



## **EnergySolutions Site Security Plan for the Receipt and Disposal of UCNI and Export Controlled Waste from DOE**

EnergySolutions is hereby requesting approval from the US Department of Energy (DOE) to receive and dispose of Unclassified Controlled Nuclear Information (UCNI) and Export Controlled radioactive waste. The approval would permit DOE prime contractors to destroy UCNI and Export Controlled components by burial at EnergySolutions. This type of waste primarily originates from the DOE gaseous diffusion enrichment facilities located in Oak Ridge, Portsmouth, and Paducah. EnergySolutions is submitting the following information that addresses the security measures to ensure safe and secure disposal of UCNI and Export Controlled waste during the operational and institutional control periods of EnergySolutions' disposal facility.

### **Disposal Site History**

The initial selection of the EnergySolutions disposal site location dates back to the late 1970s when the US Department of Energy (DOE) and the State of Utah began the cleanup of an abandoned uranium mill site. The Vitro mill site, located in central Salt Lake City, was one of the first sites cleaned up under the DOE Uranium Mill Tailings Remediation Action (UMTRA) Program.

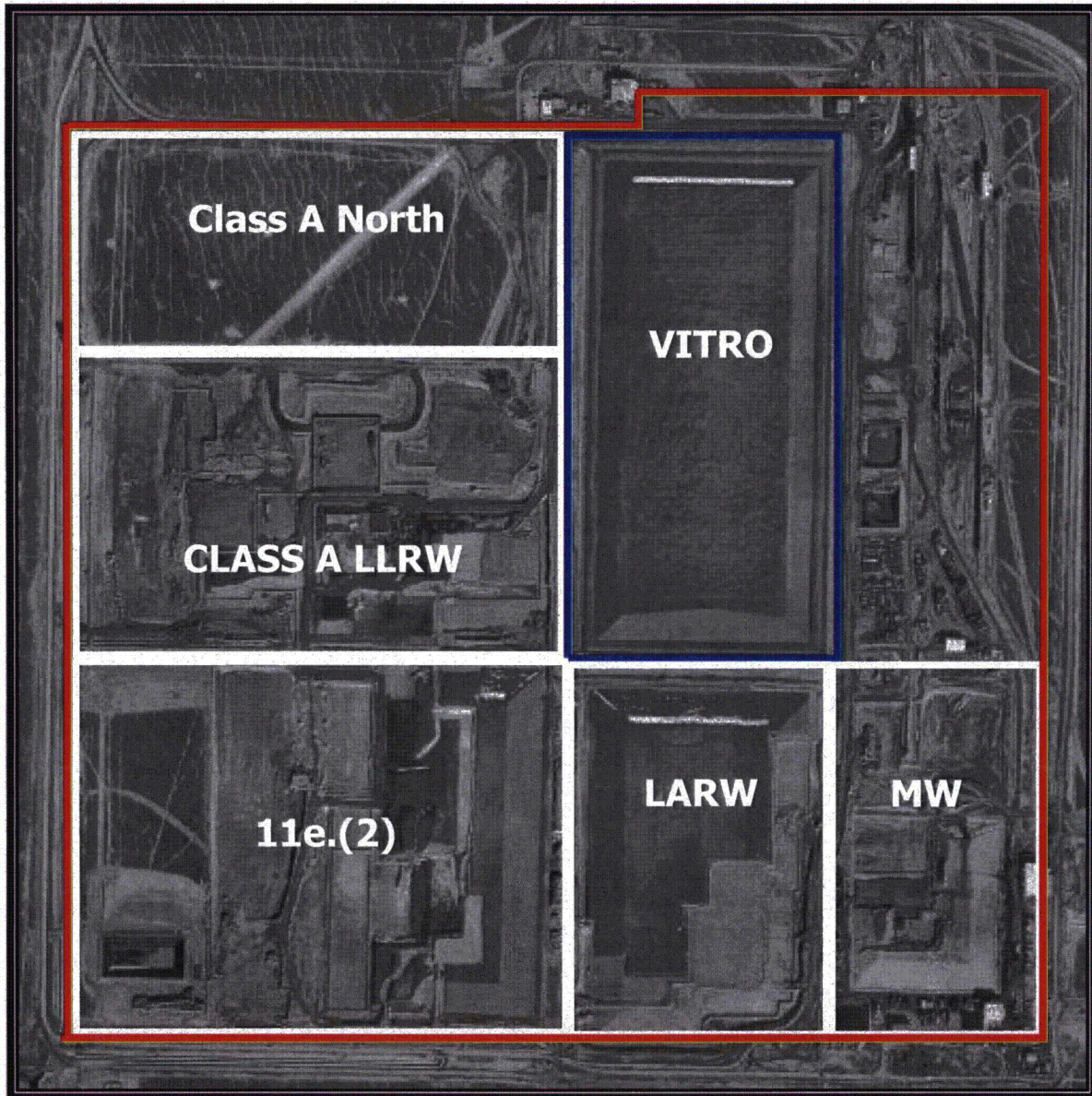
The DOE investigated 29 sites to identify the safest permanent disposal site for these materials. After eight years of characterization and evaluation of several sites, the agency selected the Clive site located in Utah's West Desert approximately 75 miles west of Salt Lake City. The site's remote location, low precipitation, naturally poor groundwater, and low-permeability clay soils were some of the attractive qualities of the area that lead to the DOE's selection of the Clive disposal site. From 1984 to 1988, the Vitro tailings were relocated to Clive and placed in an above-ground disposal embankment.

After completion of the DOE Vitro Tailings project, EnergySolutions purchased the land adjacent to the completed Vitro disposal embankment and submitted a license application to receive and dispose of Naturally Occurring Radioactive Materials (NORM). Since 1988, EnergySolutions' Radioactive Material License has been amended several times, expanding the types of radioactive materials to include low-level radioactive waste (LLRW), mixed low-level radioactive waste (MLLRW), and 11e.(2) byproduct material.

### **Disposal Site Controlled Access and Security**

The EnergySolutions' disposal facility is located on a one square-mile section as illustrated in Figure 1. The disposal facility restricts access to the general public via fences and controlled gates. Access to the site, controlled areas, restricted areas, and waste access areas is monitored by EnergySolutions' Security Department and is set forth in the "Site Radiological Security Plan" provided as Attachment A to this document.

**Figure 1. Aerial photograph of the EnergySolutions' Disposal Facility.**



EnergySolutions' Security Department provides continuous monitoring of the site 24 hours a day and 7 days a week with surveillance cameras and security personnel that provide full site coverage both internal and external to controlled and restricted areas. A six-foot chain link fence surrounds the entire site to secure access into the restricted areas (shown in red in Figure 1). All authorized individuals must enter and exit the facility through security gates accessing the LLRW and Mixed Waste restricted areas. Individuals accessing these areas are briefed on applicable Radiation Work Permits and sign the access forms. In addition, the Site Radiological



Security Plan identifies a continuous buffer zone outside the restricted area to prevent unauthorized personnel from approaching the restricted area fence.

