

TECHNICAL REPORT

**Focused Literature Review –
Decontamination Agents/Materials for
Radiological Surface Decontamination**

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Applied Research Center
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INTRODUCTION

The task addressed in this report was a focused literature review on decontamination agents/materials for radiological surface decontamination in support of the SRS 235-F Risk Reduction Project. This summary report will help the project team develop their decontamination concepts for the PuFF process cells and define the FY 14 and out year's technical activities.

As a result of previous collaboration in *in situ* decommissioning, FIU-ARC is currently supporting the Savannah River Site in identifying and demonstrating innovative technologies in support of the SRS 235-F project. The SRS 235-F facility was constructed in the 1950's as part of the weapons complex materials production and fabrication. SRS 235-F is located in the SRS F Area, near F Canyon and the Mixed Oxide Fuel Fabrication Facility. The facility has since had several production missions, the most recent of which was receipt, storage, and disbursement of plutonium-bearing materials in support of SRS and the DOE complex. In 2006, the storage vaults for nuclear materials were emptied and the facility was thereafter maintained in a surveillance and maintenance mode awaiting deactivation.

The building is approximately 24,000 ft² per floor, totaling 48,000 ft². The blast resistant, two-level, windowless structure was built to meet NPH PC-3 seismic and wind design criteria. The facility was built on a reinforced concrete slab foundation with exterior walls measuring 14-inch thick double-reinforced concrete. The 235-F building has three separate ancillary facilities: 291-2F (stack), 292-2F (sand filter fan house), and 294-2F (sand filter), plus an underground concrete tunnel connecting 235-F to the sand filter. Major modifications to the facility began in the mid-1970s to support the new Pu-238 fuel mission for NASA. The most significant quantities of residual contamination remaining in 235-F building are found in the Plutonium Fuel Form (PuFF), Plutonium Experimental Facility (PEF), Old Metallography Lab (OML), and Actinide Billet Line (ABL) facilities.

This report focuses primarily on decontamination agents that are fixatives or strippable coatings. A fixative agent works as a permanent coating that stabilizes residual radioactivity by fixing contamination in place; it prevents the spread of contamination, reduces workforce exposure and facilitates later decontamination processes. Strippable decontaminating agents function as a cleaning material. They are applied to the contaminated surface and then are peeled off, removing much of the removable (loose) contamination. Any residual radioactive material on the surface will be greatly reduced once the strippable coating is removed.

It is important to keep in mind that some decommissioning processes involve more destructive techniques than others. Thus, when choosing a decontaminating material, it is very important to evaluate the type of surface and material being decontaminated as well as the decommissioning techniques that will be applied.

METHODOLOGY

As requested by SNRL, FIU-ARC conducted a literature review of strippable coating, fixatives, and decontamination gels. The search parameters were established by telephone conversations with SRNL. Based on the established parameters, FIU-ARC conducted a detailed literature search and developed an Excel spreadsheet containing the results of this study.

The literature search included a detailed evaluation of previous reports and demonstrations conducted at FIU-ARC and throughout the DOE Complex as part of technology evaluations/demonstrations sponsored by DOE-EM. Also, FIU-ARC made use of the D&D Knowledge Management Information Tool (D&D KM-IT) and DOE's Information Bridge (OSTI). The World Wide Web was also utilized to search for these products. In addition, vendors and manufacturers were contacted via telephone and via e-mail for additional information not available online. Material Safety Data Sheets (MSDS), Project Profiles from applications already performed using some of the products listed and Fact Sheets were collected when available.

The following information was collected for each one of the products identified by this study:

- Product Name
- Manufacturer
- Strippable Coating (Yes/No)
- Application Instructions
- Price/Coverage
- Use
- Advantages
- Previous used
- Documentation
- Product Website
- Photos
- Contact Information

RESULTS

A comprehensive list of strippable coatings, fixatives and decontamination gels were researched based on application parameters established by SRNL.

The information was collected and compiled into an Excel spreadsheet and it is presented in the Appendix as Tables 1 and 2 starting on page 5 of this report.

CONCLUSION

A preliminary evaluation of strippable coatings, fixatives, and decontamination gels was conducted based on application parameters established by SRNL. A comprehensive Excel sheet was developed and is presented in the Appendix of this report. Additional investigation has to be conducted based on specific applications and SRS 235-F project needs. This initial list will be presented to SRNL and future discussions will take place to better define application requirements so that the correct product(s) can be identify for field application.

