

# New York State Department of Environmental Conservation

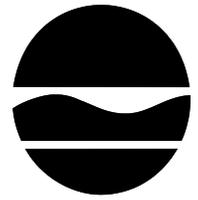
## Division of Materials Management

Radiation Control Permit Section

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## Application Guide for the Use of Radioactive Proppant Particles in Deep Well Tracer Studies

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The use of radioactive tracers in well logging studies involves the controlled placement of radioactive materials in deep underground well fractures. The tracers may be in the form of liquids, gases, or ceramic proppant particles. This document applies only to the use of proppant particles. Well loggers proposing to use other forms of tracers should contact the Radiation Control Permit Section at the above address.

The Department's 6 NYCRR Part 380 regulations apply to the release and disposal of licensed radioactive material within the State. Because tracer studies release radioactive material to the environment, tracer studies must be conducted in accordance with the requirements of Part 380. Therefore, before a tracer study can be conducted on a well, a Radiation Control Permit must first be obtained from the Department pursuant to Section 380-3. In addition, the disposal of any radioactive wastes generated during the study is subject to Part 380, Section 380-4. This guidance document describes the information that should be submitted in an application for a permit to authorize the use of radioactive tracers in well logging studies.

Section 1 of this document describes information required for all tracer studies. Section 2 describes the information required if the well logger proposes to dispose of labeled frac sand by burial on site. During a tracer study, radioactively labeled proppant particles are injected and mixed into frac sand that is forced deep into a well; the now radioactively-labeled frac sand is intended to remain within the well fractures into which it is emplaced. However, on occasion, labeled frac sand may exit back out of the well bore under pressure (i.e., a screen out / sand-out / flowback event), returning labeled frac sand to the surface. Disposal of labeled frac sand by on-site burial must be specifically approved through a variance, under Section 380-3.5(c).

### Section 1: Information to be Submitted to Obtain Approval to Conduct Deep Well Tracer Studies

Requests for approval to conduct a well logging tracer study using radioactive tracers in frac sand must provide the following information:

1. Name of applicant, address, and copy of radioactive materials license. For out-of-state licensees, include a copy of the "Notice of Proposed Use of Radioactive Material under Reciprocity" form submitted to the New York State Department of Health.

2. Methods and occasions for conducting radiation surveys (i.e., describe how and when surveys will be performed)
3. Radionuclide(s) to be used, and chemical/physical form
4. Maximum activity of radionuclide(s) to be introduced into the well in millicuries
5. Method of introducing the tracer into the sand
6. Volume of sand to which tracer will be added
7. Calculated concentration of tracer radionuclide(s) in sand (pCi/g)
8. Identity of well, and location
9. Description of well: depth of well, diameter of well casing, construction (casing depths, top of cement, oil/gas shows)
10. Depth(s) at which tracer(s) will be introduced
11. Identity and location of other wells within 1320 feet of test well
12. Calculated maximum volume of labeled frac sand that could return to the surface from the well bore in the event of a flowback (“screen out”)
13. Procedures to be used to manage and dispose of labeled frac sand that could be brought to surface during a flowback event, including the following:
  - a. A detailed description of how labeled frac sand exiting the well bore will be collected and dewatered
  - b. A detailed description of the method to be used to dispose of labeled frac sand, in accordance with Section 380-4  

Note: disposal of labeled frac sand by a method not otherwise authorized under Section 380-4 (such as on-site burial) must be specifically approved through a variance (see Section 2)
  - c. A commitment to notify the Department’s Radiation Control Permit Section in writing no later than 72 hours following a flowback event, including the volume of sand brought to the surface

## Section 2: Information Needed to Obtain A Variance for On-Site Disposal of Radioactive Waste

Requests to dispose of labeled frac sand by on-site burial must be specifically approved through a variance, under Section 380-3.5(c). Variance requests must contain all the applicable information described in Section 380-3.5(b), and must be submitted to the Department in writing. The variance request must provide the following information:

14. Identify the specific provisions of the Part 380 regulations from which a variance is sought (i.e., the general disposal requirements in Section 380-4.1(a)).
15. Demonstrate that compliance with the Section 380-4 would tend to impose an unreasonable economic, technological, or safety burden on the applicant or the public. This demonstration should include:
  - a. a description of the disposal method authorized under Section 380-4.1 that would be used if the variance was not granted
  - b. a comparison between the economic, technical and/or safety implications (as applicable) of the authorized method and those of the proposed disposal method

A demonstration of economic burden must contain cost estimates. General assertions, such as “disposal by other methods would be far more costly,” will not be adequate.

16. Demonstrate that the proposed disposal method will have no significant adverse impact on the public health and safety and the environment. This must include an estimate of the radiation dose to the member of the public likely to receive the highest dose from the proposed on-site disposal (to demonstrate that the public dose limits in Section 380-5 will be met) and that the alternative disposal method to be authorized under the requested variance will keep exposure to radiation as low as reasonably achievable.
17. Describe the disposal site, including:
  - a. location, size, and depth of the disposal site
  - b. current land use of the site, and expected land use of the site during the next two years
  - c. administrative controls or physical barriers currently in place, how access to the disposal area will be restricted, and how present and future uses of the disposal site will be prevented, and the length of time these controls will remain in place

18. Describe the schedule and procedure to be used for transporting the labeled frac sand to the disposal site, placing the sand in the pit, spreading the sand, covering the sand with soil, prevention of erosion or movement of the sand after disposal, and for keeping records of the location and contents of the disposal site.
19. Describe the procedure to be used for obtaining samples of the sand prior to disposal, and for having samples analyzed at a certified radiological laboratory. The confirmatory samples must be analyzed within 30 days of collection, and the results submitted to the Department's Radiation Control Permit Section within 60 days. Confirm this will be done.
20. Describe the procedure to be used for surveying the sand prior to disposal, and for conducting a verification survey of the area around the disposal site and after disposal to determine radiation exposure rates at 1 meter, recording the readings, and reporting the results to the Department's Radiation Control Permit Section. Exposure rate survey results must be submitted to the Department's Radiation Control Permit Section within 30 days. Confirm this will be done.
21. Confirm that a written agreement with the land owner will be obtained prior to any tracer study, and that the agreement specifies the following: who will be responsible for conducting contamination surveys, isolating contaminated frac sand, obtaining samples for radiological analysis, disposal of contaminated frac sand, and preparing submissions to the Department. The agreement must also specify if the property owner has agreed to on-site disposal of labeled frac sand on the property.
22. Complete and sign Part 1 of the enclosed Short Environmental Assessment Form (SEAF), and submit it with the variance request.

Applications for Department permits to conduct tracer studies, for disposal variances, and all notifications must be submitted to the following address:

Radiation Control Permit Section  
Division of Materials Management  
NYS Department of Environmental Conservation  
625 Broadway  
Albany NY 122233-7255

Questions should be directed to the Radiation Control Permit Section at (518) 402-8652.

Enclosure