

Nuclear Decontamination

EnviroCare of Utah
Salt Lake City, Utah
Clive Facility
July 2001

Application:

Customer has 150 gondola type rails cars used to transport contaminated soil/debris to it's facility in the Tooele Hazardous Industry District.

Customer requested CIB demonstrate/test the ice blast process effectiveness in removing contaminated soil/dirt/debris from interior steel surfaces of transport rails car.

Customer requires the cleaning process to remove surface contamination to meet or exceed the levels specified for "Return to Service" (RTS) purposes.

Customer requires CIB to provide a completely portable/mobile equipment/set-up so that the system can be operated outside the "restricted area" and inside the "buffer zone". The actual test cleaning is performed by the customers prime maintenance contractor inside the "New Rail Wash Station" facility, a controlled and restricted access area.

Site Conditions/Set-up Parameters:

Site conditions are on the outside range of CIB operating specifications for optimal performance of the ice blast process.

- Ambient operating temperatures expected to exceed 100° F.
- Extended length of ice/air delivery hose needed to reach test site from buffer zone.
- Elevated water supply source, 85-90° F.
- Water supply is excessively "hard" with a high TDS level.
- Elevated supply air temperature, 150° F +.

Test Summary:

Customer performed several tests to determine the effectiveness of the ice blast process.

The first test was to clean a square meter area and check for surface contamination residue. The customer spent approximately 10 minutes cleaning the 1 square meter area. A meter was used to check for background contamination and then a smear sample was taken to the customer's lab for analysis. Results showed the ice blast process was effective.

A second test was performed to see if a reduction in time spent would yield the same cleanliness level. A second square meter area was cleaned in approximately 5 minutes. Testing showed the level of surface contamination diminished but not to the level as the first test.

Subsequent test cleaning revealed the entire surfaces of the rail car could be cleaned in approximately 6 hours elapsed time or 18 man-hours (customer employed 1 man to operate the blast nozzle, 1 man to tend the ice/air delivery hose and 1 man to supervise the operation).

Previous efforts using high-pressure water blast could not achieve the same level of decontamination as ice blast. Grit blasting was also used prior to the ice blast process. Grit blasting exceeded the requirements for RTS but encumbered the cleaning process by requiring access holes to be cut in the sides of the rail cars for waste removal. Grit blasting also required the use of extensive personnel protective equipment (PPE) such as supplied air and two layers of covering garments for the work personnel. The first rail car cleaned using grit blasting exceeded 90 man-hours.

The subsequent testing assessed the volume of waste generated during the ice blast process. Due to the elevated ambient temperature and the high evaporation point (low humidity) the water volume generated from the ice particle phase-change was nearly zero gallons. Recovery of residue from the cleaning process would be accomplished with HEPA filtered vacuum units.

Additional benefits of the ice blast process directed the customer to reduce the level of PPE required for the blasting personnel. In lieu of multi-layered "rain gear", a single "Tyvek" suit was used by the blasting personnel. This aided in reducing personnel fatigue due to excessive ambient heat. Supplied air blasting hoods were used at the time of the testing, which were available from the grit blasting operation, however it was determined that full face respirators could be used instead due to the low airborne readings obtained.

Conclusion:

CIB supplied and set-up a complete mobile ice blast system on the desert floor for the customer to perform test-cleaning/decontamination evaluation. The ice blast system ran for approximately 5 hours during the testing phases. The system was stopped and started several times so the customer could perform sample testing. The ice blast system performed within normal operating parameters even though the operating environment exceeded optimal operating conditions.

The customer performed all test cleaning, test sampling and evaluations. A full report illustrating the test parameters and results is forthcoming from the customer's Risk Manager.

Customer is currently evaluating a proposal from CIB to implement two ice blast units for this cleaning/decontamination application. Upon acceptance of proposal CIB expects to deliver and install the ice blast systems by the end of August 2001.



Picture 1: EnviroCare of Utah-Clive Facility.



Picture 2: 150 Gondola type rail cars ready for decon and RTS.



Picture 3: Entrance to decon facility.



Picture 4: Mobile ice blast system inside buffer zone.



Picture 5: Rail car prior to ice blast.



Picture 6: Rail car after ice blast..