For further reference, and with the objective of providing more detailed product information for each product, FIU-ARC is currently ongoing with this literature research. The following information is currently being collected and will be added to the Excel spreadsheet for further references:

- Category (Fixative/Strippable/Washable)
- pH
- Ingredients (Published by Manufacturers)
- Specific Gravity
- Solubility
- Incompatibility
- Boiling Point
- Conditions to Avoid
- State
- Color

After a preliminary selection, FIU-ARC recommends a test and evaluation phase prior to selecting a final product to be field deployed at the SRS 235-F project. It is recommended that a mock-up test bed be constructed and several products be selected for further evaluation and selection. It is very important to take into account the feasibility of the application, its cost effectiveness and the waste management.

In addition, FIU-ARC would like to recommend remote application of these products to reduce the exposure of workforce to potential high levels of radiation doses. For example, a remote platform has already been proven to spray and remove strippable coatings from flat surfaces. The remote platform has been developed by International Climbing Machines with support from FIU and DOE-EM.

APPENDIX

The appendix includes the following two tables:

Table 1. Contamination Control Product Information

Table 2. Contamination Control Product References and Contact Information

Appendix Table 1. Contamination Control Product Information

Product	Manufacturer	Stripable	Application	Price/Coverage	Use	Advantages	Previous uses:
DECON PEEL 5201 Hallogen Free	General Chem Corp.	Yes	Apply the product with airless spray to proper thickness (recommended a minimum of 10 mils) may also be applied with a roller or brush. Aprox. 1 to 3 hour of drying time depending on the films thickness. The coating encompasses contaminants into the film mass. For airless equipment recommended to use a .015 or .017 nozzle at 1200-1500 psi. It is removed by peeling. More than one application is recommended.	coverage 200 sqft/ gal at 8 mils	Used to immobilize radioactive contamination, minimize exposure and facilitate consequent decontamination.	Protects metals, glass, acrylics. Chlorine free. Non-flammable. Easy application and easy removal. It is well stabilized against brittleness. It will not be softened nor penetrated by solvent based paints.	NA
DECON PEEL 2640 Heavy Duty Decontamination pH Neutral Chemical, nuclear Equipment	Chemical Chem Corp.	Yes	DeconPeel_2640 is normally used as received. Can be applied by an airless spray, roller or brush. Aprox. 1 to 3 hours drying time depending on film thickness.	\$48.97/GAL approx - coverage 200 sqft/ gal at 8 mils	Nuclear Equipment (Works best on Metals)	Biodegradable/non-flammable. Neutral pH. Easy application and easy removal.	NA
DECON KLEAN 5850	Chemical Chem Corp.	Rinse	DeconKlean, liquid cleaner, can be used as received (highly concentrated) or dilute in water, depending upon the severity of the soils to be removed. When used with mechanical agitation as in a floor scrubber, DeconKlean can be diluted up to 5% (1:20).	\$40.95/ gal	Floors, walls and equipment (including tools). Clean of loose particles.	Non-toxic, non-flammable, biodegradable. DeconKlean is safe and effective for use on virtually all surfaces such as concrete and tile floors, painted surfaces, fabrics, plastics, rubber, neoprene, nylon, glass and most metals	NA
DECON PEEL NUCLEAR 2050	Chemical Chem Corp.	Yes	It can be applied by spray, roll or brush. The sprayed coating dries, depending on the film thickness, in 30 minutes to 4 hours.	Approx. (\$47/gal) 50 sqft/gal		Non-hazardous/non-toxic solution. Good on floor walls and equipment (including reactor cavities glove boxes and hot cells). Can be used to remove surface contamination or as a barrier to prevent spreading of contamination.	NA
DECON PASTE 2510	Chemical Chem Corp.	Yes	Can be applied with an airless spray equipment, brush or roller. Min of 100 microns of dry film thickness is required.		Designed for porous surfaces.	Viscous, designed for perforated or porous areas.	NA

