

VOLUME II
APPENDIX C
COMMENTS OF
THE S. W. SHATTUCK CHEMICAL COMPANY, INC.
ON THE
DENVER RADIUM SITE OPERABLE UNIT VIII

Technical Report

**Preliminary
Environmental Audit**

Envirocare of Utah, Inc.
Tooele County, Utah

The S. W. Shattuck Chemical
Company, Inc.
Denver, Colorado

Project No. D0297
May 1991



Technical Report

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Environmental Audit**

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Tooele County, Utah**

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Earth Sciences Consultants, Inc.
One Triangle Drive
Export, PA 15632
412/733-3000

3575 Forest Lake Drive
Uniontown, OH 44685
216/896-0233

9085 E. Mineral Circle
Englewood, CO 80112
303/799-9299

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Technical Report
Preliminary Environmental Audit
Envirocare of Utah, Inc.
Tooele County, Utah

1.0 Introduction and Conclusions

This report presents the results of a preliminary environmental audit of Envirocare of Utah, Inc.'s (Envirocare) waste management facility in Tooele County, Utah conducted on April 8 and 9, 1991. Earth Sciences Consultants, Inc. (Earth Sciences) performed this audit using information developed from available public sources, discussions with selected Envirocare personnel, findings from a site reconnaissance of the Envirocare facility, and review of documents from the U.S. Environmental Protection Agency (USEPA) and Utah Department of Health Division of Environmental Health Bureau of Radiation Control (BRC). The audit occurred as a due-diligence measure because the Envirocare facility is proposed as the disposal site for radiologically contaminated soil and demolition debris from Operable Unit VIII of the Denver Radium Superfund site. Envirocare is currently licensed to dispose of naturally occurring radioactive material (NORM) waste, low-level radioactive waste, and mixed waste.

Based on our reviews and observations, the following general conclusions are drawn at this time:

- The NORM facility proposed to receive material from Operable Unit VIII is unlined and permits discharge of contaminants to soil and groundwater. Envirocare's current NORM disposal operations and the adjacent former U.S. Department of Energy (DOE) Vitro Chemical Company (Vitro) disposal facility are both designed so that the bottom of the disposal cell is located just above or in a sand unit that is pervious. Considering that the waste streams accepted by Envirocare are more diverse than the Vitro tailings, a broader range of groundwater contaminants would be expected from the Envirocare operations.
- Review of the hydrogeological information associated with the facility indicates that Envirocare's current groundwater monitoring system is not adequate to determine the nature and extent of groundwater contamination from the NORM waste disposal operations. This is particularly significant relative to assessing

potential impacts of contaminated groundwater on public health and the environment.

- Envirocare's financial resources (including insurance) are limited and may not be adequate to protect itself or its customers from any long-term potential environmental liabilities that arise. Current surety arrangements with the Utah BRC are oriented to facility decontamination, disposal of residual materials, and cover placement, and appear limited relative to long-term monitoring and postclosure care.
- Mixed waste and possibly low-level radioactive waste are currently being stored on site in waste piles or containers in anticipation of the construction of appropriate disposal cells. However, any measures that are in place to prevent mishandling or migration of these wastes while in storage were not described. For example, it is unclear (1) whether the pile(s) is currently covered and bermed to protect against runoff/run on; and (2) how these wastes would be handled if the planned disposal cells are not accepted by the regulatory agency.
- The adequacy of Envirocare's operating practices and the related oversight activities are subject to question. Examples of our concerns follow:
 - Considering the potential physical and chemical variability of the NORM waste streams accepted by Envirocare, many of the quality assurance/quality control (QA/QC) measures used by Envirocare are inadequate.
 - Waste received at the facility is not being tested to confirm the absence of non-NORM radionuclide or nonradiological chemical constituents.
 - There are substantial questions about the validity of the on-site QA/QC test data that Envirocare is generating.
 - During colder months, freezing of waste in rail cars (including waste shipments from other operable units of the Denver Radius site) is an operational problem that, if not properly handled, could exacerbate groundwater contamination associated with disposal of waste in unlined cells.
 - Some key facility personnel do not have significant operating or construction training and experience managing sites of this type and do not appear to

satisfy the associated permit application representations.

- BRC does not appear to be confident that Envirocare has the ability to comply with their permit conditions as demonstrated by the following statement: "Considering Envirocare's corporate structure, compliance history and staff, it is clear that there is little commitment to operating the facility in a comprehensive, competent manner....with one clear exception, there is an inability or unwillingness to attract the management staff necessary to develop, design and implement the facilities' programs; likewise, trained and/or experienced staff to perform the daily operations is wanting. The applicant does not possess an in-depth understanding of the regulations, the regulatory process or their license. The applicant has consistently demonstrated that even when an inspection (or other exchange) points out violations or program deficiencies, that Envirocare cannot correct them for the long haul."

Based on the information evaluated to date, Earth Sciences cannot recommend use of the Envirocare facility for disposal of contaminated soil from Operable Unit VIII.

