

## MANAGEMENT OF ALPHA CONTAMINATED UN-SERVICEABLE GLOVE BOXES.

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Abstract: -

India with its closed fuel cycle policy, like few others in the world, has its own share of legacy waste. Slow but steady accumulation of  $\alpha$ -contaminated un-serviceable Glove Boxes (GBs) is a concern and demands solution for management of such radioactive waste. As a temporary measure these GBs, encased in individual secondary enclosures, were transported and stored at dedicated alpha storage facility.

In 2014, a campaign for contact dismantling of these  $\alpha$  contaminated GBs was planned. Under this campaign, a temporary facility for active contact dismantling was developed, designed & erected in the existing alpha storage facility and six (6) GBs stored were successfully dismantled and disposed. This report talks about the practices being followed in the nuclear industry around the world, the inactive dismantling trials in BARC and finally about the campaign for active contact dismantling of alpha contaminated GBs.

### 1. Introduction:

Extensive dismantling trials were carried out on dummy GBs using various portable cutting tools in prototype setups based on remote, contact and cutting through glove port modes. Cutting through glove port appeared the best among the three options considering many important criteria. But a decision was taken to go for a contact dismantling campaign in a temporary set up at alpha storage facility due to several constraints and considerations; one of the reasons among them was to create spare storage space for receiving such waste already accumulated in the laboratories.

#### 1. Common International practices on management of GBs:

#### 2. Contact Dismantling Facility at AWTSF:

A primary containment (PC), an airlock, secondary enclosure (SE) with local HEPA filtration was erected. The PC and the airlock was made of PVC sheet. The SE was made of Perspex and metal sheets. Existing negative pressures system, ventilation system was augmented for the dismantling facility. All necessary safety systems and radiological monitoring systems were installed. The dismantling of GBs was carried out manually by operators wearing plastic suit and fresh air line connection. Detailed internal swipe samples of each and every GB were carried out in PC by removing their glass panels. GBs were decontaminated prior to cutting and the cut pieces were bagged out and stored in the drums. The same setup was reused for dismantling of all the six GBs by proper DC of the airlock and PC.

#### 1. Important findings of the campaign:

- The cut pieces and secondary waste generated were stored in drums.
- Glass panels of GBs were stored in special containers.
- The air activity was found well within the limits and no spread of contamination outside SE. The campaign was safely executed by adhering to the best radio-logical practices.
- Internal dose assessment of the personnel involved was found below detectable limit.

#### 1. Characterization & Disposal of waste:-

A methodology was formulated to estimate total activity content based on various swipe survey data. It was observed that the cut pieces of the GBs qualify for disposal to NSDF after cementation. Accordingly the drums filled with the cut pieces were disposed after cementation as CAT-I non alpha solid waste.

#### 1. Conclusion:-

- The campaign, apart from the experience of a pioneering venture, has generated valuable data not only on the radiological aspects like generation of air activity, level of contamination but also on the mechanical issues like tools & handling systems.
- It has been observed that there is substantial volume reduction and the same can be further enhanced by adapting to scheme of cutting through glove port and reusable enclosures.

- Dismantling of GBs allow detailed assaying and through DC which helps in segregation and disposal of the waste, besides volume reduction.

#### 1. References

- State of Art Technology for Decontamination and Dismantling of Nuclear Facilities, Technical Report Series No. 395, International Atomic Energy Agency, Vienna 1999.
- “Design Innovation For The Management Of Alpha Contaminated Unserviceable Glove Boxes”, Devendra Sandhanshive, BARC, Trombay, et al, Proceedings of the ASME 2013 15th International Conference on Environmental Remediation and Radioactive Waste Management Sep 8-12, 2013, Brussels, Belgium, [2013]

### **Country or International Organization**

Bhabha Atomic Research Centre, Mumbai, India

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**Primary authors:** Mr SANDHANSHIVE, Devendra (Bhabha Atomic Research Centre (BARC), Trombay, Mumbai, India); Mr KHAN, Siddhartha (Bhabha Atomic Research Centre (BARC), Trombay, Mumbai, India.)

**Co-author:** Mr SHENDGE, Shivaji (Bhabha Atomic Research Centre (BARC), Trombay, Mumbai, India.)

**Presenter:** Mr SANDHANSHIVE, Devendra (Bhabha Atomic Research Centre (BARC), Trombay, Mumbai, India)

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