

**EnSol, Inc.**  
**Environmental Solutions**

**452 Third Street**  
**Niagara Falls, NY 14301**

*Professional Engineering • Business Consulting*

*Ph (716) 285-3920 • Fx (716) 285-3928*  
*E-Mail EnvSol@aol.com*

June 10, 1999

██████████  
New York State Department of Environmental Conservation  
Division of Solid and Hazardous Materials  
Bureau of Radiation and Hazardous Site Management  
Radiation Section, Room 402  
50 Wolf Road  
Albany, NY 12233-7255

Re: Tonawanda Landfill Closure  
FUSRAP Material  
PN 99-0025

Dear ██████████,

The attached information has been provided as a follow-up to our meeting of June 4, 1999 regarding the above referenced project. The information has been provided to give the NYSDEC an understanding of the currently proposed approach for handling the FUSRAP waste located at two distinct, non-contiguous locations at the site.

As presented at our meeting, we have made contact with the Army Corps of Engineers to review the proposed plan and discuss options for handling the closure of the FUSRAP waste. During our meeting with the Corps we agreed that the most cost effective and expedient option for handling the waste was to negotiate directly with the Corps for cost recovery purposed and have the Town of Tonawanda perform the closure in concurrence with the landfill closure. Under this scenario, and based upon our meetings with your Bureau, NYSDEC would be the regulatory approval body for the RAD waste closure. The NYSDEC and NYDOH have already acted in this capacity for the Americium 241 waste on site. The final outcome of this waste included capping with additional soil fill.

To date several studies of the FUSRAP waste have been performed. The studies included:

Results of Mobile Gamma Scanning Activities in Tonawanda, New York prepared by Oak Ridge National Laboratory dated December 1990

Results of the Radiological Survey at the Town of Tonawanda Landfill, New York prepared by Oak Ridge National Laboratory dated December 1992

FUSRAP Technical Memorandum ~ Tonawanda Landfill Field Sampling Results prepared by BECHTEL FUSRAP Project Job 14501 dated November 11, 1995

Technical Memorandum Radiological Human Health Assessment for the Town of Tonawanda Landfill prepared by US Army Corps of Engineers dated February 1999

Our meetings with the US Army Corps have indicated our proposed Closure Plan for the landfill, with the addition of added barrier material over the RAD waste areas and

institutional controls, would be an acceptable closure alternative for the site. The Corps also concurs with our thought that the consolidation of the FUSRAP material from the Mud Flats area would also be an acceptable method for reducing the overall closure costs, making the Mud Flats property developable and provide a timely closure of the site.

### **Proposed Closure Plan**

The proposed Closure Plan for the site will include the following components related to the RAD Waste portion of the closure:

- 1) **Waste Relocation** – Waste relocation will take place from three separate areas. Two of these areas include the FUSRAP material.

The first FUSRAP area is located on the North edge of the site. Waste/FUSRAP material will be consolidated from an area along the edge of the property, to a maximum depth of 3 feet. The relocation of the waste will reduce the amount of capping required, create an additional buffer from the adjacent residences rear yards and allow for the installation of a perimeter control system including a clay berm and leachate collection system. The total amount of waste/FUSRAP material that will be relocated is currently estimated at 3,400 cyd. The material will be placed immediately adjacent to the excavation and placed over the FUSRAP material that will remain in-place. No relocated FUSRAP material will be placed outside its current horizontal limit.

The second FUSRAP area is located in the Mud Flats. The Technical Memorandum (Feb 1999) estimated that total volume of FUSRAP material in this area to be 1,700 cyd. Our proposed plan will be to relocate this waste material to the North Edge of the landfill, over the existing FUSRAP material area.

Procedures will be put into place for the proper material handling and "verification of removal" from the waste relocation areas. In addition, a field survey will be performed during the cover placement to ensure the additional barrier material and the final cover system.

A drawing is attached which illustrates the FUSRAP and waste relocation limits. Please note, following our meeting discussion, we have further reduced the amount of material to be handled on the North side of the landfill. The material to be relocated will only consist of waste less than 3' in thickness and will provide for a clean buffer to adjacent properties.