Product	Manufacturer	Strippable	Application	Price/Coverage	Use	Advantages	Previous uses:
CC FIX	InstaCote, Inc.	No	CC Fix is typically applied over CC Wet. CC Fix is applied using garden sprayers and airless paint sprayers. It successfully adheres to floors, ceilings, walls and other contaminated surfaces. More than one coats are recommended. This is the final step of a two step approach, it should be applied over the CC Wet.	\$600.00 per 5 gallon pail		non hazardous, water based solution, non-toxic fixative	Used at The Hanford Site over CC Wet on building 313 contaminated with beryllium, this product 'allowed controlled demolition without risk of re-suspension to the workers or the environment" (see project profile)
CC FIX LV	InstaCote, Inc.	No	CC Fix is typically applied over CC Wet. CC Fix can be brushed, rolled, misted or spray applied. Spray application can best be accomplished with a hand pump, metal canister spray unit with fan tip. More than one coats are recommended.	\$550.00 per 5 gallon pail 320 ft ² /gal	Designed for hot cells and other high radiation/contamination areas, avoids exposure within these areas of concern.	Low viscosity permanently stabilizes radiological and other hazardous contamination.	Used at an ORNL facility (building 4507). It was used to stabilize contamination in place until demolition took place. (See Project Profile)
CC WET (use with CC Fix)	InstaCote, Inc.	No	CC Wet can be applied using a garden canister spray unit with fan tip. The very fine mist has virtually no impingement energy and will not cause contaminate particles to become airborne. This is the first of a two step approach. The use of this product before a applying a fixative (CC FIX) would prevent the re-suspension of loose contamination.	\$475.00 per 5 gallon pail 1250 ft ² /gal	Recommended for inaccessible areas such as ducts, areas behind and under equipment, overhead pipes etc.	Non toxic/non hazardous. Reduces airborne contamination. Greatly reduces exposure risk. Creates a hard coating.	Used at The Hanford Site along with the CC FIX. Allowed contractor to perform air demolition of Building 313. (see project profile)
CC STRIP	InstaCote, Inc.	Yes	CC Strippable can be brushed, rolled, misted or spray applied. Spray application can best be accomplished with a hand pump, metal canister spray unit with fan tip. This is the final step in a two step approach, previously using the CC Wet.	\$490.00 per 5 gallon pail 320 ft ² /gal		Strippable coating. Removes radiological beryllium and other hazardous contamination.	Used in an experimental radiological dispersal exercise by Homeland Security. (See project profile)
CC EPOXY 609 (Pipe Stabilizer)	InstaCote, Inc.	No	CC Epoxy 609 resin and curing agent are mixed using a hand-held drill motor turbine mixer and poured in place. The liquid CC Epoxy 609 has an initial viscosity similar to water and rapidly cures to a solid in approximately 10 minutes. Once cured, the contamination is locked down and can be size reduced at anytime in the future.	\$306.90 per 3 gallon kit	CC Epoxy is a fixative control agent used to effectively grout piping/plumbing closed and will render any contamination within pipe locked down.	Increases productivity and reduces risk during size reduction of pipes by preventing re-suspension and spread of contamination. Delivery of this product into pipelines allows collection of residual process liquids.	Used to stabilize pipes at building 886 at Rocky Flats. Where it eliminated spread of contamination.

Product	Manufacturer	Stripable	Application	Price/Coverage	Use	Advantages	Previous uses:
CC T207 (Sludge Stabilization)	InstaCote Inc.	No	CCT 207 is pumped or poured into process tanks. It is packaged in both 5-gallon and 55-gallon containers.	NA	Stabilized tank residues that have potential for resuspension and spread of contamination during removal. This product transformer, dry, powder-like tank residues to a spongy "brownie-like" consistency.	NA	Tank 207 (Rocky Flats Site) a 40ft by 20 ft. petroleum size tank was stabilized for residual removal. (no supporting doc)
CC PS 413	InstaCote Inc.	No	CC PS 413 is a two part urethane consisting of a resin and a hardener that is pumped into contaminated piping systems.	\$550.00 per 5 gallon kit	Designed for piping systems. Stabilized pipes and reduces the potential for spread of contamination during size reduction. CC PS 413 increases productivity and reduces risk during size reduction of pipes by preventing re suspension of spread contamination.	NA	NA
POLYUREA WASTE PACKAGING (InstaCote SEFR)	InstaCote, Inc.		Easy to use with a spray on application . Signs contaminants in place while it meets DOT's regulations for safe transportation.	NA	Allows faster packing and size reductions (through packaging) of large pieces of equipment reducing significantly costs and safety risks.	Used in the construction of low level radioactive waste shipping packaging.	Used at Rocky Flats to cover large contaminated equipment before shipping over public highways. Equipment was initially raped with industrial strength Saran Wrap and later on sprayed with Polyuera Coating to 1/4" thickness. (See Rocky Flats PP)