## **Employment Policies and Practices**

EnergySolutions' employment policies and practices are set forth in the "Employee Policy Manual". All employee candidates must provide documentation pertaining to proof of United States citizenship and eligibility to work in the United States prior to being hired as an EnergySolutions' employee. In addition, all employee candidates are subject to background investigations, medical examinations, and substance abuse tests. Applicable sections of the Employee Policy Manual are provided below.

### **Equal Employment Opportunity**

*EnergySolutions values the talents and skill sets of each employee and applicant. EnergySolutions is determined to provide an equal opportunity environment and to comply with all laws, regulations and policies regarding personnel actions. It is the policy of EnergySolutions to provide equal opportunity without regard to race, religion, color, national origin, age, gender, disability, marital status, veteran status or any other characteristics protected by federal, state or local laws. Each employee is expected to respect the dignity and equality of all people.*

### **Background Investigations**

*As a condition of employment, inquiries will be made of former employers and personal references. Verifications will also be made of education, criminal records, licensing and professional credentials. Additional credit checks may be completed depending on the nature of the work performed. Only fully qualified applicants will be considered for employment. Applicants who are found to have falsified information by misrepresentation or falsification of facts on their application will not be considered for employment. If they have already been employed, they may be terminated.*

### **Conditions of Employment**

*Upon an offer of employment, but prior to the commencement of employment, you may be required to complete a medical examination, which may vary according to the requirements of the position. All employee candidates will be subject to a substance abuse test. All required documentation pertaining to proof of citizenship and eligibility to work in the United States must be submitted at time of hire and updated as required by law. It is the responsibility of the employee to keep this information current by notifying the Human Resources Department of any changes in employment eligibility status.*

### Immigration Compliance

*This Company is committed to employing only United States citizens and aliens who are authorized to work in the U.S. We do not unlawfully discriminate on the basis of citizenship or national origin.*

*In compliance with the Immigration Reform and Control Act of 1986, each new employee must complete the Employment Eligibility Verification Form I-9 and present documentation establishing identity and employment eligibility. Former employees who are rehired must also complete the form, regardless of the length of time between termination and rehire.*

### Waste Acceptance

Radioactive waste shipments via truck and rail are scheduled with EnergySolutions' Operations Department a minimum of 5 working days in advance of the shipment arrival date. Each shipment will be inspected upon arrival at the EnergySolutions' disposal site to verify compliance with Department of Transportation (DOT), all other Federal and State of Utah regulations, applicable EnergySolutions' licenses and permits, the Waste Profile, and other disposal site requirements. The information contained on the Uniform Low-Level Radioactive Waste Manifest and, for mixed waste shipments, the Uniform Hazardous Waste Manifest will be reviewed for accuracy and completeness. Signed copies of the manifest(s) will be returned to the generator identified on the manifest within seven days of receipt.

### Disposal Site Operations

EnergySolutions uses an above-ground engineered disposal technology. The design provides for long-term disposal with a minimal need for active maintenance. In addition to the standard liner and cover requirements used in the LLRW / 11e.(2) cell design, the mixed waste cell also has a triple synthetic liner system with a synthetic cover barrier to comply with the land disposal requirements contained in 40 CFR 264.

Soil and soil-like material are placed in the disposal cell in 2-foot lifts. After placement, the lift is compacted to 90 percent of its optimum density based on the results of standard proctor tests (ASTM D-698) in a continuous cut and cover process. EnergySolutions uses two procedures for the placement of all non-soil or solid debris material. Under the first method, debris that is no longer than 12 feet in any dimension and less than 10 inches in one dimension may be placed uniformly in the lift. Soil is compacted in and around the debris to eliminate void space. The lift is then further compacted.

Debris that does not meet these size criteria is identified as "Oversized Debris". Oversized Debris is placed in the cell and disposal is effected through the application of a grout-like mixture termed Controlled Low-Strength Material (CLSM). The CLSM is used to fill void spaces that may exist

such that the final form is monolithic. This is necessary to minimize the effects of long-term settlement of the disposal embankment.

The specific location of each waste shipment in the disposal embankment is identified using standard survey practices. This allows *EnergySolutions* to identify the specific location of each shipment in the disposal embankment.

### **Operating Procedure for Secure Management of UCNI and Export Controlled Waste**

The procedure governing the secure management of UCNI and Export Controlled waste at *EnergySolutions* is the "Operating Work Permit for the Management of UCNI and Export Controlled DOE Waste" provided as Attachment B to this document. The purpose of the procedure is to establish a method for unloading, transporting, and disposing of UCNI and Export Controlled waste received from the DOE in a highly secure manner while maintaining compliance with all applicable license requirements and/or State and Federal regulations.

All UCNI and Export Controlled waste management activities will be performed under the continual surveillance of the Site Security Department. Only authorized personnel will be allowed to manage these wastes and will be distinguished by wearing a green vest per the Operating Work Permit. The Site Security Department will monitor unloading and disposal activities until the waste is covered to prevent visibility. If desired, one or more authorized DOE representatives may also be present during waste management activities to observe final disposal of UCNI and Export Controlled waste.

To control visibility of UCNI and Export Controlled waste during disposal operations, generators will be required to either 1) package the waste in a disposable bag, wrap, or other disposable container, or 2) package the waste in a secure bulk shipping container (e.g., intermodal) to facilitate operational logistics in managing the waste prior to disposal. Waste that is packaged per option one will be disposed in the bag, wrap, or other disposable container. Waste that is not wrapped, bagged, or packaged in a disposable container will be placed on the disposal embankment and covered with other material to prevent accessibility and visibility of the waste. As previously stated, the Site Security Department will provide continual monitoring of the disposal area until the waste is completely covered and secured.

Bulk shipping containers that have been emptied will be inspected to ensure all waste has been removed, radiologically decontaminated, and surveyed to applicable release standards. Empty containers will be secured with a Tamper Indicator Device before being released from the disposal site. After disposal of the waste, *EnergySolutions* will provide the DOE prime contractor a Certificate of Disposal for the shipment.

### **Contractual Agreements**

*EnergySolutions* is currently working with DOE and one of its prime contractors to incorporate contractual language addressing the management requirements of UCNI and Export Controlled

waste. DOE officials have raised the concern regarding future events that may lead to the recovery of UCNI or Export Controlled waste from the disposal facility. EnergySolutions considers disposal as an appropriate method of destruction of UCNI and Export Controlled waste. Although the likelihood of recovering these wastes is extremely low, EnergySolutions will establish contractual requirements with DOE and/or its prime contractors that prevent these wastes from being recovered without prior written approval from the DOE. The contractual language will require EnergySolutions to "obtain DOE approval for any removal or other disposal of UCNI or Export Controlled waste and to comply with applicable U.S. Government export control regulations in the event that it is decided to export any of the equipment."

