



## Stakeholder Sensitivity To Tritium Releases

**Special Operations Reports** are issued to initiate management actions in response to events whose subject matter represents significant Departmental safety concerns.

**Environment, Safety and Health Alerts** are issued to initiate immediate action on potentially significant safety issues.

**Environment, Safety and Health Bulletins** are issued to share information and recommend actions on potential safety issues.

**Safety Advisories** are issued to provide information to the DOE Complex on potentially significant safety or health issues.

Pursuant to the Atomic Energy Act, discharges and releases of tritium to waters from DOE facilities are regulated by DOE and those from licensed nuclear facilities are regulated by NRC or NRC Agreement States. Under the Safe Drinking Water Act, the Environmental Protection Agency (EPA) has established the standard for tritium in water from drinking water systems. EPA and States also use this standard for protection of ground water that may be used as drinking water. DOE requirements prohibit DOE operations from releasing effluents that would cause a drinking water system to exceed this standard. The Table below illustrates the regulatory requirements for the release of tritium.

### PURPOSE

This Safety Advisory provides information on a concern that may impact operations at Department of Energy (DOE) facilities. Specifically, there is increased sensitivity in the public and media with regard to tritium releases which is largely the result of recent discoveries of tritium in the surface and ground water around commercial nuclear reactors and in local municipal landfills. DOE programs and facilities should be aware of these increased concerns and be sure that our monitoring programs are effective and openly communicated to stakeholders.

### BACKGROUND

Recent reports of unplanned tritium releases at commercial nuclear power facilities (although below regulatory standards) have raised concerns in the public and media about the impacts of tritium to human health and the environment. These events have also sensitized Federal and State regulators to tritium monitoring related issues. As a result, the Nuclear Regulatory Commission (NRC) announced the creation of a task force to consider the implications of the inadvertent unmonitored release of water containing tritium from commercial nuclear power reactors. Also, the Nuclear Energy Institute (NEI) announced a voluntary industry policy to "enhance detection, management and communication about inadvertent radiological releases in groundwater that are below federal standards at nuclear power plants."

### REGULATORY REQUIREMENTS

REGULATOR	TYPE OF FACILITY REGULATED	DISCHARGE LIMIT	COMPLIANCE POINT
DOE	DOE facilities	Assess dose to meet dose limits and As low as reasonably achievable (ALARA)	Off-site Waters
NRC	NRC or Agreement State licensed facilities	1000 pico curies per milliliter (pCi/ml)	Effluent Discharges
EPA	Public Drinking Water systems	20 pCi/ml	Drinking water at the tap

DOE facilities using or generating tritium have had monitoring programs in place for many years (decades) and have been openly reporting the releases to the public. DOE Directives require the reporting of radiological releases and site monitoring programs in the Annual Site



Environmental Reports. Despite that long history of monitoring and reporting, public concerns can still arise when there is a tritium release from a DOE site. Although tritium has very low radio-toxicity, it is very mobile and almost impossible to totally contain for extended periods, and DOE needs to have a communication strategy in place should a release to the environment occur.

Recently, detection of low concentrations of tritium in surface waters at some DOE facilities drew considerable attention from state regulators. In one case, although the regulation of tritium releases to the water is the responsibility of the Department under the Atomic Energy Act and is not subject to Clean Water Act regulation, the State issued a Notice of Violation to the facility for a state specific ground water non-degradation law. Working with the State, the facility agreed to certain monitoring requirements in its water discharge permit. Though the release was within DOE requirements and did not pose a hazard to the public, the site still began an aggressive communication program to provide the stakeholders with information.

DOE does not have a specific discharge limit, but rather requires its facilities to monitor releases of radionuclides and evaluate potential doses to the public to ensure that the doses are far below dose limits and constraints as low as reasonably achievable (ALARA).

Concerns about tritium in the environment have also resulted from recent State studies of radionuclides in landfills. Following release of a Pennsylvania Department of Environmental Protection (PA DEP) study that identified tritium in the leachate of most landfills in the state, DOE was contacted by a local official regarding a possible connection between the tritium found in the local landfill and DOE. DOE had considered but had not disposed of any waste in the subject landfill. DOE facilities can and have obtained DOE-approved authorized limits for disposing of waste in Resource Conservation Recovery Act (RCRA) regulated landfills. It is important DOE facilities applying these limits verify compliance and coordination consistent with Departmental guidance. Documentation that supports the authorized limits should be publicly available. In cases where off-site landfills are used, sites should be vigilant in maintaining records and documentation of waste characterization and ultimate disposition as well as coordinating and communicating with state and landfill officials.