2.0 Facility Description

2.1 Facility Location

The facility, located about 75 miles west of Salt Lake City along Interstate 80, is accessed by exiting the highway just past Milepost 50 onto an unmarked gravel road. Page 1/3 in Appendix A provides a facility location map. The site is in Section 32, Township 1 South, Range 11 West (a roughly 640-acre parcel). Page 2/3 in Appendix A is a general plan layout of the facility. Envirocare controls the majority of the section (about 550 acres) with the exception of the area designated "DOE Vitro Embankment." Currently, Envirocare's active waste disposal operations use only a small portion of the site. The northwest part of the area designated "Current Envirocare Embankment" on Page 2/3 in Appendix A is where the NORM-contaminated soil and related waste from the other Denver Radium Site operable units and other Envirocare customers is disposed. NORM waste from other Denver Radium Site operable units containing contaminants at concentrations greater than Resource Conservation and Recovery Act (RCRA) Toxicity Characteristic Leaching Procedure (TCLP) regulatory levels are reportedly being stored on a synthetic liner and in some containers in the control area. We were not able to determine (1) if these wastes are covered, (2) if the waste pile is designed to conform with RCRA type requirements, or (3) if any low-level radioactive waste received by Envirocare is also being stored on a synthetic liner. From our site reconnaissance, we were also not able to determine if low-level radioactive and mixed wastes are being managed together or whether the activities are separate. Storage of these wastes is expected to continue until the associated disposal cells are constructed and accepted by the cognizant regulatory agency.

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2.2 Facility Operating Permits

Envirocare's facility began operation as a waste management site in 1988 when they received a permit to manage (by disposal) NORM wastes. However, ten permit amendments have been approved since 1988 and the site is currently licensed to also store and dispose of low-level radioactive wastes (accelerator produced radioactive, source, byproduct, or special nuclear material) and "mixed waste" (a mixture of NORM or low-level radioactive waste and hazardous waste, as defined under the RCRA). During the initial part of the audit, Envirocare provided copies of the following: the original Radioactive Material License and Amendments Nos. 01 through 09 (Appendix B of this report), Amendment No. 10 and the

revised Utah BRC permit in its entirety (Appendix C), and a summary of the mixed waste permit conditions (Appendix D). The expiration date affixed to Amendment No. 10 for the NORM and low-level waste is February 28, 1996 and the expiration date for the mixed waste license is November 30, 2000.

Appendix C lists the range of non-NORM radionuclides that can be accepted at Envirocare's facility. The permit indicates these materials are to be disposed in a separate mixed waste disposal embankment (located in the southeast portion of the current permitted area). Appendix D provides a summary of Envirocare's mixed waste permit conditions and a list of RCRA hazardous wastes that can be accepted if they also have radioactive characteristics. This listing is substantial and includes the following:

- Hazardous wastes that exceed TCLP concentration levels as described in 40 Code of Federal Regulations (CFR) 261.24. This listing includes a spectrum of heavy metals (such as arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver), pesticides, and chlorinated compounds included in the RCRA land disposal prohibitions (40 CFR 268.10 through 268.35).
- Selected hazardous wastes from nonspecific sources including F001 through F005 (halogenated and nonhalogenated solvents such as trichloroethylene, methylene chloride, 1,1,1-trichloroethene, carbon tetrachloride, chlorinated fluorocarbons, xylene, acetone, toluene, methyl ethyl ketone, benzene, etc.), F006 (electroplating wastes), F008 (electroplating wastes where cyanide is used), F010, F012, F019, F024, F028 (dioxin-containing waste), and F039 (leachates resulting from the management of dioxin-containing waste) as described in 40 CFR 261.31. This listing also includes wastes subject to the RCRA land disposal prohibitions as discussed in 40 CFR 268.30, 268.31, and 268.35.
- Selected hazardous wastes from specific sources including K050, K051, K052, K061, and K069 as described in 40 CFR 261.32 and discussed in the RCRA land disposal prohibitions under 40 CFR 268.33.
- Selected discarded commercial chemical products, off-specification species, container residues, and spill residues that are acute hazardous wastes as referenced in 40 CFR 261.33 and addressed relative to RCRA land disposal prohibitions under 40 CFR 268.35. The

listing includes 2,3,4,6-tetrachlorophenol, 2,4,5-trichlorophenol, 2,4,6-trichlorophenol, pentachlorophenol, 2,4,5-T, and 2,4,5-TP that are more commonly referenced as USEPA Waste No. F027, a dioxin-containing waste.

The permit information reviewed to date does not elaborate on pretreatment requirements or special exemptions that may have been granted the facility. The management standards associated with NORM, low-level radioactive, and mixed (containing hazardous wastes) wastes are very different and span a wide range of siting, operational, monitoring, closure, and postclosure considerations.

2.3 Facility Capacity

Envirocare is currently permitted to accept a total of 4.0 million cubic yards of NORM waste. The actual amount of low-level radioactive or mixed waste that they can dispose is unclear from the available information. It is also uncertain whether the newly permitted mixed waste facility reduces the total capacity of the NORM waste facility.