### **Disposal Site Institutional Controls**

EnergySolutions has the responsibility of maintaining the facility in the future. EnergySolutions is required by its Radioactive Material License (RML) to maintain a Surety Fund with sufficient funds for activities during the closure and the post-closure period in the event that EnergySolutions is unable to maintain the facility. Condition 73 of the RML states,

"The Licensee shall maintain a Surety that satisfies the requirements of UAC R313-25-31 in an amount adequate to fund the decommissioning and reclamation of Licensees' grounds, equipment and facilities by an independent contractor. The Licensee shall annually review the amount of surety and submit a report of its findings to the Executive Secretary by August 31 each year. The Executive Secretary shall annually determine the required amount of surety under the Surety and shall require the Licensee to adjust the surety as necessary to reflect any increase in decommissioning and reclamation costs."

The financial surety agreement gives exclusive control of the trust fund to the State of Utah. Utah Administrative Code R313-25-31(8) states that "financial or surety arrangements shall remain in effect until the closure and stabilization program has been completed...and the license has been transferred". Until a transfer of the license occurs, the surety arrangement remains in effect and will continue to be reviewed to determine the amount necessary to protect public health and the environment. With this fund and other regulatory authorities, the State of Utah will be equipped to take whatever action necessary to protect the public health and the environment.

The closure and post-closure activities included in determining the amount of the Surety Fund are detailed in Appendix HH of the 1998 Radioactive Material License Renewal Application, "Decontamination and Decommissioning Plan", and Appendix F of the Ground Water Quality Discharge Permit, "Post-Closure Monitoring Plan". These Plans are provided as Attachment C to this document. The main activities covered during these periods include the following:

- Building and support facility demolition and decommissioning costs
- Disposal of the allowable waste in storage
- Closure of disposal embankment assuming open cell volume at maximum allowable
- Installation of permanent fencing, monuments, etc.
- Closure and post-closure monitoring and maintenance costs for a period of 100 years

As of August 31, 2008, the amount of the Surety Fund for EnergySolutions' Radioactive Material License is approximately \$51,000,000. EnergySolutions' Surety Funds for the Mixed Waste and 11e.(2) embankments amount to an additional \$16,200,000. The amount of the Surety Fund is adjusted at least annually depending on the changes to the disposal site and related costs associated with decommissioning these facilities.

In addition to the Surety Fund, EnergySolutions is required to pay for the Perpetual Care and Maintenance Fund prescribed in UAC R19-3-106.2. This fund has been established by the State of Utah to provide a funding source, should monitoring and maintenance of the EnergySolutions' disposal site be needed at some time after the closure and post-closure periods (i.e., post 100 years). The current amount in the Perpetual Care and Maintenance Fund is \$13,000,000.

The EnergySolutions' disposal facility is in a special "Hazardous Materials Zone" within Tooele County that is specifically zoned for the operations of hazardous materials management. No other types of activities are allowed within this 100 square mile zone. Tooele County requires permits for the construction of all activities within the County. Any facility that would be located within this zone would have to be permitted to be constructed and operated and would be required to be compatible with the zoning requirements of the area.

In 1993, EnergySolutions entered into an agreement with the Utah Department of Environmental Quality (DEQ) establishing "Covenants and Restrictions" regarding the use of the disposal site. This agreement is provided as Attachment D to this document. The restrictive covenants impose on EnergySolutions and future owners of the site the following conditions:

1. No excavation or construction after the LLRW is disposed of and the facility is closed, except as necessary to maintain the premises.
2. No uses of the property that may impair its integrity.
3. No change in use of the Site following closure except with the prior written consent of the Utah DEQ.
4. The erection and continuous maintenance by EnergySolutions and its successors of monuments and markers, approved by DEQ, to warn of the presence of radioactive material at the Site.
5. No conveyance of the Site by EnergySolutions without prior written approval of DEQ, and no conveyance of any interest in the Site by EnergySolutions without adequate and complete provisions for continued maintenance of the Site.
6. The ability of any State or Federal agency to enforce the restrictive covenants in an action in state court in Tooele County.

The Covenants and Restrictions agreement, Surety Fund, and Perpetual Care and Maintenance Fund address the long-term security and control of the site even if EnergySolutions does not self-perform the closure and post-closure activities. With these site control and funding mechanisms already in place, the State of Utah would have sufficient means to complete the closure and post-closure activities of the disposal facilities. Additionally, the EnergySolutions' site is located within 300 feet of the Vitro Tailings disposal embankment owned by the DOE on the north and within 300 feet of the 11e.(2) disposal embankment to be owned by DOE on the west. Federal ownership of these disposal embankments will provide additional control.

**ATTACHMENT A**

**Site Radiological Security Plan**



**Site Radiological Security Plan**

**Revision 2**

**March 28, 2006**

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## 1.0 PURPOSE

This plan outlines the required security measures to be implemented and which are enforced at EnergySolutions Clive facility to prevent radioactive waste material(s) and contaminated equipment without authorization from being used within or exiting the facility.

## 2.0 SCOPE

This plan outlines the security measures in place for the EnergySolutions Clive facilities; with additional measures identified for specific waste access areas within the Bulk Waste Facility (BWF). It introduces a multi-layer security model containing specific security controls for site access, restricted area boundary, and overall waste access. This plan applies to all personnel who access EnergySolutions Clive facility located within Section 32.

## 3.0 DEFINITIONS

### Waste Access Areas

Areas where personnel can come in direct contact with un-containerized waste. These areas include the following:

- 11c.(2), Class A, Class A North, and Mixed Waste disposal cells
- Railcar Rollover Facilities
- Intermodal Unloading Facility
- Mixed Waste Treatment Facilities when they contain waste
- Rail Digging Facility
- Shredder

### Access Control Stations

The only points (designated areas) established for normal personnel and personal item entrance and egress to and from the Restricted Area.

### Restricted Area Boundary

The area within the controlled area that requires control of access and occupancy for radiation protection purposes. The restricted area boundary is posted "Caution, Radioactive Material" and is bordered by a 6-foot high fence.

### Controlled Area

The area within EnergySolutions' property boundaries that is controlled for purposes other than radiation protection, i.e., security.

### Facility (Site) Access Areas

The area within EnergySolutions' property boundaries by which there is only gate access. A badge or electronic key must be presented at the gates upon entry and exit. These gates are monitored by security cameras and security personnel.

**Un-Containerized Waste**

Bulk waste that has been unloaded from a transportation container.

**Debris**

Debris is material for disposal other than soil.

**Unloading**

For the purposes of this plan, unloading is the removal of unpackaged waste from the container.

**Authorized Personnel** – Personnel with Unescorted/Unrestricted access demonstrated by a green, blue, or orange badge. Every individual issued a green, blue, or orange badge shall have completed the training procedures as required by EnergySolutions training manual.