Product	Manufacturer	Stripable	Application	Price/Coverage	Use	Advantages	Previous uses:
<u>POLYMERIC BARRIER SYSTEM</u>	Bartlett Nuclear, Inc.	No	Sprayable coating, may apply thin coats over smooth areas and heavy coats over porous surfaces. Takes eight to 24 hours to dry. <u>Seals contamination in place.</u>	50 ft ² /gal at 25 mils(approx)	Apply PBS to any surface to lock down loose contamination and prevent leaching of contaminants after decontamination efforts. PBS is commonly used to stabilize large plant components, concrete, valves, and other problematic radwaste equipment prior to shipment. May be used to control environmental contamination and soil erosion.	PBS is a non-toxic, water-based solution which forms an impermeable barrier between hazardous or contaminated materials and the environment.	has been used to "cocoon " large items that have been left outside or shipped. Was used at ORNL on outside of a metal Quonset Hut to seal contaminated flaking paint prior to demolition.
<u>Stripcoat TLC Free</u>	Bartlett Nuclear, Inc.	Yes	Can be sprayed, or applied with roller or brush. Takes 4 to 12 hrs to dry. Several light layers are recommended. While curing, Stripcoat mechanically and chemically entraps contamination. This product is approved for disposal at low-level radioactive waste facilities or by incineration.	50 ft ² /gal (approx)	Recommended for the decontamination of floors, walls and equipment, Stripcoat's chemical composition also makes it ideal for system components including reactor cavities, glove boxes or hot cells. Stripcoat can also serve as a barrier to prevent contamination or as a covering to contain contamination, preventing areas and equipment from becoming contaminated during maintenance activities	Non-hazardous, non-toxic, water based solution, designed to safely remove and prevent the spread of contamination.	Used in Oak Ridge National Lab (ORNL) Fall 2011

Product	Manufacturer	Strippable	Application	Price/Coverage	Use	Advantages	Previous uses:
DECON GEL 1101	CBI Polymers	Yes	Temporary strippable coating. Can be applied by paint brush, towel, etc. Can be easily applied to surfaces on a horizontal, vertical or inverted plane. Compatible with most surfaces. 2 to 4 coats need to be applied depending on the porosity of the surface. Spraying techniques require more than one coat.	25 to 100 ft ² /gal	1101 is a brush-on gel for heavy nuclear and toxic industrial chemical and material decontamination.	When dry, the product locks the contaminants into a polymer matrix. Allows nearly 100% decontamination. Avoids spreading of contamination. This product is good to work with on any surface.	Decon Gel has been used by the DOE for several projects. Among the previous jobs performed with Decon Gel is the uranium and plutonium decontamination of hot cells at the ORNL; clean-up of contaminated equipment, tools, storage containers and fuel cask at Alaron Nuclear Services; plutonium decontamination of gloveboxes Lawrence Livermore National Lab and coating of concrete, carbon steel stainless steel and plexiglas contaminated with AM241, PU239 and Cs137 at Sandia National Lab. See reports.
DECON GEL 1102	CBI Polymers	Yes	Application include hot cells, glove boxes, radioactive spills, D&D of buildings, general maintenance and beryllium removal.	25 to 100 ft ² /gal	1102 is a brush-on gel optimized for oil and grease decontamination (crude oils, diesel, PCB's, etc.). DecDeconGel 1102 is a brush or trowel on application.		
DECON GEL 1108	CBI Polymers	Yes		25 to 100 ft ² /gal	1108 is a brush-on gel for extremely heavy nuclear and toxic industrial chemical and material decontamination.		
DECON GEL 1128 Spray	CBI Polymers	Yes		25 to 100 ft ² /gal	1128 is a spray-on version of 1108 formulated for extremely heavy duty industrial sprayers for horizontal and vertical hard porous and non-porous surfaces such as concrete, pavement, wood, glass, steel, stone, and other hard substrates, and is used for heavy nuclear and chemical decontamination.		
DECON GEL 1120 Spray	CBI Polymers	Yes		25 to 75 ft ² /gal	1120 is a spray-on version of 1101 formulated and optimized for hand-held light duty sprayers and hard, smooth surfaces such as glass, steel, polished stone and other smooth hard substrates and is used for nuclear and chemical decontamination.		
DECON GEL 1121 Spray	CBI Polymers	Yes		25 to 75 ft ² /gal	1121 is a spray-on version of 1101 formulated for heavy duty industrial sprayers for horizontal and vertical hard porous and non-porous surfaces such as concrete, pavement, wood, glass, steel, stone, and other hard substrates, and is used for heavy nuclear and chemical decontamination.		