2.4 Disposal Cell Conceptual Design

Page 3/3 in Appendix A illustrates Envirocare's typical design section for the NORM waste disposal cell concept. This concept is very similar to the design concept used for the Vitro disposal site and does not incorporate a bottom clay or synthetic liner, or leachate collection system. Essentially, 9 feet of natural silty/clayey soil are excavated to create a depression below the current ground surface. The soil removed from the excavation is stockpiled for later use as cover material during cell closure. The sandy unit in the bottom of the depression is scarified (loosened using a bulldozer equipped with a ripping blade) to a depth of 12 inches. Then it is compacted to 95 percent Standard Proctor density in conformance with the American Society for Testing and Materials Method D 698. This procedure forms the foundation of the disposal cell. NORM-contaminated soil or debris is placed in 12-inch lifts and compacted. Photographs of the facility taken during the site reconnaissance are presented in Appendix E. These include views of the embankment under construction.

The disposal operation continues until the surface of the cell reaches a specified elevation. A 7-foot-thick compacted silty/clayey soil cover is placed

(stockpiled soil from the original excavation) on the completed disposal cell. Lastly, the compacted silty/clayey soil layer is covered with a 2-foot-thick stone riprap erosion barrier. Surface water controls and fencing are constructed for the facility and retained after cell completion.

No design details for the NORM facility were provided to us by Envirocare during the preliminary environmental audit. Inquiries to their site manager regarding the design details of the cap revealed no detailed design information was available. Rather, the typical section used for the Vitro facility (Appendix A of the Final Environmental Impact Study [FEIS] for "Remedial Actions at the Former Vitro Chemical Company site south of Salt Lake, Salt Lake City, Utah") has been slightly modified to serve as Envirocare's typical section for the NORM disposal cell. During the audit, no detailed set of plans and specifications for the cap or other components of the facility were available. Additionally, in response to a request for as-built drawings and reports, we were advised that none existed. Subsequent requests from the Utah BRC indicate that a set of as-built drawings has been received from Envirocare and they are currently undergoing review. These documents were not available to us for this audit.

2.5 General Site Soil, Geologic, and Hydrogeologic Setting

Envirocare's permit application for NORM waste relies heavily on information developed for the FEIS to characterize the soil, geologic, and groundwater conditions of the site area. From our review, the bottom of Envirocare's embankment is positioned in or very near the upper portion of a pervious sand unit that is continuous throughout most of the site.

As described in Section 2.4, preparation of the disposal embankment requires the excavation of the upper 9 feet of silty/clayey soil. This material corresponds to a distinct surface soil unit present throughout the area. The characterization information in Envirocare's NORM permit application and the FEIS shows that this unit is 7 to 10 feet thick beneath the active Envirocare operations. The Unified Soil Classification System (USCS) designation for this unit varies from a CL to an ML. A soil classified as a CL is typically characterized as an inorganic silty clay of low to medium plasticity while an ML soil is characterized as an inorganic clayey silt or clayey/silty fine sand that has a quick to slow dilatancy (reaction to shaking). This unit is underlain by a sand unit with

a USCS classification varying from SC, SM, and SP. An SC soil is characterized as a poorly graded sand-clay mixture, an SM soil is poorly graded silt-sand mixture, and an SP soil is poorly graded sand with little or no fines. The bottom of the embankment is keyed into the top portion of the previous sand unit.

The water table is located near the bottom of the sand unit at 25 to 35 feet below the ground surface and, based on other permit application information and the FEIS, the soil continues to be saturated to a depth of at least 230 feet below the ground surface. Borings and observation wells completed for the Vitro facility and the mixed waste permit application are the basis for this information. The siting and design related evaluations for the Vitro facility recognized that some seepage from the embankment would occur due to redistribution of moisture within the tailings (Page A-31 in Appendix A of the FEIS) and site geologic conditions. According to the FEIS, done in 1984, the existing groundwater conditions were expected to limit the impact of seepage due to naturally poor water quality and the absence of other users near the site. The same design concept was approved for the Envirocare NORM facility.

Groundwater flow beneath the Envirocare facility is portrayed as being in a northerly direction. Earth Sciences reviewed a hydrogeologic report prepared by Delta Geotechnical Consultants, Inc. (Delta) which was included in Envirocare's submittal for a mixed waste permit and was unable to identify any specific evidence to support a northerly flow direction. Groundwater level measurements by Delta were inconclusive and did not confirm any distinct flow pattern. Nevertheless, the groundwater monitoring network for the facility is constructed assuming a north or northeast groundwater flow direction. Our preliminary evaluation of topographic and borehole information suggests that the groundwater flow direction may be to the west or southwest (Appendix F). Neither of these directions are appropriately assessed by the existing monitoring well network. In that regard, the current groundwater monitoring network may not be adequately positioned to detect any groundwater flow/contamination from Envirocare's existing NORM waste disposal operations. A more detailed investigation of the hydrogeologic conditions at the facility appears necessary.

The actual performance of the Vitro and Envirocare facilities should be assessed before anyone considers use of the Envirocare facility. Besides the groundwater

quality issues, the soil used for the Vitro and NORM facilities' compacted cover should be evaluated further for its performance as impervious long-term cap material. Specifically, we could not find any information in either the Envirocare NORM application or the FEIS regarding (a) measurements of permeability versus degree of compaction or (b) shrink/swell potential determinations and believe both considerations warrant further assessment. A review of U. S. Department of Agriculture, Soil Conservation Service mapping information indicates that the soil type mapped at the Envirocare location has shrink/swell characteristics that may be of concern. This suggests that the compacted silty/clayey cover exposed directly to the ambient environment could potentially generate fractures in response to drying. If fractures develop, they could serve as preferred paths along which water could enter the waste and radon gas could exit.

