

Impact Area Groundwater Study Program

Chemical Fact Sheet – TNT

Fact Sheet 2001-05

This fact sheet is a part of a series of chemical fact sheets to address community concerns on public health and environmental issues associated with the Massachusetts Military Reservation (MMR).

What is TNT?

TNT (2,4,6-Trinitrotoluene) is produced both at military arsenals and commercial facilities and is used as an explosive in military munitions. TNT also is used in underwater blasting and in industrial explosive uses. Other industrial uses include chemical manufacturing as an intermediate in the production of dyestuffs and photographic chemicals. It may be mixed with other explosives, such as Royal Demolition Explosive (RDX) and High Melting Explosive (HMX). It is a manufactured chemical not occurring naturally in the environment.

How is TNT used at MMR?

No training with TNT is currently taking place at MMR. TNT charges are occasionally used for the destruction of unsafe to move ordnance items. In the past, the Army and Army National Guard used TNT for open detonation of unexploded ordnance, engineering training, and in artillery and mortar shells that were fired into the Impact Area. In addition, TNT was utilized in the filling of munitions by several military contractors in the southeast corner of the ranges. The principal degradation products of TNT are 2A-DNT (2-amino-4,6-dinitrotoluene) and 4A-DNT (4-amino-2,6-dinitrotoluene).

Where is TNT found at MMR?

TNT and or TNT breakdown products have been found at MMR in both soil and groundwater (see map attached) in the following general locations: the impact area, the explosive training and disposal areas known as Demolition Areas 1 and 2, the contractor and military training ranges located southeast of the impact area (Southeast Ranges), and in several other areas where munitions containing TNT were utilized.

Where can I get more information about this chemical?

For additional technical information and review of current research, contact EPA's Safe Drinking Water Hotline at (800) 426-4791, the Massachusetts Office of Research and Standards at (617) 556-1160, or see the Agency for Toxic Substance and Disease Registry's (ATSDR) Toxicological Profile for TNT.

Information about obtaining this profile is available by calling ATSDR's 24-hour Toxicology Information Service at 888-422-8737. Or at <http://www.atsdr.cdc.gov/toxfaq.html>

To order toxicological profiles contact the National Technical Information Service at (800) 553-6847.

The Impact Area Groundwater Study Program has been working on an investigation and cleanup of groundwater-related contamination on the upper 15,000 acres at Camp Edwards on the Massachusetts Military Reservation since 1997. The goals of the program are to protect public health and safety through their investigation and cleanup actions.

How may TNT affect my health?

If you are not exposed to TNT, it does not pose a risk to your health. If there is exposure to TNT, several factors will determine whether harmful effects may occur and what the type and severity of those health effects may be. These factors include:

- The dose (how much)
- The duration (how long)
- The route or pathway by which you are exposed (breathing, eating, drinking, or skin contact)
- Other chemicals to which you are exposed

Various other personal factors (e.g. age, sex, family traits, lifestyle, personal habits, state of health).

In scientific experiments conducted on laboratory animals using high doses, results indicated that exposure to high levels of TNT via inhalation or ingestion may cause liver, blood, immune system, and reproductive damage. While it is not known if health effects seen in laboratory animals will be the same for people, the results of animal studies are used to predict potential health effects in people. At high air levels (above the level permitted today in the workplace) workers involved in the production of TNT experienced anemia and abnormal liver tests. After long term exposure to skin and eyes some people developed skin irritation and cataracts, respectively. There is no information that TNT causes birth defects in people.

Is exposure to TNT likely to cause cancer?

The EPA has listed TNT as a possible human carcinogen as a result of animal studies. In laboratory studies, TNT has been shown to cause bladder cancer in rats fed TNT over a long time.

What Federal and State standards exist to protect public health and the environment?

The EPA has established a lifetime Health Advisory (HA) guidance level of 2 ppb (parts per billion) for TNT in drinking water. The EPA and MADEP have not established an ambient air level for TNT or a cleanup standard for TNT in soil.

Currently there are no regulatory levels for TNT breakdown products in soil or groundwater; however, it is known that these compounds have toxic effects similar to that of TNT.

How might I be exposed to TNT?

You can be exposed to TNT and/or TNT breakdown products when you come in contact with it by drinking, breathing, eating or touching it. Examples include:

- Drinking contaminated water
- Ingestion of soil impacted by TNT
- Breathing air contaminated by TNT
- Contacting TNT in water while swimming or bathing
- Playing in contaminated soil

Contributing Agencies

U.S. Environmental Protection Agency (EPA)
Massachusetts Department of Environmental Protection (MADEP)
Air Force Center for Environmental Excellence
Massachusetts Department of Public Health
Army Environmental Center
United States Air Force
Agency for Toxic Substance and Disease Registry

For Additional Information, Contact:

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