Dioxin is a group of chemicals that are usually formed as a by-product in chemical industry, e.g., herbicide manufacture, paper making industry (bleaching process), and in low temperature incineration of solid waste. Its importance to environmental stems from its toxicity and carcinogenicity to humans and animals, and the fact that it is very stable in the environment. The major source of dioxin in human, other than accidental or occupational exposure, is through food (which contains variable quantities of dioxin, depending on the extent of contamination in the environment where the food is produced).

The known health risks are: (Exposure to high levels, e.g., accidental or occupational exposure) Chloracne (a skin disease, non-life-threatening but resistant to treatment) Liver enzyme disturbances (significance not fully understood) Changes in immune system and glucose metabolism (non-specific)

Carcinogenic effects are of much greater concern to the general public. From epidemiological evidence (mostly derived from studies of "cohorts" of workers exposed at work (herbicide producers), or accidentally exposed (Sereso accident in Italy), there is a generally increase in "all cancer" risk. When we examine site-specific cancer risks, there is a higher risk of lung cancer, which may be partly explained by smoking. Other cancers are: soft-tissue sarcoma, a rare form of cancer, non-Hodgkin lymphoma, multiple myeloma, digestive system cancers, thyroid cancer, liver cancer, etc. but the no. of cases for the rarer cancers are small, and some findings are not consistent and statistically insignificant (i.e., we cannot rule out the fact that the observation of a higher risk can happen by chance).

There is much evidence that dioxin is an animal carcinogen (liver cancer, benign tumours in various organs / tissues, skin cancers and fibrosarcomas).

As to the utility of recalling ex-workers at the shipyard for medical examination, I have my reservations on the rationale of this course of action and what it can achieve:

First, we can examine the workers to find out if there are any abnormalities in liver enzymes or any neurological system abnormalities. Unfortunately, the tests are neither sensitive nor specific at picking up cancer. So a positive test does not necessarily mean a higher cancer risk, and a negative test cannot be taken to interpret that we can rule out cancer.

Second, and perhaps more importantly, there is no way to document the level of exposure of these workers. If I were to make an educated guess, assuming the dioxin comes from open burning of rubbish, I think the ex-workers are unlikely to have been exposed to high airborne concentrations of dioxin, and any risks associated with possible exposure to dioxin would be low. A man-hunt of these ex-workers with medical examination would probably end up raising their anxiety levels, which probably do more harm to these workers than any real benefit.

The matter is of course different for those engaged in the excavation of artifacts at the contaminated site. There is a possibility of exposure via contaminated airborne particulates, and appropriate safety and personal protection measures, as well as environmental measures (to prevent further contamination e.g., of the surface water) must be implemented. Safety guidelines for handling hazardous waste are available from environmental protection agencies worldwide, and reference should be made to these.