2.6 Financial Resources

A waste management company's ability to protect itself and its customers from potential Superfund liability is a critical factor in its selection for disposal services. As part of the preliminary environmental audit, Earth Sciences recovered several important documents to help evaluate Envirocare's financial strength. These are summarized below:

- In 1990, Envirocare's sales were \$12,059,000, net profit was \$9,543,000, and a cash dividend of \$8,058,000 was paid out. The working capital was reported to be \$3,854,000 at the end of 1990. This sum may not be significant for a facility in the midst of designing and building low-level radiological and mixed waste disposal facilities. It could easily be expended during completion of the detailed designs and construction of the low-level and the mixed waste facility(s) (including extensive QC) that comply with DOE and RCRA standards. This level of resources raises concerns regarding the extent that Envirocare will be able to address any future environmental liability as well as closure, decontamination and decommissioning costs, and long-term monitoring and post-closure care. Further information is also needed to confirm their ability to finance the planned new construction.
- The limits of insurance maintained by a waste management company are a good measure of a company's long-term ability to defend its customers and itself.

Envirocare's coverage is limited to a comprehensive general liability policy with no environmental impairment liability coverage. Additionally, although Envirocare can accept mixed waste (a mixture of radioactive and hazardous wastes), they did not have any insurance coverage comparable to RCRA requirements at the time of the audit.

- As part of the NORM waste disposal permit, Envirocare must maintain a Utah BRC approved surety arrangement adequate to fund the decommissioning and reclamation of the grounds, equipment, and facilities. We understand that this is currently oriented to funding the decontamination of equipment and closing of the facility and appears limited relative to long-term monitoring and postclosure care. Specifically, only \$74,000 is allocated for the postclosure monitoring and postclosure care of the facility. This amount considers only water quality sampling and analysis of a limited suite of parameters. It does not include any fencing or facility maintenance, replacement, or periodic inspections.

3.0 Facility Operating Practices

3.1 Introduction

During the site reconnaissance, Earth Sciences representative photographed various aspects of the facility with the consent of the site manager. Appendix E presents those pictures to help with the following facility operations description and observations.

3.2 Waste Flow into Facility

Waste arrives at the Envirocare facility by rail in "gondola" cars or by truck in roll offs, drums, or other steel containers. The locomotive shown in Photograph 1 moves rail cars to and from Envirocare's controlled area from the Union Pacific Railroad Company line to the north. The rail car contents are sampled for radiological activity testing and the results compared with the predisposal waste profile information to confirm that the waste is as previously represented and appropriate for disposal. Based on our inquiries, the NORM waste is only evaluated to confirm that it is within an acceptable radiological activity range and that work is performed at the facility by Envirocare personnel and equipment. To our knowledge, Envirocare does not routinely test each waste shipment to confirm that it is nonhazardous (as defined by RCRA regulations); rather, they seem to rely on generator representations.

When the waste is accepted, the rail car is moved to a rail car dumper ("rollover") and secured. The rollover rotates and empties the gondola car contents into a below-grade concrete-lined staging area. Photograph 2 shows the rollover. A backhoe loads the contaminated soil from the staging area into off-road vehicles for transportation to the disposal or temporary storage areas. Photograph 3 shows a truck used to transport waste from the rollover staging area to the disposal or storage areas.

Waste transported to the facility by truck is received at the site office/entrance area where it is tested to confirm predisposal waste profile information. Upon acceptance, the truck accesses the site and unloads its contents near the active disposal operations. Photographs 4, 5, 6, and 7 illustrate different views of the container storage and disposal areas. Before leaving the site, the

vehicle is decontaminated to an appropriate standard, the decontamination verified, and the vehicle released.

According to the site manager, the low-level radiological and mixed waste will ultimately be disposed at a separate nearby facility. Photograph 8 shows that general location and some support facilities. The low-level radioactive and mixed waste disposal facility is proposed to be constructed later this year.

3.3 Observations and Related Concerns

Observations during the preliminary environmental audit were an essential factor in evaluating Envirocare's operating practices. At the time of our audit, important portions of Envirocare's NORM waste permit application were not available. Without benefit of a review of these sections, our audit and field activities were limited to reliance on permit descriptions and observations of practices and conditions at the facility.

Based on discussions with Envirocare's site manager and the Denver Radium Site remedial contractor's project manager, much of the waste shipped in bags or in bulk by rail during December, January, February, and some of March was frozen in route. During loading at the originating facility, water is sprayed on contaminated soil and other waste to reduce dust emissions. The low ambient temperatures and available free water apparently have been sufficient to cause the soil and/or other waste materials to freeze into large blocks during transport. Once frozen, the waste is very difficult to unload from the rail cars and to compact in the embankment. After unloading, these frozen wastes are reportedly stored in the work area or in the lined storage area (if they are low-level radioactive or mixed wastes).