#### WHAT DOE FACILITIES SHOULD DO

The public will likely be concerned anytime there is a release of a radioactive substance, even if the release is not in violation of any DOE Directive or regulatory standard. It is important that Departmental elements maintain proactive, frequent and open communication with

interested Federal, State and Local agencies and officials and the public. Delays in communicating information on new developments may aggravate concerns. The potential environmental and human health risks should be explained in plain English. Sites should take immediate steps to implement corrective actions to mitigate potential impacts, including environmental monitoring. Site managers need to treat this issue very seriously and proactively provide information that address stakeholder questions.

To help maintain public trust, one DOE site developed a webpage which contains fact sheets on site operation that generate tritium and the potential health hazards of tritium in general. The webpage also provides weekly monitoring data of the tritium concentrations in the surface waters in proximity to the site. Additionally, staff has participated in meetings with the local community. Other sites have regular meetings with the community and states and post monitoring, radionuclide fact sheets and frequently asked questions on their websites (see Additional Sources of Information).

#### DOE ENVIRONMENTAL PROTECTION PROGRAM REQUIREMENTS AND GUIDANCE

Site environmental protection programs provide a mechanism for addressing tritium contamination.

DOE Order 450.1, Chg. 2, *Environmental Protection Program*, requires sites to:

- conduct environmental monitoring, as appropriate, to support the site's [Integrated Safety Management System] ISMS;
- to detect, characterize, and respond to releases from DOE activities;
- assess impacts;
- estimate dispersal patterns in the environment;
- characterize the pathways of exposure to members of the public;
- characterize exposures and doses to individuals, to the population; and,
- to evaluate the potential impacts to the biota in the vicinity of the DOE activity.

DOE G 450.1-9, *Ground Water Protection Programs Implementation Guide for Use with DOE O 450.1, Environmental Protection Program*, highlights the benefits, goals and objectives of a successful ground water protection program (GWPP) that is consistent with the requirements of DOE O 450.1, Chg. 2. To ensure long-term ground water protection, DOE sites should consider establishing and maintaining a GWPP as an integrating



element of the site-wide ISMS /Environmental Management System (EMS).

**ADDITIONAL SOURCES OF INFORMATION:**

**DOE Order 5400.5**, *Radiation Protection of the Public and the Environment*

**DOE Order 450.1, Chg. 2**, *Environmental Protection Program*

**DOE G 450.1-9**, *Ground Water Protection Programs Implementation Guide for Use with DOE O 450.1, Environmental Protection Program*

**DOE G 450.1-6**, *Ground Water Surveillance Monitoring Implementation Guide for Use with DOE O 450.1, Environmental Protection Program*

**DOE/EH-0173T**, *Environmental Regulatory Guide for Effluent Monitoring and Environmental Surveillance, 1991*

**DOE G 441.1-xx**, *Implementation Guide for the Control and Release of Property with Residual Radioactive Material, April 2002.*

**EXAMPLE FACT SHEETS AND WEBSITES ON TRITIUM**

*FERMI National Accelerator Laboratory*

<http://www.fnal.gov/pub/about/community/>

<http://www.fnal.gov/pub/about/community/IndianCreek.html>

*Argonne National Laboratory*

[www.ead.anl.gov/pub/doc/tritium.pdf](http://www.ead.anl.gov/pub/doc/tritium.pdf)

[http://www.anl.gov/Community\\_and\\_Environment/environment.html](http://www.anl.gov/Community_and_Environment/environment.html)

*Savannah River National Laboratory*

[www.srs.gov/general/news/factsheets/het.pdf](http://www.srs.gov/general/news/factsheets/het.pdf)

*Nuclear Regulatory Commission*

<http://www.nrc.gov/reactors/operating/ops-experience/grndwtr-contam-tritium.html>

<http://www.nrc.gov/reactors/operating/ops-experience/tritium/faqs.html>

If you have any question, please call Melanie Pearson, Office of Air, Water and Radiation Protection Policy and Guidance, EH-41, at 202-586-0939 or e-mail at [Melanie.Pearson@eh.doe.gov](mailto:Melanie.Pearson@eh.doe.gov).