<http://www.youtube.com/watch?v=LV3vCfPCoA0>

Product	Manufacturer	Stripable	Application	Price/Coverage	Use	Advantages	Previous uses:
RUST DOCTOR	The Rust Doctor	No	Can be sprayed, rolled or brushed over rusty metal. For large areas a latex bristle brush is recommended. Use as received. Second coat should be applied while the first coat is still tacky to touch (within 10 minutes after 1st applications more or less).	\$ 595.99 / 5 gallon pail Aprox 200 sqft/gal	Eliminates rust and prime storage tanks for painting. Treat rusting metal prior to welding or demolitions. Repair rusting metals on roofs and building.	Used to fix contamination into place by converting the rust to magnetite. Making the metallic surface safer for demolition.	NA
ALARA 1146	William Power Corporation (distributed by Carboline)	Yes	Can be sprayed rolled, brushed, poured or squeegeed into surface. Seals contaminant and peels off. Characterized by its rapid application and removal. It reduces waste volumes, immobilizes surface contaminants, and is proven to reduce surface contamination.	Aprox 26 ft^2	Alara 1146 attracts and binds surface contaminants in bare or painted concrete, wood, carbon steel, stainless steel, and plastic. may be used for insulation. It is effective removing surface contaminants such as radionuclides, dirt, PCB's, asbestos particles and loose paint.	Rapid application and removal, reduced waste volumes, high decontamination factors.	Used at SRS 321-M Fuel Fabrication Facility (See report)
ARGONNE SUPERGEL	Argonne National Laboratory (2012)	Vacuum /Scraping	Remote spray washers apply a wetting agent and a super-absorbent gel onto the contaminated surface. Designed for indoor and outdoor use.	NA	The wetting agent causes the bound radioactivity to resuspend in the pores, the super gel absorbent polymer gel then suctions the radioactivity out of the pores and it then becomes fixed in the engineered nanoparticles that sit in the gel.	Removes nearly 80 percent of radioactive isotope. Leaves structures intact.	Tests have been performed by Argonne national Lab with collaboration from the EPA (Environmental Protection Agency) and NHRSC (National Homeland Security Research Center) to test the decontamination efficacy of the Argonne Supergel. Please see report.
RAD-RELEASE	Idaho National Lab. Commercialized by EAI, Environmental Alternatives, Inc.		Applied in two steps for major efficacy. Foam and clay extraction process. First apply the foam to contaminated surface and let the reagent process work for two hours. (about 50% decontamination is achieved), remove by vacuuming, then for further decontamination apply the clay (leave for 2 to 6 weeks) clay may be applied with commercial sprayers after 6 weeks 95% of radioactive isotopes are removed.	NA	It minimizes costs, waste volume and worker exposure. It is effective for both loose surface and fixed subsurface contaminants. The technology can be deployed in various geometrical surfaces including walls, ceilings, equipment, structural beams, internal piping and highly irregular surfaces.	nearly 80 % removal rate in two steps/ non destructive	Rad Release was tested alongside other decontaminating agents. Please see 'Side by Side' report for results.




Product	Manufacturer	Stripable	Application	Price/Coverage	Use	Advantages	Previous uses:
Polyshield SS-100 (Spray Polyurea Elastometer)	Specialty Products Inc.	No	Spray application, only one application necessary if appropriate thickness is achieved. The polyshield SS100 is not affected by moisture. Eco-friendly.	Aprox. 100 sqft/ gal at 16 mils	Recommended for coating of steel tanks, silos and pipes. Encapsulation for asbestos, lead paint, or other dry hazardous materials.	Unaffected by moisture. Eco-friendly, 100% solids with no solvents or VOCs.	Polyshield SS 100 was used in Petro-Chemical tank farms as a liner please see job profile.
Polyshield HT	Specialty Products Inc.	No	Spray application. It is recommended that spray is done in multi-directional (east-west/north-south) passes to ensure uniform thickness. 1 or 2 applications may be necessary although desired thickness may be achieved with only one application.	Aprox. 100 sqft/gal at 16 mils	Coating for steel, or other substrate exposed to corrosion. Liner for concrete tanks, concrete floors, ponds, lagoons, reservoirs, dikes, irrigation ditches, tunnels etc. Bridge waterproofing. Encapsulations for asbestos, lead paint, or other dry hazardous material (Consult SPI).	Ultra High Strength, Abrasion Resistance Polyurea. Hardens in 2 minutes. Eco-friendly, 100% solids with no solvents or VOCs.	Polyshield HT was used to create a waterproof barrier to mitigate rainwater reaching a leaking containment tank at the Hanford Nuclear site in Washington state. See job summary.
Polyurea Special Protective Coating (Envirolastic AR 425)	Sherwin Williams	No	Spray applicatio. Upon application product exhibits extraordinary toughness and elastometric performance characteristics. Recommended thickness is between 30 and 250 mils.	NA	Designed for use in immersion or atmospheric exposures. This is a tough, flexible, impact resistant waterproof coating and lining system. Example of uses: Tank linings, cold storage areas, aquariums, geotextile linings, tunnels, pipeline coating and lining, fuel storage and containment, railbridge decks, offshore platforms, Nuclear Power Plants or fabrication shops among others.	Fast cure-short downtime. No VOC's. Impact tear and abrasion resistant. Chemical resistant.	NA
ArmorSeal 650 SL N (Nuclear)	Sherwin Williams	No	This is a heavy duty coating usually applied with a roller, trowel or squeegee. ARMORSEAL650 SLN self-leveling epoxy is a heavy duty concrete floor system that provides a high gloss, seamless, durable surface in nuclear facilities subject to radiation, decontamination and loss of coolant accident.	NA	Recommended for Nuclear power plants, DOE Nuclear Fuel Facilities, fabrication shops, and DOE Nuclear Weapons Facilities.	Chemical resistant. Impact resistant. Abrasion resistant. Outstanding application properties.	NA
MACROPROXY 646 N (Nuclear)	Sherwin Williams	No	May be Sprayed, brushed or roller applied. MACROPROXY 646 N is a fast drying, polyamide epoxy designed to protect steel and concrete. It is self-priming and is for use as an intermediate and topcoat in multiple systems.	NA	Recommended for power plants, tank exteriors, water treatment plants, chemical plants, fabrication shops among others.		NA