Our observations during the site reconnaissance showed many large bags of waste in the embankment area (Photographs 6A, 6B, 7A, and 7B). The distribution of these bags suggests the potential that frozen waste is being incorporated into the embankment - a practice that is not addressed in Envirocare's permit conditions. Placement of frozen soil is not typically an acceptable procedure for construction of a compacted fill designed to minimize settlement, final cover failures, or impact on groundwater. If soil is placed in the embankment in a frozen state, it cannot be adequately compacted and contains significant free

water. When it thaws, the free water will drain into the surrounding soil and has the potential to dissolve soluble contaminants. Additionally, the soil entrained in the frozen mass may settle when the water drains away. The significance of the settlement is a function of the frozen soil's position in the embankment, the amount of frozen soil placed, and the time lapse between soil thawing and final cover placement.

During the site reconnaissance, we requested an opportunity to review as-built drawings and reports and detailed design drawings for the final cover. We were advised that no as-built drawings or reports had been completed and that the detailed design for the cap is as presented on Page 3/3 of Appendix A. Additionally, the requirement for as-built drawings and reports was just imposed on Envirocare by the Utah BRC in February 1991 when the revised permit was issued with Amendment No. 10. Regardless, as-built drawings are a standard requirement for most significant engineered earthen structures such as the Envirocare disposal cell(s). They are essential to confirm adherence to various permit conditions and to locating a specific customer's waste later. Since our audit, we have confirmed that Envirocare issued as-built drawings to the Utah BRC. These have not yet been reviewed.

Like the Vitro facility, Envirocare's NORM license does not require a clay or other impervious liner or a leachate collection system. In both cases, leachate generation is inevitable and the leachate is allowed to enter the natural groundwater system. This is the case despite the fact that Envirocare's commercial NORM waste streams are much more varied than the waste disposed in the Vitro facility. Appreciating the potential variability of Envirocare's waste streams, it appears that the non-NORM and nonradiological constituents of the waste are not well characterized at the site. A review of BRC's inspection files indicate that as of November 1990, Envirocare was not able to successfully quantify non-NORM radionuclides. In June 1990, BRC cited them with a permit condition violation because they failed to accurately measure either NORM or non-NORM radionuclide concentrations in 10 samples of unknown isotopes at unknown concentration levels. On the basis of the results of the analyses, BRC cited them with a violation of associated requirement.

Potentially broad variations in the nonradiological chemistry of the wastes would be expected and it does not appear that Envirocare is required to provide determinations or confirmatory testing on waste shipments received at the facility. Additionally, there is no indication in any records reviewed to date that Envirocare performs on-site confirmatory testing for nonradiological constituents. If this situation is correctly understood, Envirocare has no control measures in place to confirm that hazardous substances are not present in the NORM waste received at their facility.

Interactions with the facility personnel indicated that they were conscientious but did not necessarily possess formal training commensurate with their positions or as required in the documentation for the permit application. For instance, Envirocare's site manager's background includes service in the U.S. Navy on a nuclear submarine tender where he was trained in radiation safety and involved with radioactive waste management. He then joined U.S. Ecology, Inc. as a safety technician at their low-level radioactive waste disposal site near Richland, Washington. He later served as the site safety officer at U.S. Ecology, Inc.'s low-level radioactive waste disposal site near Beatty, Nevada. He has been with Envirocare for about 6 months. To our knowledge, he does not have significant operating or construction training and experience managing a NORM waste disposal site. He also does not have any known hazardous waste management experience.

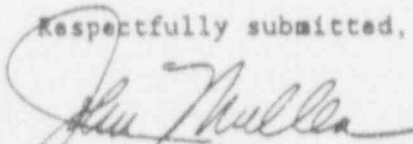
The Utah BRC has a site inspector at the operation 3 or 4 days a week. The trailer used for their activities is shown in Photograph 9. While on site, we observed a BRC representative patrolling the perimeter of the controlled area and were advised that BRC's representatives do not typically inspect within the controlled area.

Based on our site reconnaissance, it appears that Envirocare's day-to-day waste handling operations are being managed by a local earthwork contractor. These operations are not under direct field control by Envirocare's facility staff or a third party to ensure adherence to permit conditions and more importantly to sound operating practices and to provide an appropriate level of QC oversight. The contractor is Broken Arrow, Inc. (Broken Arrow) of Tooele, Utah, a relatively small (reportedly 20 to 30 people) excavation contractor that has been working on the site for about 2 years. Our discussions with the site manager suggest

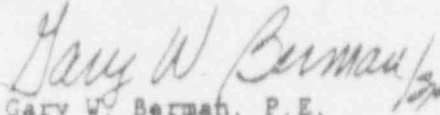
that Broken Arrow employs about 15 to 18 personnel on site. There is no indication that Broken Arrow has the in-house technical staff necessary to provide an appropriate level of QC confirmatory monitoring of its operations. Discussions with the site manager indicate that Envirocare staff are typically on site from about 7:30 a.m. to 3:30 p.m. and that Broken Arrow's personnel typically stay later. These factors, when coupled with concerns identified in BRC's inspection files, suggest that QC of waste disposal activities may not be adequate.

