Cryogenic Broken Tap Removal

It has been reported to me that tool steel as used in taps tends to become very brittle at low temperatures, while some metals, especially 300 series stainless steel become tougher. In one case the worker was able to freeze the broken tap with Liquid Nitrogen and then shatter the tap with a hammer and punch. Since it was on a vertical wall of a large stainless steel pressure vessel, he built a dam using modeling clay and poured the liquid nitrogen into the hole until the part was cooled.

Liquid nitrogen has a temperature of 77 degrees Kelvin (-196 C or –321 F) and caution must be taken to avoid injury from frostbite. Be very careful using this liquid without very good ventilation since the nitrogen gas produced by the boiling liquid can displace the oxygen in an enclosed space possibly causing loss of consciousness or death. There is no odor to warn of the loss of oxygen.

I have not tried this method, but it seems like a possibility where other methods might be more difficult or undesirable.