Product	Manufacturer	Stripable	Application	Price/Coverage	Use	Advantages	Previous uses:
Dura Seal 400 Epoxy Floor Coating-1 or 2 Gallon Kit	The Nelson Paint Company	No	Applied by roller, brush, or spray, it leaves an easy-to-clean, hard, glossy floor surface, suitable for incidental food contact.	\$119.49 (1 gal kit) 125 to 150 sqft/gal at 10 mil.	Effective in humid areas. Can make repairs in areas that may have spills or water flows. It is a wet surface catalyst and would harden even in water.	Dura Seal 400 penetrates into the pores of the concrete for excellent adhesion and "lies on top" to form a solid surface plate, recognized by the USDA as a contaminant barrier.	NA
Soil Sement	Midwest Industrial Supply Inc.	No	Spray onto surface to seal contamination in place. Applies to hard surface. May be applied with a fire hose.	NA	Recommended for Soil Stabilization. Environmentally safe, non - toxic, non corrosive, non flammable and does not polute ground water.preventsw water from seeping and destabilizing the surface.	Does not wash of easily with water. Fouls operating mechanisms.	NA
SAFEGARD CC	Sanchem Inc.	No	Water and Glue. Spray onto surfaces.	NA	Rust Prevention	For use in Aluminum, zinc , zinc plated or galvanized steel.	NA
QUICK DECON	Radiation Decontamination Solutions	No	Manually appliable solution, must be scrubbed or brushed for better results. Solution needs to be rinsed after application. Quick Decon is not a soap so vigorous scrubbing may be necessary. Do not let the produt dry. Rinse well with water and reapply for better resultls.	Varies depending on purchasing amount. Contact: Phillip Belcher (pbelcher@raddecon.com).	Quick Decon is effective on Radioactive Halogens such as iodine and fluorine; Transition Metals such as cesium and cobalt; and Actinides such as uranium, plutonium, and americium.	Recommended for any tipe of rinsable surfaces.	See technology evaluation report from EPA







Appendix Table 2. Contamination Control Product References and Contact Information





Product	Documents :	Web:	Pictures:	Contact:
DECON PEEL 5201 Halogen Free	Info. Sheet MSDS	http://www.strippablecoating.com/products/Decontamination/DeconPeel_5201.aspx		Mehul Shah mehul@generalchem.com General Chemical Corp 12336 Emerson Drive Brightnton, Michiga, 48116 USA. 248 587 5600 (PH) 248 587 5606 (FX)
DECON PEEL 2640 Heavy Duty Decontamination pH Neutral Chemical, nuclear Equipment	Info. Sheet	http://www.strippablecoating.com/products/Decontamination/DeconPeel_2640.aspx		Mehul Shah mehul@generalchem.com General Chemical Corp 12336 Emerson Drive Brightnton, Michiga, 48116 USA.
DECON KLEAN 5850	Info. Sheet	http://www.strippablecoating.com/products/Decontamination/DeconKlean.aspx		Mehul Shah mehul@generalchem.com General Chemical Corp 12336 Emerson Drive Brightnton, Michigan, 48116 USA. 248 587 5600 (PH) 248 587 5606 (FX)
DECON PEEL NUCLEAR 2050	Info. Sheet MSDS	http://www.strippablecoating.com/products/Decontamination/DeconPeel_Nuclear_2050.aspx		Mehul Shah mehul@generalchem.com General Chemical Corp 12336 Emerson Drive Brightnton, Michigan, 48116 USA. 248 587 5600 (PH) 248 587 5606 (FX)
DECON PASTE 2510	Info. Sheet MSDS	http://www.strippablecoating.com/products/Decontamination/DeconPaste_2510.aspx		Mehul Shah mehul@generalchem.com General Chemical Corp 12336 Emerson Drive Brightnton, Michigan, 48116 USA.