**4.0 RESPONSIBILITIES**

- 4.1 The **Vice President of Clive** has the ultimate responsibility and accountability for establishing and implementing this plan. The Vice President of Clive delegates authority to implement this program to the Security Department.
- 4.2 The **Director of Operations (LLRW or MW)** is responsible for the management of all waste handling operations and coordinating resources to implement and ensure compliance with this plan.
- 4.3 The **Director of Quality Assurance** or designee is responsible for performing surveillance and/or audit activities to verify implementation and compliance with the requirements of this plan.
- 4.4 The **Director of Health Physics** is responsible for providing radiation safety support to the Director of Operations in implementing this plan. The Director of Health Physics is also responsible for the performance and documentation of radiological inspections and surveys, and controlling and monitoring Access Control Points.
- 4.6 The **Security Department** is responsible for monitoring waste access areas, restricted area boundaries and site access areas, and performing random security checks on personnel and vehicles accessing these facilities.
- 4.7 **EnergySolutions Employees and Contractor Personnel** are responsible for understanding and enforcing portions of this procedure as applied to their job assignment/ work area, and reporting ANY suspicious activity to their supervisor. **All personnel** are responsible for the safe operation of the facility and compliance with this plan.

**5.0 GENERAL**

Facility vehicles transferring or unloading waste shall not be left unattended.

All hand and small power tools procured and used to perform operations activities by EnergySolutions employees or by any of EnergySolutions' contractor's employees within the Bulk Waste Facility restricted areas shall be uniquely identified and distinguishable from waste material tools delivered to the site for disposal.

*NOTE: Tools that are owned by subcontractors or rental equipment used inside the restricted areas for special projects, shall be controlled by markings, security seals, security escorts or physical inventories. Individuals assigned as security escorts shall have no other responsibility while performing the assigned task.*

Facility (Site) security patrols shall be performed seven days a week and twenty-four hours a day. A minimum of three patrols is required within a 24-hour period.

Facility (Site) Security patrols will include the following:

- Random searches
- Detection of breaches in fencing
- Detection of unattended vehicles
- Detection of suspicious items, persons, or activities
- Detection of unauthorized access by individuals

Restricted Area interior security patrols shall be performed when personnel are present within the Restricted Area and will include the following:

- Random searches
- Detection of breaches in fencing
- Detection of unattended vehicles
- Detection of suspicious items, persons, or activities
- Detection of unauthorized access by individuals

## 6.0 SECURITY PLAN REQUIREMENTS

### 6.1 Site Access Boundary Controls

Visitors to the EnergySolutions Clive site will be directed to the administration building via road signs. Visitors will be briefed on security measures and general risks found at the facility.

All individuals who access the site will be subject to camera surveillance and random inspections by security personnel.

### 6.2 Restricted Area Access Controls



Activities within the Restricted Area shall be monitored by Security, either by presence or by the use of security cameras.

Restricted Area fence lines shall be free of vegetation, equipment, and debris to help security personnel identify unauthorized material or equipment.

All material and equipment shall exit the Restricted Area through designated access control points unless an exception is granted by the Director of Health Physics.

Health Physics personnel shall be present at personnel access control point areas during periods of operation. They shall monitor personnel and other items entering and exiting the restricted area.

#### Personnel Exiting Restricted Area

All personnel must exit the restricted area through designated access control points except during a designated emergency or unless an exception is granted by the Director of Health Physics.

Upon request, items inside clothing shall be removed and presented to the Health Physics personnel located at the control point.

Random security checks shall be performed on personnel exiting the area by Security personnel.

Designated and approved Transfer Areas established for relocation of cell construction material, fill material, and CLSM into the restricted area shall be monitored by security officers and/or security cameras.

Transport Containers Exiting the Restricted Area shall be subject to the following:

- Completion of a satisfactory radiological survey;
- Security seals shall be installed on empty containers exiting the facility.

The applicable Director of Operations shall be immediately notified if security seals are found to be breached or of any other suspicious items found during inspections.

### 6.3 Waste Access Areas Control

Security personnel shall perform documented daily random security searches on personnel and vehicles accessing these areas.

Access to the railcar rollover and the intermodal unloading facility shall be monitored either by security personnel or security cameras.

Only authorized personnel shall be permitted to enter designated waste access areas.

Security officers shall conduct physical inspections of designated waste access areas when work is being performed. Any unauthorized individuals or equipment found in these areas without the proper clearance shall be immediately reported to the Director of Operations.

**7.0 REFERENCES**

EnergySolutions Training Manual

**8.0 ATTACHMENTS**

None

**ATTACHMENT B**

**Operational Work Permit  
for the  
Management of UCNI and Export Controlled DOE Waste**

## APPENDIX U - Decontamination and Decommissioning Plan

### I. REFERENCES

1. Bronson, Frazier L.; *Nuclear Instrumentation Tools for Lower Cost and Higher Reliability Decommissioning of Buildings and Grounds*. Canberra Industries, Meriden CT; June 1996.
2. NRC; NUREG-1575 *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)*, dated December 1997
3. NRC; NUREG-1506, *Measurement Methods for Radiological Surveys in Support of New Decommissioning Criteria*. 1995.
4. NRC; NUREG/CR-5512, *Residual Radioactive Contamination From Decommissioning*. April 2001.
5. NRC; Regulatory Guide 1.86, *Termination of Operating Licenses for Nuclear Reactors*. 1974.
6. NRC Office of Nuclear Materials Safety and Safeguards; *Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Materials*. 1987.
7. Utah State Bureau of Radiation Control; *Post Close Gamma Radiation Survey: Clive/Vitro UMTRA Site*. March, 1989.
8. NRC, 10 CFR 20, Standards for Protection Against Radiation, Subpart E- Radiological Criteria for License Termination

### II. DECOMMISSIONING CRITERIA

NOTE: This plan for decontamination and decommissioning of Envirocare's Clive site is not intended to describe funding requirements or required activities under the LLRW Surety.

NOTE: This plan provides the concepts of decontamination and decommissioning using existing methodologies. Envirocare is required to submit a detailed License Termination Plan one year prior to termination of disposal operations in accordance with R313-22-36. A detailed License Termination Plan will be submitted at that time taking into consideration the applicable regulations, regulatory guidance and state of the art methodologies at the time of decommissioning.

The objective of decommissioning is to reduce residual radioactivity in soils and other material which may remain after closure so that the concentration of each radionuclide which could

contribute to residual radioactivity is indistinguishable from the background radiation concentration for that radionuclide. As a practical matter, it is extremely difficult to demonstrate that such an objective has been met (Section VII describes release survey criteria in more detail).

Prior to termination of disposal activities by Envirocare, a detailed decontamination and decommissioning (D&D) plan will be developed. As part of decommissioning, the Site shall be returned as close as practical to its original contour, using preoperational survey data and interpolating uniformly between survey points. This will require that all structures (including any potentially contaminated underground items or material such as pipes and drain basins) be removed.

