

### ***Slide 1***

This case study will illustrate some of the issues that the course will cover. It will look at potential routes of exposure to a chemical, how exposures occur in the workplace and the health effects that can result from it.

### ***Slide 2/3***

Nitroglycerin is widely used in the explosives industry, with applications in defence, quarrying and demolition work. It is also a common pharmaceutical, used in the treatment of angina – nitroglycerin is a vaso-dilator i.e. it opens up the blood vessels making blood flow easier, reducing the strain on the heart. Manufacture of munitions can lead to high exposures, certainly historically, with reports of significant health effects both away from work at weekends etc (headaches) and after retirement (heart attacks) because the body had been accustomed to receiving near-therapeutic doses of nitroglycerin from occupational exposure. Nitroglycerin is well absorbed through the skin and many of the pharmaceutical products are designed to be delivered through skin absorption. Skin contact is also the most likely route of occupational exposures.

### ***Slides 4-6***

A Health & Safety inspector visited a pharmaceutical production company producing angina sprays for sublingual (under the tongue) use. Workers were complaining of headaches, a classic symptom of nitroglycerin exposure. The plant itself was based on a looped conveyor belt system with work-stations positioned opposite each other. Some ventilation above the conveyor belt was provided, but this was designed to protect the product from the workers, and workers wore gloves, but these were thin latex gloves again to protect the product. When the nozzles were attached to the bottles, a small spray was emitted. Management maintained that this was propellant only and no product (i.e. nitroglycerin) was released.

### ***Slide 7***

Air and urine samples were taken for nitroglycerin analysis. No nitroglycerin was found in the air but metabolites were found in urine indicating exposure.

Although not all tasks could be studied individually (due to the frequent swapping of tasks and the need to provide urine samples) it was clear that certain tasks (including fitting the nozzles) were causing exposures.

### ***Slide 8***

It was shown that product was released when fitting the nozzles and this was either sprayed onto the hand of the worker or across the conveyor belt to the worker opposite. The lack of measurable nitroglycerin in air indicated that exposure was primarily via the skin. The gloves provided were unsuitable for chemical protection. Changing glove type to a chemically-resistant one and staggering work positions (so not opposite one another) led to improved work practice and elimination of reported health problems.