Product	Documents :	Web:	Pictures:	Contact:
CC FIX	Fact Sheet, MSDS, Project Report	http://instacote.com/cc-fix.htm		Shirley Stearns Shirley.stearns@instacote.com (734) 847 - 5260 (PH) (866) 467 - 8220 (FAX) 160 C. Lavoy Road, Erie, MI 48133
CC FIX LV	Fact Sheet, MSDS, Project Profile	http://instacote.com/cc-fix-lv.htm		Shirley Stearns Shirley.stearns@instacote.com (734) 847 - 5260 (PH) (866) 467 - 8220 (FAX) 160 C. Lavoy Road, Erie, MI 48133
CC WET (use with CC Fix)	Fact Sheet, MSDS, Project Profile	http://www.instacote.com/wet.htm		Shirley Stearns Shirley.stearns@instacote.com (734) 847 - 5260 (PH) (866) 467 - 8220 (FAX) 160 C. Lavoy Road, Erie, MI 48133
CC STRIP	Fact Sheet, MSDS, Project Profile	http://instacote.com/cc-strip.htm		Shirley Stearns Shirley.stearns@instacote.com (734) 847 - 5260 (PH) (866) 467 - 8220 (FAX) 160 C. Lavoy Road, Erie, MI 48133
CC EPOXY 609 (Pipe Stabilizer)	Fact Sheet, MSDS, Project Profile	http://instacote.com/cc-epoxy.htm		Shirley Stearns Shirley.stearns@instacote.com (734) 847 - 5260 (PH) (866) 467 - 8220 (FAX) 160 C. Lavoy Road, Erie, MI 48133

Product	Documents :	Web:	Pictures:	Contact:
CC T207 (Sludge Stabilization)	MSDS	http://instacote.com/cc-t-207.htm		Shirley Stearns Shirley.stearns@instacote.com (734) 847 - 5260 (PH) (866) 467 - 8220 (FAX) 160 C. Lavoy Road, Erie, MI 48133
CC PS 413	MSDS	http://instacote.com/cc-ps.htm		Shirley Stearns Shirley.stearns@instacote.com (734) 847 - 5260 (PH) (866) 467 - 8220 (FAX) 160 C. Lavoy Road, Erie, MI 48133
POLYUREA WASTE PACKAGING (InstaCote SEFR)	MSDS	http://instacote.com/sefr.htm		Shirley Stearns Shirley.stearns@instacote.com (734) 847 - 5260 (PH) (866) 467 - 8220 (FAX) 160 C. Lavoy Road, Erie, MI 48133

Product	Documents :	Web:	Pictures:	Contact:
<u>POLYMERIC BARRIER SYSTEM</u>	Fact Sheet, MSDS	http://www.bartlettnuclear.com/products-technology-contamination-control-coatings-polymeric-barrier-system.htm		Nick DiMascio President nick.dimascio@bartlettinc.com 800.225.0385 x 1267 Bartlett Nuclear, Inc. 60 Industrial Park Road Plymouth, MA 02360
<u>Stripcoat TLC Free</u>		http://www.bartlettnuclear.com/products-technology-contamination-control-coatings-stripcoat-tlc.htm		Nick DiMascio President nick.dimascio@bartlettinc.com 800.225.0385 x 1267 Bartlett Nuclear, Inc. 60 Industrial Park Road Plymouth, MA 02360