Areas to be surveyed will be classified in accordance with MARSSIM criteria. These areas may be structures, such as individual buildings or the rail car rollover; or features, such as waste storage pads, evaporation ponds, haul roads, rail beds, decontamination facilities or staging areas. The area to be included and sample aliquots will be determined using the MARSSIM methodology. A plan will be developed for the decontamination and release of each area believed to be contaminated. All other areas will be managed under a single plan. The total area to be surveyed includes the entire Restricted Area and its perimeter.

Where possible, contaminated equipment and materials shall be decontaminated and radiologically-released for unrestricted use following applicable Envirocare procedures. Items with inaccessible or porous surfaces which prevent radiological release based on surface contamination measurements or which cannot be effectively decontaminated shall be placed in a disposal cell.

The decommissioning process entails the removal of buildings, structures and other non-natural features such as roads, pads and fences. Decontamination and removal or disposal of those items not required to support the decommissioning process will occur initially, followed by contamination surveys to determine the extent of soil contamination, removal of contaminated soils and final confirmation surveys. Finally, any buildings or support features necessary to conduct operations during D&D will be decontaminated and removed or disposed of during final closure of the disposal cell. Clive is within a recognized bald eagle nesting region. It is proposed that existing power poles within the restricted area be frisked for residual contamination and left in place, with the addition of platforms to serve as eagle nesting areas. If the poles cannot be radiologically released they will be removed and placed in the disposal cell.

### **III. PRELIMINARY DECONTAMINATION**

Areas other than structures known or suspected to be contaminated will be cleaned by removing all material down to the natural surface or to the soil beneath the bottom synthetic liner (where such liners are used). These areas include the evaporation ponds, storage pads, decontamination pads, rail car rollover pit, haul roads, and vehicle maintenance shop. Because it is assumed that these areas are contaminated, no scoping or characterization surveys will be required. These areas are generally underlain by synthetic liners or are constructed of distinctive material which is



is easily identified. Following decontamination, these areas will be given a final status survey to confirm that they are clean.

#### **IV. CHARACTERIZATION SURVEY**

A characterization survey will be performed to the standards of a final status survey in the expectation that most areas surveyed will not need further decontamination. Therefore, the characterization survey can serve the needs of both characterization and final release. In cases where the characterization survey indicates the need for remediation, data collected from surveys in non-contaminated areas will be used to develop the statistical data needed to determine the scope of the final status survey.

Envirocare has received waste containing a wide variety of radionuclides. Approximately 60% of these nuclides are gamma-emitters and can be quantified by gamma spectrometry. Characterization will be performed by in-situ gamma spectrometry for gamma-emitting nuclides or by soil sampling and analysis by gamma spectroscopy. As described in Reference 1, in-situ gamma spectrometry is capable of providing detection limits on the order of 0.05 pCi/g for such nuclides as Co-60, Cs-137 and Ra-226; and on the order of 0.5 - 1.0 pCi/g for U-238 with 15-minute count times. These detection limits are typically much lower than those for non-gamma emitters as determined by radiochemistry (usually 1 pCi/g or higher).

##### **1. Buildings and Structures**

Building areas will be assigned a class, based on the contamination potential in accordance with the guidance in MARSSIM. Walls and floors of affected areas will be gridded, as required by MARSSIM. If there is potential for contamination of the ceilings, they will also be gridded. Radiological measurements of fixed and removable radioactivity will be performed based on the statistical analysis required by MARSSIM.

##### **2. Rail Beds**

Rail beds within the restricted area will constitute a separate set of areas. These will be wide enough to encompass the full width of the bed. A gamma exposure rate survey will be made along the full length of the tracks to identify any obviously contaminated areas. Those portions of the rail bed which are not found to be contaminated during this survey will be further surveyed by in-situ gamma spectrometry or by collection of samples for laboratory analysis. In-situ measurements will be made every 10 m along the bed. Clean rail bed material will be used to return excavated areas to original contour. Survey Units will also be established for the Envirocare rail spur outside the restricted area. Rail spur beds outside the restricted area which are determined to meet release criteria will be used as fill material, as needed, within the restricted area.

### 3. Soil Surveys

All areas within the LARW Surety area will be evaluated at site closure. Envirocare has defined areas of Section 32 for radiological survey at closure in three classes in accordance with MARSSIM. A "Class 1 area" will be any area inside of the Restricted Area which has not undergone preliminary excavation as part of site demolition. A "walkover survey" will address the area west of Vitro and north of 11e.(2), less 196,900 ft<sup>2</sup> around the Administration building and parking areas (which will be surveyed as "unaffected"). A "Class 2 area" for purposes of radiation survey is defined as any area within the LARW Surety area of Section 32 which has not been accounted for otherwise.

Areas of Section 32 outside of the LARW Surety area are addressed under the 11e.(2) Surety, the Mixed Waste Surety, or consist of the Vitro embankment. Drawing # 9710-1 displays the class of survey to be performed for specific LARW Surety areas.

All areas will be evaluated and surveyed in accordance with the guidance provided in MARSSIM.

### 4. Measurement Criteria

Areas of elevated activity will be compared to release limits using the methods of Section 8.6 of Reference 2. The adequacy of soil samples will be evaluated for each area using the methods described in MARSSIM.

## V. DECONTAMINATION

### 1. Buildings and Structures

Any areas not meeting the release criteria of Section VII must be decontaminated and resurveyed or disposed of as waste. The initial steps in decontamination of floors will be to remove any floor coverings. If floor coverings were not used, as in the case of concrete floors, the cost of complete removal versus decontamination by such means as scabbling will be evaluated. If the floor is to be decontaminated, the area will be surveyed following decontamination. Walls and ceilings found to be contaminated will be removed and disposed of as waste. In the case of other structures found to be contaminated, the net cost of decontamination and resale will be evaluated against the cost of disposal. Such decontamination may be performed by means of high pressure water washing or sandblasting. Sandblasting, if performed, will be conducted in a closed facility with appropriate emission controls.

## 2. Soil

Areas of soil suspected or found to be contaminated will be removed in a manner that will not re-contaminate the area. This will normally be by means of a backhoe, which is able to remove material from an area without having to go onto the area being cleaned. Areas which have not been disturbed and are expected to be contaminated on the surface only will have the minimum thickness of soil removed which the equipment is capable of removing. After the SU has been decontaminated in this manner a final status survey will be performed.

For areas where it is suspected that contamination may be deeper than the surface, in-situ gamma spectral analysis will be performed during remediation to determine when sufficient soil has been removed to meet release limits. After remediation of the SU is complete, a final status survey will be performed.

## VI. FINAL STATUS SURVEY

The characterization survey is performed to the same criteria as the final status survey. Therefore, the only surveys needed following decontamination are those required to demonstrate that any contamination found during the characterization survey has been adequately remediated. Those surveys will follow the format described in Section IV.

