

ENGINEERING REPORT
USE OF FIXATIVES FOR
PRIMARY CONTAMINATION CONTROL
DURING DECOMMISSIONING ACTIVITIES

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ENGINEERING REPORT
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1.0 INTRODUCTION

BNI proposes to use fixatives as a control during dismantlement of a nuclear fuel fabrication facility located in San Diego, California (The SVA Decommissioning Project). These fixatives will be applied to the internal surfaces of the facility structures to prevent the spread of residual contamination (heavy metals or radiological) during the controlled dismantlement of the facility structures.

1.1 SCOPE

The purpose of this engineering report is to determine if and where fixatives have been used as the primary radiological control method for surface contamination control, with the prior approval of the U.S. Nuclear Regulatory Commission (NRC), for projects other than the SVA Decommissioning Project. A second purpose is to give guidance on the fixative(s) to be used. It is noteworthy that the NRC approved the SVA Decommissioning Plan (dated April 1990) which addressed the use of fixatives as a radiological contamination control method:

"2.1.9.2 Building 3.7 North Roof Removal

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Removing the steel roof deck will require an increased level of radiological controls since some contamination could exist on the inner surfaces within the interstices of the decking (e.g., seams and joints). If loose contamination is

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identified, appropriate measures (decontamination, applying a fixative, wrappings) will be implemented to prevent its spread.

Until proven otherwise, the removed steel decking will be considered contaminated. The radiological controls will focus on preventing the spread of contamination during removal and handling. The contaminated decking will be decontaminated or prepared for containerization and shipment as radioactive waste. Radiological controls during this phase will focus on controlling the spread of contamination during the cutting and containerization operations. . . ."

1.2 SCOPE

This engineering report addresses: 1) a review of current BNI projects where fixatives were applied in a similar manner as that proposed for the SVA Decommissioning Project, and 2) a literature search where fixatives were used with federal (DOE, NRC, EPA) approval as the primary means for contamination control.

2.0 INVESTIGATION

This section addresses the results of BNI's investigation regarding the use of fixatives as a primary means of contamination control.

2.1 BNI CURRENT PROJECTS

BNI has used or has specified that others use fixatives (paints, grouts, asphalt, membrane covering) as a means for contamination control (See 2.1.8.3 Contamination Control Methods Section on Page 2-6 of the SVA Decommissioning Plan).

On two of our current decommissioning projects, fixatives will be applied in the same fashion as that proposed for the SVA

Decommissioning Project. These projects are; the "Colonie Site Decommissioning Project," and the "RCC Decommissioning Project".

2.2.1 Colonie Site Decommissioning Project is a U.S. DOE project which is being managed by Oak Ridge Operations Office through FUSRAP (Formally Utilized AEC/MED Remedial Action Program). The facility is located near Albany, New York and was operated by National Lead to manufacture depleted uranium penetrators. BNI project plans call for initial decontamination, internal dismantlement and volume reduction of waste, application of fixatives, controlled dismantlement of the structure, and disposal of the resulting wastes.

2.1.2 RCC Decommissioning Project is an EPA Superfund project which is being managed by the U.S. Army Corps of Engineers. The facility is located in Queens, New York and is contaminated with ^{226}Ra . This facility had been operated by the Radium Chemical Company. BNI is under contract to decontaminate and dismantle the facility in accordance with specifications generated and approved by others. These government approved specifications require fixatives (paint) to be applied to the interior surfaces of the concrete roofing panels and the roof truss members before facciltiy dismantlement is to proceed.

2.2 LITERATURE SEARCH

BNI has an extensive technical library which was searched for referenced use of fixatives as being proposed for the SVA Decommissioning Project. The search did not reveal any references where fixatives had been used as the primary contamination barrier during decommissioning; however, many instances could be cited where fixatives were applied effectively after an accident (SL-1, TMI-2, Chernobyl) to control and limit the spread of contamination.

Further, the application of fixatives to the exterior surfaces of steam generators during steam generator change out has been documented in Safety Analysis Reports (SARs) for the following nuclear power plants: Turkey Point, SURRY, and D.C. Cook. The fixative used at two of the plants was paint and at the other facility two coats of hot floor wax was used. The fixatives were to control residual contamination on the exterior surfaces of steam generators during their on-site transport from the reactor building to the special prepared storage facility. The "Cook Nuclear Plant Unit 2 Project Radiation Protection and ALARA Group Steam Generator Repair Project Report", prepared by the Impell Corporation, states, "No major radiological problems occurred during the transport. Subsequent surveys of the lower channel head areas, two weeks after transfer, showed contamination leaching through the wax to 20,000 dpm/100 cm²".

Also documented are the use of fixatives to the roofs of the SURRY and Ginna Unit 1 nuclear power plants. The roof structure of these facilities had become contaminated as a result of steam valve reliefs while operating with primary to secondary leaks. In these instances, fixatives were applied until the contaminated roofing could be replaced. The roofing disposal project from Ginna Unit 1 is of significant interest in that the NRC granted the nuclear utility permission under 10CFR10.302 to dispose of about 70 tons of roofing debris containing approximately 1.4 mCi [¹³⁷Cs (64%), ⁶⁰Co (20%), ¹³⁴Cs (16%)] at a municipal landfill. (Reference Health Physics Society CONF-860203 Report "Health Physics Consideration in Decontamination and Decommissioning", page 439).

3.0 DISCUSSION OF FIXATIVE INVESTIGATIONS

The use of fixatives in the nuclear industry as a means of contamination control is frequently used during normal plant operations, but is not well documented. Paint, wax, quick

oxidizing oils, asphalt, grouts, and ureaformaldehyde foams have been used as fixatives applied directly to contaminated surfaces. Plastic, rubber, and fabric coverings have been applied more over to contain contamination on covered surfaces. Stripable (pealable and soluble) paints and adherent paints are the most common of the applied fixatives.

Adherent paints have been or and are currently planned to be used by BNI to fix loose contamination during the dismantling of radioactively contaminated facilities, including the SVA facility.

The NRC is aware of these practices.

4.0 RECOMMENDATIONS

BNI recommends that adherent paint be used as the fixative during SVA facility dismantlement with the understanding that 1) the paint will be carefully specified (low volatility, high ignition temperature, low toxicity, high bond strength), 2) the fugitive dust concentration will be controlled during the dismantlement to less than the most limiting applicable standard (Federal 40CFR50.6(a), State of California, or local), 3) the local concentrations of airborne radioactivity will be maintained within 10CFR20, Appendix B, Table 1, Column 1 criteria, and 4) its use will not create a mixed waste hazard.

5.0 REFERENCES

- 5.1 SVA DECOMMISSIONING PLAN, BNI, April 1990
- 5.2 CONF - 860203 Health Physics Society Proceeding,
"Health Physics Consideration in Decontamination and
Decommissioning" February 1986
- 5.3 10CFR20 - Energy, "Standards for Protection Against Radiation"
- 5.4 40CFR50 - Protection of Environment, "Air Programs"

6.0 APPENDIX

None used.