The QA/QC measures described in Envirocare's NORM permit application appear oriented to a waste stream that is uniform (such as the tailings disposed in the Vitro facility). However, the commercial nature of Envirocare's business suggests the potential for significant physical and chemical variation in wastes accepted at this facility. Under conditions where there is a potential for wide variations in the waste characteristics, the QA/QC measures described on Pages 9.4 and 9.5 of the NORM permit application do not appear adequate.

Respectfully submitted,



John C. Mullen
Vice President, Rocky
Mountain Operations



Gary W. Berman, P.E.
Executive Vice President,
Operations

JCM/GWB:sja

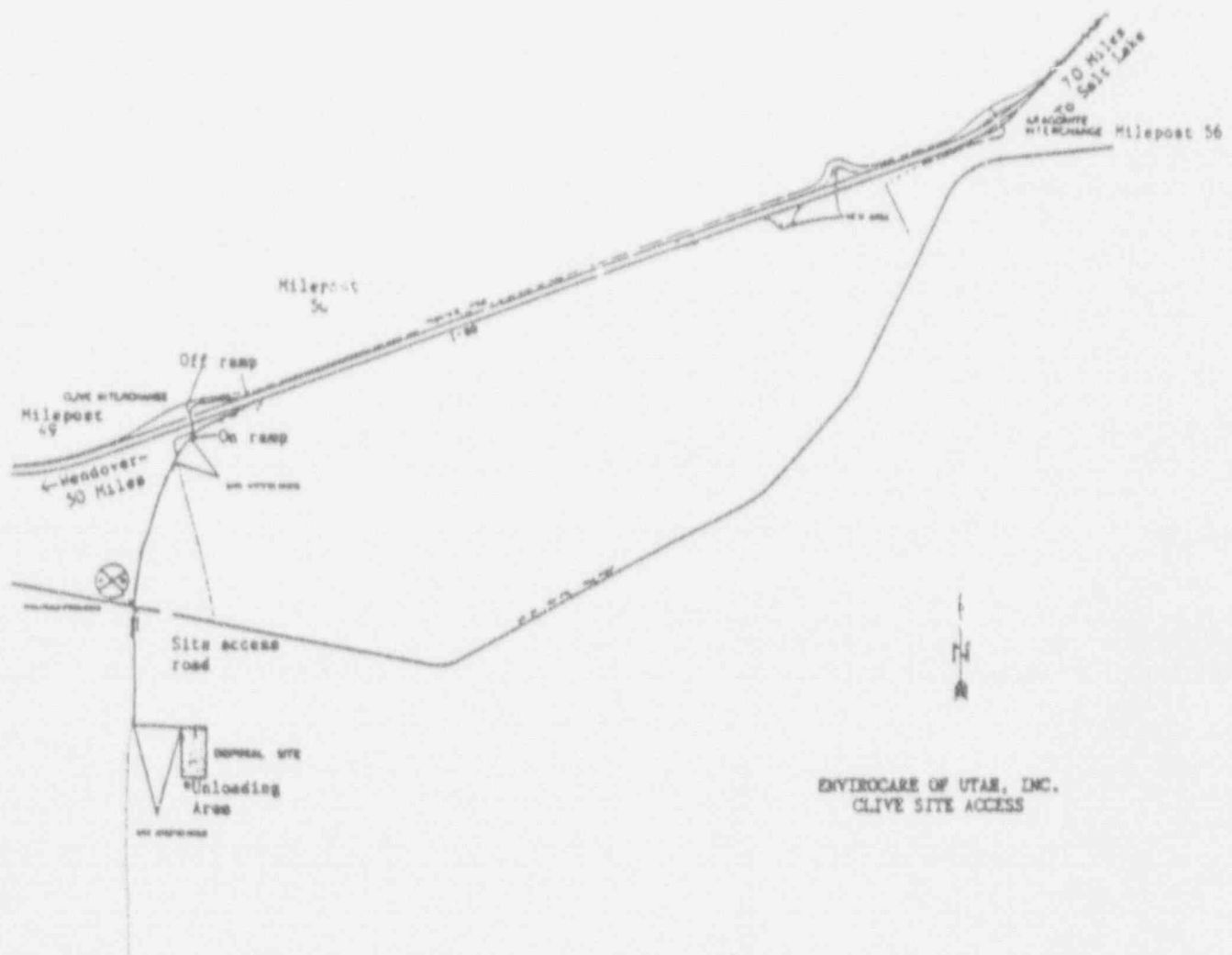
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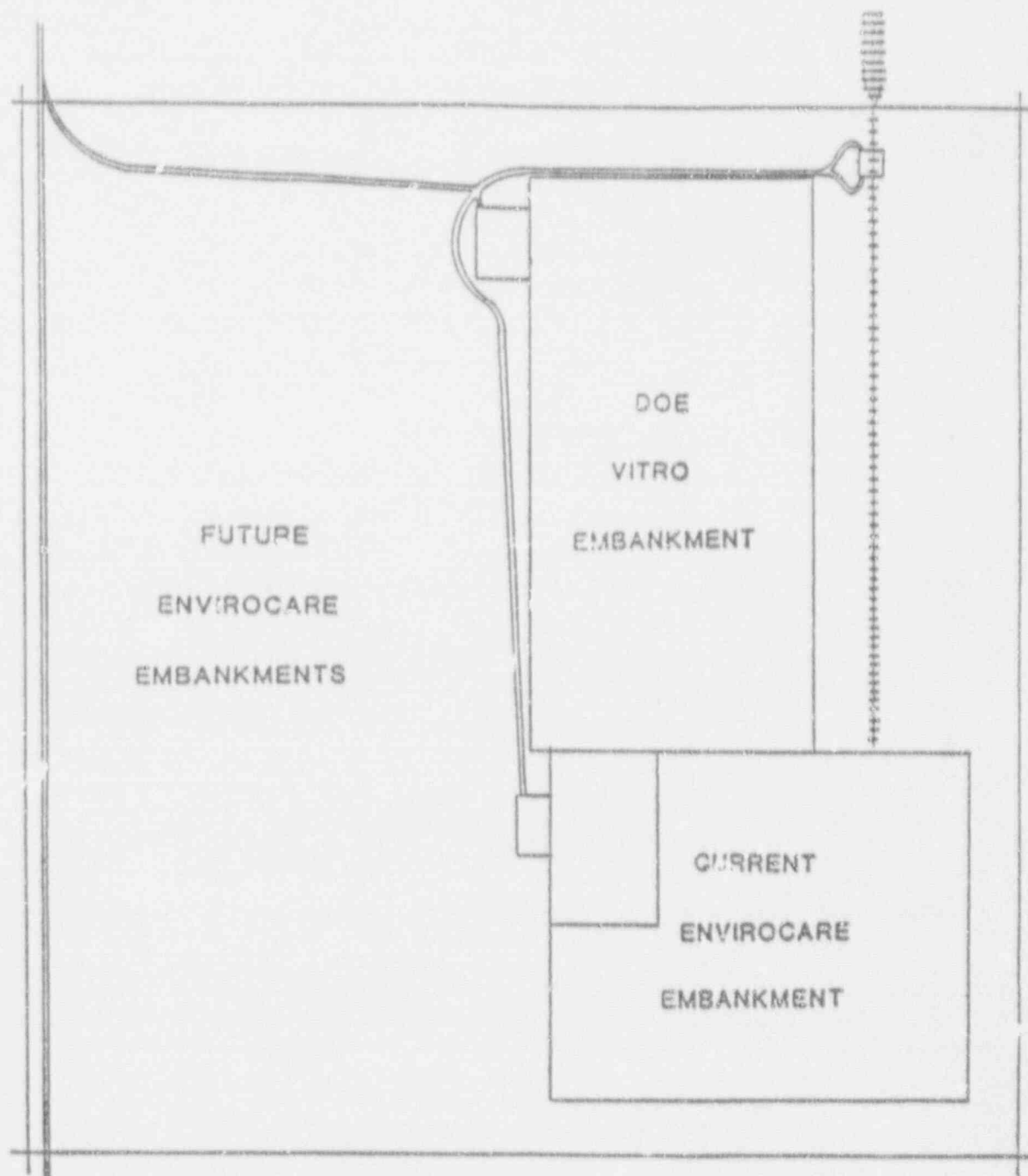
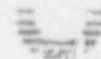
Appendix A