## VII. RELEASE SURVEY CRITERIA

All items to be removed will meet the surface contamination limits of Regulatory Guide 1.86 (Reference 5). Areas with activity exceeding those limits will be remediated to below the release limits and resurveyed. Elevated levels of radioactivity are permitted on released items as long as the maximum value over an area not to exceed 100 cm<sup>2</sup> is less than three times the release limit and the average activity over a 1 m<sup>2</sup> area meets the release limit.

Soil will be decontaminated to background levels, averaged over each 15 cm (six inches) of depth. NRC has recognized the extreme difficulty of demonstrating that a site has been decontaminated to "background." NRC has recommended (in section 1402 to 10 CFR 20) that a calculated annual dose of 25 mrem to the maximally exposed individual from residual radioactivity is a reasonable approximation of background.

Using data from Tables 4.7 and 4.8 of a letter from DRC dated March 24, 1994, the following values for background concentrations of naturally-occurring nuclides and Cs-137 have been calculated:

**Table VII.1: Background Concentrations of Naturally-Occurring Nuclides at the Envirocare South Clive Site**

<u>Nuclide</u>	<u>Concentration (pCi/g)</u>	<u>Std Dev (pCi/g)</u>
Ra-226	1.07	0.10
U-238	1.00	0.33
Th-232	0.95	0.09
Cs-137	0.64	0.30

In-situ gamma spectrometry or soil sampling and analysis will be performed with count times and geometries adequate to measure the above concentrations at the observed standard deviations or to provide minimum detection limits of 0.05 pCi/g for Co-60, whichever provides the most sensitive detection capabilities. Measured concentrations of naturally-occurring radioactive nuclides or Cs-137 which are not significantly different from the background values at the 95 percent confidence level will be considered to be at background. These nuclides, or their decay products, are expected to be among the dominant gamma-emitting nuclides managed. Therefore, they are considered to be the best indicators of radioactive contamination. However, the waste received for disposal will contain a number of other gamma-emitting nuclides. A positive finding of any other non-natural gamma-emitting radionuclide will be considered confirmation of contamination. If any naturally-occurring radionuclide is detected above background, or if any non-natural radionuclide is measured above its minimum detectable concentration, all non-gamma-emitting nuclides will be scaled from the measured concentration at the same relative amounts as disposed of during the operating life of the disposal facility.

Limits will be established for non-natural nuclides following the procedures (described in Reference 4) used for determining dose to an individual from residual contamination in soil. The concentration limits will be based on a 25 mrem per year total effective dose equivalent assuming residential occupancy and the dose conversion factors of Table 3.6 of Reference 4. Doses will be summed for all nuclides measured above background.

Areas of elevated radioactivity concentration are permitted within a 100-m<sup>2</sup> area as long as the maximum activity does not exceed three times the limit and the average activity over the elevated area does not exceed  $(100/A)^{1/2}$  times the limit, where A is the area of the elevated activity in m<sup>2</sup>.

### VIII. DOCUMENTATION AND FINAL REPORT

All data collected during site closure activities will become part of the permanent decommissioning record, and will be retained by Envirocare until such time as authorized by the Division of Radiation Control for disposal. These records will be available for review by the Division of Radiation Control.

Records will include: the approved D&D plan; detailed plan views of the property showing all proposed areas for evaluation; scale plans of all buildings showing the proposed survey plan; field notes of survey measurements performed; laboratory reports of laboratory or in-situ gamma spectrometry measurements made; records of any decontamination performed and disposition of removed materials; a record of instrumentation used for the surveys; maps or survey records documenting original surface contours; a final surface contour map with 1-ft contour intervals of post-remediation conditions; and a final radiological status report of D&D activities performed and the results. The summary report will contain the following information:

- 1.0 Background Information
- 2.0 Site Information
  - 2.1 Site Description
  - 2.2 Site Condition at Time of Final Survey
  - 2.3 Identity of Potential Contaminants and Release Guidelines
- 3.0 Final Status Survey Overview
  - 3.1 Survey Objectives
  - 3.2 Organization and Responsibilities
  - 3.3 Instrumentation
  - 3.4 Survey Procedures
    - 3.4.1 Area Classification
    - 3.4.2 Reference Grids
    - 3.4.3 Surface Scans
    - 3.4.4 Surface Activity Measurements
    - 3.4.5 Soil Sampling/Measurements
    - 3.4.6 Special Measurements
  - 3.5 Background Levels
  - 3.6 Sample Analysis
  - 3.7 Data Interpretation
  - 3.8 Records
- 4.0 Survey Findings and Results
  - 4.1 Building Surveys
  - 4.2 Structure Surveys
  - 4.3 Non-structural Survey Unit Surveys
  - 4.4 Data Evaluation
- 5.0 Summary

Appropriate Drawings and Tables



UGW450005

# APPENDIX F

## Post-Closure Monitoring Plan

Dated January 5, 2000



## Post-Closure Monitoring Plan

### 1.0 FACILITY CONDITIONS

#### 1.1 General Description

Envirocare of Utah, Inc. (Envirocare) operates a waste disposal facility (Site) located at Section 32 Township 1 South and Range 11 West, Tooele County, Utah. The Site has been licensed to receive and dispose of naturally occurring radioactive material (NORM) waste, 11e.(2) waste, and low-activity radioactive waste (LARW). Envirocare has also been granted a permit to receive, treat, store, and dispose of Radioactive/Hazardous waste (Mixed Waste). Additionally, Envirocare has been granted a Ground Water Quality Discharge Permit, (GWQDP) Permit No. UGW454445, by the State of Utah, Division of Water Quality. This Plan does not attempt to satisfy the closure requirements of Envirocare's Radioactive Materials License, the closure requirements of Envirocare's state issued RCRA Part B Permit, or closure requirements of Envirocare's 11e.(2) License No. SMC-1599. The portions of the Envirocare Site which are covered by this Post-Closure Monitoring Plan include the Low Activity Radioactive Waste (LARW) Disposal Area, LARW compliance monitoring wells, compliance monitoring wells at the Mixed Waste Facility for radiological constituents, and compliance monitoring wells located within the 11e.(2) Disposal Area for non-radiological constituents. In addition, required sampling of Mixed Waste Landfill Cell Leachate is covered in this plan.

### 2.0 POST-CLOSURE MONITORING PROCEDURES

#### 2.1 Sampling and Analytical Procedures

Post-closure sampling at the Site will include sampling of the LARW suction lysimeters and inspection of the observation manholes for the collection lysimeters. If fluids are present in the manholes, samples will be collected. Post-closure sampling will also consist of groundwater sampling from compliance monitoring wells, soil sampling, and vegetation sampling.