Product	Documents :	Web:	Pictures:	Contact:
DECON GEL 1101	Fact Sheet	http://decongel.com/product-docs.html		Larry Stack President, Government and Defense, CBI Polymers, Inc. 1946 Young Street, Hawaii 96826 (808) 949 2215 x 140 (808) 225 -7986 (cel) lstack@cbipolymers.com
DECON GEL 1102	Fact Sheet	http://decongel.com/product-docs.html		Larry Stack President, Government and Defense, CBI Polymers, Inc. 1946 Young Street, Hawaii 96826 (808) 949 2215 x 140 (808) 225 -7986 (cel) lstack@cbipolymers.com
DECON GEL 1108	Fact Sheet	http://decongel.com/product-docs.html		Larry Stack President, Government and Defense, CBI Polymers, Inc. 1946 Young Street, Hawaii 96826 (808) 949 2215 x 140 (808) 225 -7986 (cel) lstack@cbipolymers.com
DECON GEL 1128 Spary	Fact Sheet	http://decongel.com/product-docs.html		Larry Stack President, Government and Defense, CBI Polymers, Inc. 1946 Young Street, Hawaii 96826 (808) 949 2215 x 140 (808) 225 -7986 (cel) lstack@cbipolymers.com
DECON GEL 1120 Spray	Fact Sheet	http://decongel.com/product-docs.html		Larry Stack President, Government and Defense, CBI Polymers, Inc. 1946 Young Street, Hawaii 96826 (808) 949 2215 x 140 (808) 225 -7986 (cel) lstack@cbipolymers.com
DECON GEL 1121 Spray	Fact Sheet	http://decongel.com/product-docs.html		Larry Stack President, Government and Defense, CBI Polymers, Inc. 1946 Young Street, Hawaii 96826 (808) 949 2215 x 140 (808) 225 -7986 (cel) lstack@cbipolymers.com

Product	Documents :	Web:	Pictures:	Contact:
RUST DOCTOR		http://www.rustdoctor.com/		The Rust Doctor info@therustdoctor.com 1065 Benson Way, Suite 9 Ashland, OR 97520 (1800) 460 6167
ALARA 1146	Fact Sheet, MSDS	http://www.carboline.com/markets-we-serve/power-nuclear/product-details.aspx?market=Power%20-%20Nuclear&product=5303		Carboline 2150 Schuetz Road St Louis, MO 63146 314 644 4617 (PH) 314 644 4617 (FAX)
ARGONNE SUPERGEL	Fact Sheet, Tech Evaluation Report	http://www.cse.anl.gov/national_security/super_absorbent_gel.html		Michael Kaminski kaminski@anl.gov Argonne National Laboratory 630 252 7699
RAD-RELEASE	Fact Sheet	https://inlportal.inl.gov/portal/server.pt/community/newsroom/257/feature_story_details/1269?featurestory=DA_586198		Karen Wright Idaho National Labs 2525 Fremont Ave Idaho Falls, ID 83401 866 495 7440

Product	Documents :	Web:	Pictures:	Contact:
Polyshield SS-100 (Spray Polyurea Elastometer)	Fact Sheet, MSDS	http://www.specialty-products.com/polyurea-products/polyurea-plural-component-coatings/polyshield-ss-100/		Jeff Wheat Southeast Region Account Manager Specialty Products Inc. 2410 104th Street Court South Suite D jeffw@specialty-products.com 813 455 0435 (CELL) 253 983 7523 (DIRECT)
Polyshield HT	Fact Sheet,	http://www.specialty-products.com/polyurea-products/polyurea-polyurethane-foam/		Jeff Wheat Southeast Region Account Manager Specialty Products Inc. 2410 104th Street Court South Suite D jeffw@specialty-products.com 813 455 0435 (CELL) 253 983 7523 (DIRECT)
Polyurea Special Protective Coating (Envirolastic AR 425)	MSDS	http://protective.sherwin-williams.com/detail.jsp?A=sku-26670%3Aproduct-6977		Sherwin Williams 1-800 - 474 - 3794
ArmorSeal 650 SL N (Nuclear)	MSDS	http://protective.sherwin-williams.com/detail.jsp?A=sku-38112%3Aproduct-11289		Sherwin Williams 1-800 - 474 - 3794
MACROPROXY 646 N (Nuclear)	MSDS	http://protective.sherwin-williams.com/detail.jsp?A=sku-36280%3Aproduct-11110		Sherwin Williams 1-800 - 474 - 3794

Product	Documents :	Web:	Pictures:	Contact:
Dura Seal 400 Epoxy Floor Coating-1 or 2 Gallon Kit		http://www.nelsonpaint.com/DS100-2.html		
Soil Sement	Fact Sheet, MSDS	http://www.midwestind.com/products-services/dust-control-products/soil-sement-stabilizer.html		
SAFEGARD CC	MSDS	http://www.sanchem.com/safegard_us.es.html		
QUICK DECON	MSDS	http://www.raddecon.com/technology		Phillip Belcher Radiation Decontamination Solutions Operations Manager (813) 854 -5100 pbelcher@raddecon.com 141 Stevnes Ave #9, Oldsmar, FL 34677 www.raddecon.com