Site Location, Plan, and Conceptual Details

ACCESS TO ENVIROCARE'S CLIVE DISPOSAL FACILITY

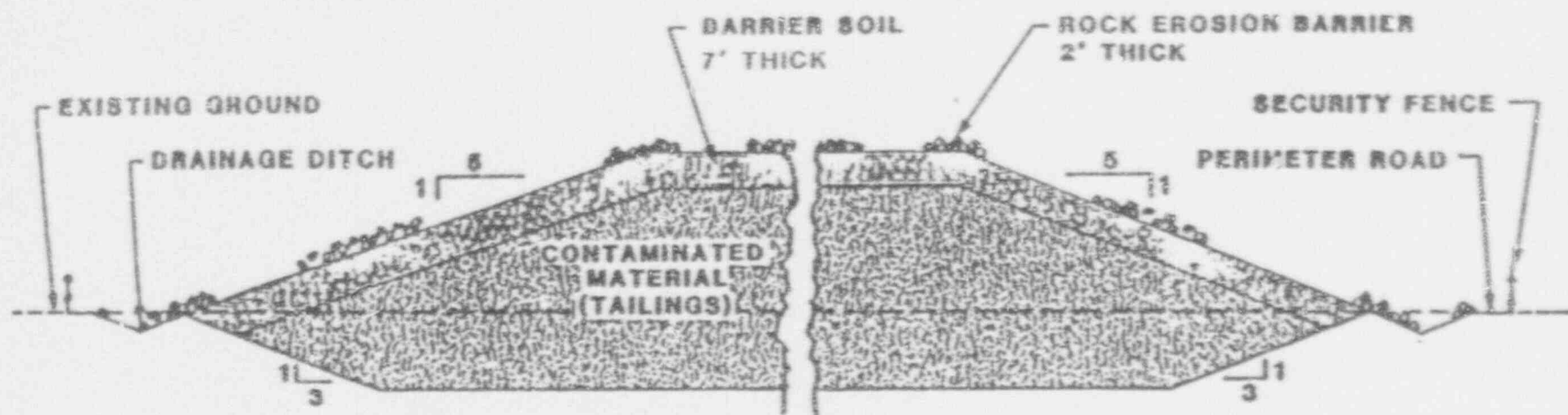
From Salt Lake City the Envirocare facility can be accessed by traveling west on Interstate 80 approximately 75 miles. As you are traveling west you will come to a graveled exit from I-80 just past milepost 50. There are no signs or markers at this exit. Take this gravel exit and turn to the left and pass over the interstate. You will continue approximately two miles on the main gravel road. To the left you will see a large pile of rock about 1/2 mile long. Near the rock pile is a group of several trailers. Continue about 1/4 mile to a white trailer on the left. Check in at this trailer for further unloading directions. Railcare access is via Union Pacific Railroad to Clive, Utah, Zone 24, Track 740.