All LARW suction lysimeter or groundwater sampling procedures and methodology will comply with the approved Water Monitoring Quality Assurance Project Plan, GWQDP, Appendix B. All 11e.(2) groundwater sampling will be performed in accordance with the 11e.(2) License, Sections 11.1 and 11.2. Groundwater sampling for radiological constituents at the Mixed Waste Facility will be performed in accordance with Module VI,

*Ground Water Monitoring of the RCRA Part B Permit.* Sampling of any fluids from the LARW collection lysimeters will be in accordance with the requirements of Appendix C of the GWQDP. Soil, and vegetation sampling will be conducted in accordance with Appendix R of the Application for Renewal, Radioactive Materials License No. UT2300249, dated March 16, 1998.

Groundwater sampling will be performed for all compliance monitoring wells which are required by the GWQDP. Water samples collected from monitoring wells and lysimeters will be analyzed for all groundwater protection levels (GWPLs) and other monitoring parameters as required by the GWQDP. If monitoring of groundwater for Polychlorinated Biphenyls (PCBs) is required, it shall be performed using the Test Methods, Practical Quantitation Limit (PQL), and Concentration Limits specified in Section 14 of the GWQDP, Appendix I, *Plan for the Management of Waste Containing Polychlorinated Biphenyls (PCBs)*, and Table VI-1 of the Mixed Waste Storage and Disposal Permit #982598898.

Mixed Waste Landfill Cell Leachate sampling will be performed on a semi-annual basis. Representative samples of leachate from the upper leachate collection access pipe will be analyzed for radiological constituents as specified in the GWQDP.

All groundwater, leachate, and lysimeter sampling and analysis will be reviewed by the Groundwater Manager or qualified designee. The Groundwater Manager or designee must be familiar with the Envirocare Water Monitoring Quality Assurance Project Plan, and the requirements listed in the Radioactive Materials License, 11e.(2) License, and RCRA Part B Permit.

## 2.2 Site Inspection

The LARW/11e.(2) Cells will be inspected at a minimum of once every six-month period for the duration of post-closure monitoring. The Mixed Waste Landfill Cell will be inspected in accordance with Attachment II-8, *Post-Closure Monitoring Plan* of the RCRA Part B Permit. The LARW/11e.(2) inspection will include the following tasks:

- a. Inspection for evidence of any vandalism or mischief including any breach of the security fencing, damage to the monitoring devices or systems, deposition of any litter or wastes or any other situation which would hinder Envirocare's ability to control site access or monitor the facility.
- b. The cell caps will be viewed to determine any visual evidence of settlement, erosion, burrowing animals, and vegetation. Any vegetation observed on the cap or riprap will be removed within 10 working days to prevent any damage to the structural or hydraulic integrity of the cap, and subsequent infiltration of water. Any other damage to the cell cover, i.e., settlement, erosion, burrowing, etc., will

also be repaired within 10 working days.

- c. Surface drainage systems, including the drainage ditches and the dispersion area will be visually inspected for any erosion, blockage, settlement or any other condition which may prevent or impede free drainage. If such conditions are observed, corrective actions will be taken within 10 working days to restore a condition of free drainage to these areas.
- d. The observation manholes for the collection lysimeters will be inspected for mechanical integrity and security status. If fluids are present in the observation manholes, their volume and flow rate will be recorded in addition to the information required by the GWQDP. If such conditions are observed, corrective actions to restore mechanical integrity and security status will be taken within 10 working days.
- e. A report from these semi-annual inspections will be submitted to the Executive Secretary. The semi-annual periods will be January-June and July-December. The reports will be submitted within 30 days of the end of the semi-annual period.

### 2.3 Groundwater Monitoring

Groundwater samples will be taken from the compliance monitoring wells on an annual basis for the period of post-closure monitoring (100-year period). The annual sampling events must be conducted at least six months later than the previous year's sampling event. A report of the analytical results of groundwater sampling will be submitted in writing to the Executive Secretary within 90 days of the completion of the groundwater sampling event unless a corrective action report is required relating to groundwater under Section 3.0. Groundwater compliance will be determined by a comparison of the results of sampling to the established groundwater protection levels specified in the GWQDP.

Suction lysimeters, soil moisture instruments, and other devices will be monitored and sampled on an annual basis in accordance with the GWQDP.

In conjunction with the annual sampling event, the compliance monitoring wells will be inspected for security of the surface casing, mechanical integrity, condition of inside casing and well depth to assure the well's screens are free and open to the formation. The suction lysimeters will also be inspected for mechanical integrity and security status. If any conditions requiring corrective actions are observed, these actions will be taken within 10 working days.

### 2.4 Closure/Post Closure Quality Assurance Procedures

All groundwater, suction lysimeter, leachate, soil, and vegetation sampling, analyses, and

documentation shall be conducted in accordance with the applicable Permit and/or License as listed in Section 2.1, with the exception of PCBs. Groundwater monitoring for PCBs as required, will be conducted using the Test Methods, Practical Quantitation Limit (PQL), and Concentration Limit as specified in Section 14 of the GWQDP, Appendix I, *Plan for the Management of Waste Containing Polychlorinated Biphenyls (PCBs)*, and Table IV-1 of the Mixed Waste Storage and Disposal Permit #982598898.

## 2.5 Closure/Post Closure Certification

All phases of closure operations will be documented by an "As-Built" Report which has been reviewed and stamp/certified by a Utah registered professional engineer. Upon completion of closure, a certification will be provided by the engineer stating that all work has been performed in accordance with the accepted engineering plans and specification.

Surveys of the site will be performed annually during post-closure and certified by a Utah registered land surveyor or Utah registered professional engineer. Surveying will include the cap of each disposal cell, all surface drainage systems and the water level measuring point at each compliance monitoring well.

A surveying report will be submitted to the Executive Secretary on or before March 31 of each calendar year.



## 3.0 CORRECTIVE ACTION

In addition to any other corrective action that may be required under the GWQDP, the need for corrective action will be evaluated in the event that Post-Closure monitoring detects migration of constituents to the groundwater, slope settlement (any relative decrease in slope from the approved design slope between settlement monitor points) of the final cap, or any other situation which indicates a compromise of the Cells' integrity, or settlement of the drainage system (any relative decrease in grade of center line of any drainage ditch). The Executive Secretary will be notified within five days of discovery of a need for corrective action including, but not limited to, security fence repair, cap repair, drainage system repair, monitoring well replacement or implementation of an escalated monitoring of both the vadose zone and compliance monitoring wells due to the detection of groundwater or lysimeter water exceeding the protection levels. Within ten days of notifying the Executive Secretary, Envirocare will submit a plan and compliance schedule to complete the corrective action.

## 4.0 NOTIFICATION REQUIREMENTS

The Utah Division of Radiation Control and the Utah Division of Solid and Hazardous Waste will be notified at least one (1) year in advance of the initiation of closure activities. Envirocare

will notify the Divisions of completion of closure by the submittal of an engineers' certification of closure. The Divisions will be notified of any plans for performing Post-Closure monitoring so that representatives from the Divisions may be present.