- 2) **Site Fill** – Fill will be added to the landfill site in order to create the proposed barrier over the RAD waste areas and also provide for a shallow slope for recreational use. A minimum of 3' of total fill/cap material will be placed over the radiological waste.
- 3) **Capping** – A final cover system will be placed over the entire landfill. The final cover system will be designed to meet all NYSDEC requirements. Additional barrier fill will be placed over ALL the RAD areas (both the FUSRAP and Americium). The final cover and barrier fill will have a minimum combined thickness of 36". In order to ensure that the full extent of coverage has been met, the additional barrier fill boundary will be extended a minimum of 50' beyond the RAD waste limits, within the waste limit boundary.

**Human Health and the Environment**

The Health Assessment prepared by the Corps for the site indicates that the closure of the site will not create an unacceptable risk for human health and the environment. The study anticipates the final closure use as recreational. The Town has plans for creating several soccer fields and walking/bike paths on the site.

A review of the DEC TAGM you provided has given some insight into the Department's requirements for the protection of public health and the environment. The TAGM has a maximum allowable exposure rate of 10 mrem/year for unrestricted use. The analysis performed by the Corps indicates levels below this for the landfill recreational use. The remediation worker scenario exceeds this limit, although the TAGM does allow for this limit to be exceeded during construction activities with a decision from the Chief of the Bureau of Radiation.

The scenario that reflects the impact to adjacent residents during remediation construction was not performed. This scenario may be necessary to fully comply with the TAGM. Provisions can be made during the construction activities that will negate this impact.

The Town of Tonawanda is very anxious to move forward with the closure of the landfill. We believe it is in the best interest of the Town of Tonawanda residents for the most expedient and cost effective closure alternative to be selected to handle this site. We look forward to your response.

Sincerely,

**EnSol, Inc.**

**[Redacted], PE, MBA**  
President

- Cc:
- [Redacted] - Tonawanda
  - [Redacted] - Tonawanda
  - [Redacted] - DEC
  - [Redacted] - DOH
  - [Redacted] - DEC
  - [Redacted] - DEC
  - [Redacted] - Corps
  - [Redacted] - Corps
  - [Redacted] - Corps
  - [Redacted] - Tonawanda

New York State Department of Environmental Conservation  
Division of Hazardous Substances Regulation

Technical

Administrative

Guidance

Memorandum

# TAGM

Insert in

**TECHNICAL MANUAL**

Memorandum: 4003 Page 1 of 6

Subject: Cleanup Guideline for  
Soils Contaminated with  
Radioactive Materials

Date: **SEP 14 1993**

- New  
 Obsolete  
 Supersedes Memo No. \_\_\_\_\_

## I. PURPOSE

This TAGM describes the policy and procedure to be followed by Division of Hazardous Substances Regulation, Bureau of Radiation staff in evaluating cleanup plans for soils contaminated with radioactive materials.

The purpose of this cleanup guideline is to provide for:

- (1) protection of public health and the environment, and
- (2) consistency in implementing remedial actions at sites contaminated with radioactive materials.

## II. POLICY

The total effective dose equivalent to the maximally exposed individual of the general public, from radioactive material remaining at a site after cleanup, shall be as low as reasonably achievable and less than 10 mrem above that received from background levels of radiation in any one year.

The radiation dose received from an exposure to soils contaminated by radionuclides will strongly depend on the time of exposure and pathways by which the radionuclides or their decay products can come in contact with an individual. For this reason, the estimated annual dose resulting from exposure to any residual radionuclides in the contaminated area is the basis for establishing site-specific cleanup criteria. The dose estimate is to be based on the contaminating radionuclides, but not on background concentrations of any radionuclides that may be at the site. Background radiation refers to:

- (1) local area concentrations of naturally occurring radionuclides,

New York State Department of Environmental Conservation  
 Division of Hazardous Substances Regulation

Technical  
 Administrative  
 Guidance  
 Memorandum

# TAGM

Insert in

**TECHNICAL MANUAL**

Memorandum: 4003	Page 2 of 6
Subject: Cleanup Guideline for Soils Contaminated with Radioactive Materials	
Date: <b>SEP 14 1993</b>	
<input checked="" type="checkbox"/> New <input type="checkbox"/> Obsolete <input type="checkbox"/> Supersedes Memo No. _____	

- (2) cosmic radiation, and
- (3) radionuclides of anthropogenic origin which have been regionally dispersed and are present at low concentrations (such as fallout from the testing of nuclear weapons).

