

PRODUCTION OF IONIZING RADIATION SOURCE OF IRIDIUM-192 FOR NDT

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Manufacturing of ionizing radiation source Ir-192 activity 50 Ci has been begun that 20-30 pieces of disks of natural iridium ($\varnothing=2.7$ mm, $h=0.2$ mm, $m=31.7$ mg) was placed in aluminum foil packing, then aluminum container with packaging in vertical channel of the WWR-SM reactor was irradiated by neutrons at following regime: special container EK-10 with iridium disks loading place is into core of fuel assemble type IRT-4M on distance 30 cm from top point of fuel assemble; nominal power of reactor =10 MWt; reactor operating mode with periodic stopdowns; thermal neutrons stream density $\geq 0,7 \times 10^{14}$ n/cm²sec; irradiation time ≥ 550 hours. Than after certain exposure aluminum packaging with disks of iridium irradiated containing Ir-192 radionuclide to special device was placed and their radiochemical processing was spent. Then iridium disks irradiated in stainless steel capsule ($\varnothing=4.5$ mm, $h=8.0$ mm) was placed, by cover was closed, dot argon-arc welding was spent and check of tightness of Ir-192 sources by immersion method was spent. The dimensions of the active part of the source are $\varnothing=3.0$ mm, $h=4.0$ mm.

For complete set gamma flaw detector of Gammarid 192/120M with source of Ir-192 in the special installation source of Ir-192 was placed in the source holder, closed by cover and rolling was spent, source holder with source of Ir-192 with flexible shaft was connected and to gamma flow defector of Gammarid 192/120M protective radiating head was charged. Then Ir-192 source together with gamma flow detector of Gammarid 192/120M for carrying out of gamma-radiographic NDT method of pipelines welded seams of quality assurance was used.

Non-destructive testing was carried out using source of Ir-192 of welded seams of metal designs and pipelines and gamma-radiography x-ray pictures was received (Figure 1). By NDT method with Ir-192 sources received x-ray images in terms of sensitivity and quality was corresponded to requirements of Russian standards (GOST-7512-82 «Control nondestructive control. Connections welded. Radiographic method») and USA standards (ASME).

Figure 1. X-ray picture of welded seam sample ($\varnothing=50.8$ mm) received by ionizing radiation source of Ir-192.

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