysis should be done for radioactive sources handled off-shore and on-shore.

The applicable provisions of the AERB Safety Guides on ‘Security of Radioactive Sources in Radiation Facilities’ (AERB/RF-RS/SG-1) and ‘Security of Radioactive Material during Transport’ (AERB/NRF-TS/SG-10) should be incorporated in the security arrangements.