### III. PROCEDURE

The process of determining the appropriate cleanup requirements will generally involve measurements of radioactivity at the site, laboratory analysis of soil samples for concentrations of radioactive materials, modeling of expected doses based on the measurements and analyses performed, and evaluation of site remediation alternatives. The modeling will require determination of site characteristics critical to the migration of radionuclides, and will need to be referenced to reasonable scenarios for current and plausible future uses of the land. Consideration of the time period during which the radioactive material is expected to persist at the site will be important in the selection of scenarios for land use. The estimated dose limit of 10 mrem/year refers to land released for unrestricted use. If unrestricted use scenario calculations result in dose estimates that are greater than 10 mrem/year, it may be necessary to invoke institutional controls and/or deed restrictions so that actual doses from allowed uses are not likely to exceed 10 mrem/year.

#### A. Dose Analysis Methods

Analysis methods used must be acceptable to the DEC Division of Hazardous Substances Regulation, Bureau of Radiation. The methods used should be appropriate to the complexity of the contaminated site and to the potential for harm. The primary criterion is that the analysis yield conservative results, i.e., the results of the analysis, must predict doses no lower than are likely to actually occur. This principle should be applied to both

New York State Department of Environmental Conservation  
 Division of Hazardous Substances Regulation

Technical  
 Administrative  
 Guidance  
 Memorandum

# TAGM

Insert in

**TECHNICAL MANUAL**

Memorandum: 4003	Page 3 of 6
Subject: Cleanup Guideline for Soils Contaminated with Radioactive Materials	
Date:	SEP 14 1993
<input checked="" type="checkbox"/> New <input type="checkbox"/> Obsolete <input type="checkbox"/> Supersedes Memo No. _____	

the analysis methods and to the site-specific inputs required for any models used in the evaluation.

All reasonable pathways of exposure shall be considered when determining the estimated dose to individuals. Approval of the procedures used in, and the interpretation of, each step of the analysis must be obtained from NYSDEC. The steps to be followed are:

1. Perform a site assessment. This involves determining exposure levels at the site, the extent of the contamination, and concentrations of radionuclides in the contaminated areas. Care must be taken that the appropriate instrumentation is used for detecting radiation at the site (gamma, beta, alpha, or neutrons). Concentration profiles as a function of depth in the soil should be determined. Where possible, the chemical and physical forms of the radionuclides should be determined. It should be possible from this data to characterize the locations and concentrations of all radionuclides which can significantly contribute to the dose potentially received from the site. When modeling the site characteristics, and the migration of radionuclides within and from the site, it will be necessary to show that the site parameters used will cause the dose estimates to be conservative.

During on-site investigation, staff and contractors must abide by all appropriate requirements and Departmental policies related to personal protection and by any applicable health and safety plans. At sites where non-radioactive contaminants are known to be present, staff should contact appropriate persons from other involved Bureaus, Divisions, or Agencies as to health

New York State Department of Environmental Conservation  
Division of Hazardous Substances Regulation

Technical  
Administrative  
Guidance  
Memorandum

# TAGM

Insert in

**TECHNICAL MANUAL**

Memorandum: 4003 Page 4 of 6

Subject: Cleanup Guideline for  
Soils Contaminated with  
Radioactive Materials

Date: **SEP 14 1993**

New  
 Obsolete  
 Supersedes Memo No.

and safety and coordination of activities. If non-radioactive chemical contamination (where not previously known) is suspected at a site, be it by observation and/or analysis, the appropriate regulatory staff should be notified.