**ATTACHMENT D**

**Restrictive Covenants Agreement**

BCCN 353

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PAGE 452-456

DONNA S. W. TOLSON  
TOOELE COUNTY RECORDER

EN AGREEMENT AB

ESTABLISHING OF RESTRICTIVE COVENANTS

DEPUTY [Signature] FEE 18.00

THIS AGREEMENT is made the day and year hereinafter given by and between ENVIROCARE OF UTAH, INC. (hereinafter "Envirocare"), a Utah corporation having its general offices at 46 West Broadway, Suite 240, Salt Lake City, Utah 84101, and UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY (hereinafter the "Department").

RECITALS:

(1) Envirocare is the record owner of the following-described premises located in Tooele County, Utah, to wit:

SEE ATTACHED EXHIBIT A FOR A LEGAL DESCRIPTION AND EXHIBIT B FOR A DIAGRAM OF THE PROPERTY.

(2) Envirocare is in the process of constructing and operating a low-level radioactive waste disposal facility described in Exhibit B for the permanent disposal of radioactive material pursuant to a license granted by the Department under R447-25.

(3) The parties desire to clarify and supplement the Agreement Establishing Covenants and Restrictions recorded March 16, 1993, at Book 348, Pages 104-107.

NOW, THEREFORE, these restrictive covenants are executed by Envirocare to ensure the long-term integrity of the disposal facility for the safety of the people of the State of Utah, to wit:

(1) These covenants shall be in addition to any restrictive covenants currently on record affecting the above-described premises, and recorded at Tooele, Utah, in the Tooele County Records.

(2) No excavation or construction, except as necessary to maintain the integrity of the above-described premises, shall be allowed after the low-level radioactive waste is disposed of and the facility closed.

(3) No uses of the property shall be made which may impair its integrity. Any change in use following closure of the facility shall require the prior written consent of the Department, or its successors or assigns, which shall not be unreasonably withheld.

(4) Envirocare, its successors or assigns, shall erect monuments and markers and shall thereafter continuously maintain, while it has title, these monuments and markers. These monuments and markers are to be approved by the Department to warn of the presence of radioactive material at the site.

(5) Envirocare shall notify the Department of its intent to convey any interest in the property described herein. Such conveyance shall not be made



without the prior written approval of the Department, provided however that such approval is not to be unreasonably withheld. No conveyance of title, easement or other interest in the property shall be consummated by Envirocare without adequate and complete provision for continued maintenance of the property.

(6) Any state or Federal governmental agency, affected by any violations of these restrictive covenants, may enforce them by legal action in the District Court for Tooele County.

(7) Any of the parties mentioned in the previous paragraph may obtain an immediate temporary restraining order from the District Court upon allegation that these restrictive covenants have been violated without any further showing being required. Envirocare, its successors or assigns, shall then bear the burden of proof as to why such temporary restraining order should not be made a permanent injunction by the court.

(8) Envirocare, its successors and assigns, shall not at any time institute legal proceedings, by way of quiet title or otherwise, to remove or amend these restrictive covenants unless the Department has given advance written approval.

These restrictive covenants shall run with the land in perpetuity and shall be binding upon Envirocare, its successors and assigns.

Dated this 29th day of June, 1993.

UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY

ENVIROCARE OF UTAH, INC., a Utah corporation

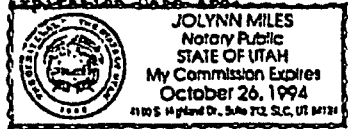
By Deanne R. Nielson  
Executive Director, Department of Environmental Quality

By Khosrow B. Semnani  
Khosrow B. Semnani, President

STATE OF UTAH )  
                  ) ss.  
COUNTY OF TOOELE )

The foregoing instrument was acknowledged before me this 29th day of June, 1993, by KHOSROW B. SEMNANI, the President of Envirocare of Utah, Inc., on behalf of the Corporation.

My Address and Commission Expiration Date App.



Jolynn Miles  
NOTARY PUBLIC

EXHIBIT A

TO

AGREEMENT ESTABLISHING OF RESTRICTIVE COVENANTS

Premises located in Tooele County, Utah, described as follows:

Section 32, Township 1 South, Range 11 West, Tooele County, Utah, excepting the following-described property being the Vitro impoundment site:

PROPERTY DESCRIPTION OF VITRO EMBANKMENT


Beginning at a point located 1120.32 feet North 89°56' West, along the section line, and 329.49 feet South from the Northeast corner of Section 32, Township 1 South, Range 11 West, Salt Lake Base and Meridian and running thence North 89°56'32" West 1503.72 feet; thence South 0°03'28" West 2880.50 feet; thence South 89°56'32" East 1503.72 feet; thence North 0°03'28" East 2880.50 feet to the point of beginning.

STATE OF UTAH )  
 ) ss.  
COUNTY OF SALT LAKE )

On the 29 day of June, 1993, personally appeared before me Dianne R. Nielson, who being by me duly sworn did say that she is the Executive Director of the Department of Environmental Quality and that she did sign the foregoing instrument on behalf of the Utah Department of Environmental Quality and that said Department executed the same.

My Address and Commission  
Expiration Date, Are: - - - -

Notary Public  
MARRI CHARLENE LATHAM  
223 North 1400 West  
Salt Lake City, Utah 84116  
My Commission Expires  
September 6, 1993  
State of Utah



Dianne R. Nielson  
NOTARY PUBLIC

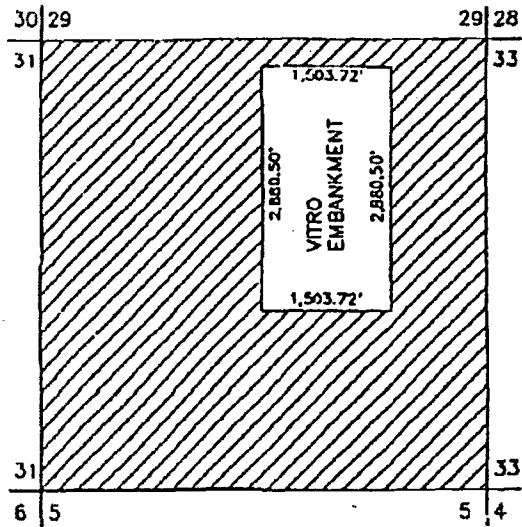


EXHIBIT "G"

ENVIROCARE OF UTAH PROPERTY  
(ALL OF SECTION 32 EXCEPT  
VITRO EMBANKMENT)



ENVIROCARE OF UTAH, INC.

"THE SAFE ALTERNATIVE FOR WASTE DISPOSAL"

ENVIROCARE OF UTAH PROPERTY  
PROPERTY LOCATION

SCALE: 1"=1600' DATE: 29 JUN 93