2. Provide a review of current land use and a rationale for potential use of the site. Use this information to estimate possible occupancies for the site and review how different plausible uses of the site can contribute to exposures. Keep in mind that the maximally exposed individual of concern is a member of the general public not associated with the use of radioactive materials. This is usually a resident, but may also be a worker at a business not licensed to use radioactive materials. Radiation exposure to workers at facilities with radioactive materials is regulated by the licensing agency under the New York State Industrial Code (New York State Department of Labor) or the New York State Sanitary Code (New York State Department of Health).
3. Analyze all reasonable pathways. Only when pathways can be shown to contribute insignificantly to the dose, can they be eliminated from further consideration. Pathways that must be considered are:
  - (a) Doses from direct exposure to radiation emitted from the contaminated soil and, where applicable, from contaminated ground or surface water.
  - (b) Doses from internal exposure - including inhalation of contaminated dust (including radon progeny if present), ingestion of contaminated soil, ingestion of food raised on contaminated

New York State Department of Environmental Conservation  
Division of Hazardous Substances Regulation

Technical

Administrative

Guidance

Memorandum

# TAGM

Insert in

**TECHNICAL MANUAL**

Memorandum: 4003 Page 5 of 6

Subject: Cleanup Guideline for  
Soils Contaminated with  
Radioactive Materials

Date: **SEP 14 1993**

- New  
 Obsolete  
 Supersedes Memo No. \_\_\_\_\_

soil, and ingestion of drinking water  
(both aquifer and surface waters) or  
contaminants from irrigation water.

## B. Analysis of Remediation Alternatives

Remediation techniques should be evaluated for effectiveness at meeting the 10 mrem/year dose limit, at keeping radiation doses as low as reasonably achievable, and at minimizing the creation of radioactive waste. If site remediation is needed to achieve the 10 mrem/year dose limit, it will be necessary to prepare a work plan that is acceptable to NYSDEC and other cognizant agencies (NYS DOL, NYSDOH).

Acceptable remediation procedures might include:

- (1) Removal of contaminated soil for disposal at a licensed facility.
- (2) Isolation of contamination such as covering the contamination with clean soil. This technique may be acceptable for short-lived isotopes assuming that restrictions to land use are used until the radionuclides no longer pose a threat.
- (3) Other remediation techniques, if applicable, considered and approved on a case-by-case basis.

Remediation alternatives should be evaluated for exposures which will occur to workers, staff and the general public during corrective action/remedial activities. Appropriate health and safety plans should be prepared or referenced for construction and monitoring activities (see also item C. (1) below).

New York State Department of Environmental Conservation  
 Division of Hazardous Substances Regulation

Technical  
 Administrative  
 Guidance  
 Memorandum

# TAGM

Insert in

**TECHNICAL MANUAL**

Memorandum: 4003	Page 6 of 6
Subject: Cleanup Guideline for Soils Contaminated with Radioactive Materials	
Date: <b>SEP 14 1993</b>	
<input checked="" type="checkbox"/> New <input type="checkbox"/> Obsolete <input type="checkbox"/> Supersedes Memo No. _____	

Remedial alternatives should also be evaluated for the potential to cause significant damage to sensitive environmental or historical areas (see also item C. (2) below).

Special consideration must be given to sites contaminated with non-radioactive chemicals as to remedial alternatives and disposition of the resultant hazardous or "mixed" waste.

Before a site can be released for unrestricted use it will be necessary to confirm that the approved work plan has been completed successfully. This confirmation will include measuring exposure rates and/or measurements of residual radionuclide concentrations. The final modeling step will need to show that release of the site, with any radionuclide concentrations still remaining after remediation, will not cause the dose limit to be exceeded.

C. Alternative Procedures

There may be incidents/situations whereby:

- (1) the health and safety of individuals involved in a cleanup may necessitate acceptance of a dose greater than 10 mrem/year to the maximally exposed individual, or
- (2) the cleanup may cause irreversible destruction or loss of environmental habitat.

In such situations, remedial options will be evaluated on a case-by-case basis. Final decisions will be made by the Chief, Bureau of Radiation.