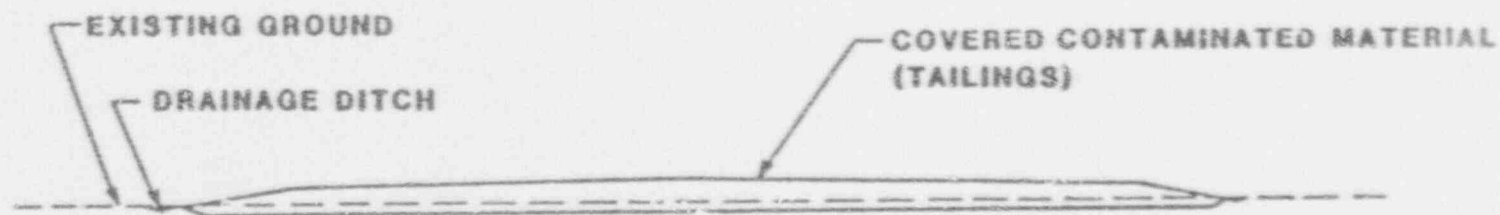


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SCALE

DISPOSAL CELL SEQUENCE



NO HORIZONTAL OR VERTICAL SCALE



200 FEET

HOR. & VER. SAME SCALE

CROSS-SECTION OF THE EMBANKMENT

100
200
300
400
500
600
700
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900
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1100
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2300
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Appendix B

**Bureau of Radiation Control
Radioactive Material License and
Amendments Nos. 01 to 06**



Norman H. Bangerter
Governor

Suzanne Dandoy, M.D., M.P.H.
Executive Director

February 2, 1988

Khosrow Semnani
Envirocare of Utah, Inc.
175 South West Temple, Suite 500
Salt Lake City, Utah 84101

Dear Mr. Semnani:

Please find enclosed your Radioactive Material License No. UT 2300249. You should carefully review the license and familiarize yourself with all of its provisions and requirements. Please note that your application and other documents submitted to us have been incorporated into your license and are, therefore, legal requirements. It is our view that the requirements of your license and the applicable regulations are reasonable and necessary to protect the radiation worker and the public. The Bureau expects management attention to the radiation safety program and a high standard of compliance with Bureau requirements. You will be inspected to verify that requirements have been met. Action will be taken on those licensees who fail to control their licensed program and allow significant violations to occur.

Please contact us if you have questions concerning the license or the requirements of Utah State regulations. Enclosed is a copy of Utah Radiation Control regulations and Form BRC-04. These documents should assist you in beginning your program. You must maintain an update of these documents in the future. You should contact the Bureau if you change your address or place of use of licensed material, as an amendment to your license may be required. It is important that we be able to contact you by telephone and mail you certain documents pertaining to your licensed program.

We wish you every success in your program utilizing this license.

Sincerely,

Dane L. Finerock, Health Physicist
Bureau of Radiation Control

Enclosures: As stated

UTAH BUREAU OF RADIATION CONTROL
RADIOACTIVE MATERIAL LICENSE

BRC
April 1

Pursuant to Chapter 2, Title 26-1-27 of the Utah Code, and the Utah Department of Health Regulations for the Control of Ionizing Radiation, and in reliance of statements and representations heretofore made by the licensee designated below, a license is hereby issued authorizing such licensee to transfer, receive, possess and use the radioactive material designated below; and to use such radioactive material for the purpose(s) and at the place(s) designated below. This licensee is subject to all applicable rules, regulations, and orders now or hereafter in effect and to any conditions specified below.

Licensee		) 3. License Number
		) UT 2300249
1. Name	Envirocare of Utah, Inc.)
		) 4. Expiration Date
2. Address	175 South West Temple, #500	) February 28, 1993
	Salt Lake City, Utah 84108)
		) 5. License Category
		) 4-e

6. Radioactive material (element and mass number)	7. Chemical and/or physical form	8. Maximum quantity licensee may possess at any one time
A. Any Radioactive Material Containing Only Naturally Occurring Radionuclides.	A. Dry Packaged or Dry Bulk Radioactive Materials.	A. See Condition 10.

9. AUTHORIZED USE:

- A. Radioactive waste may be received, transferred, stored and disposed of by land burial

CONDITIONS

10. The licensee shall not possess, at any time, more than 17,000 cubic yards of radioactive waste material for disposal. This includes all wastes in storage or active processing except those buried in accordance with finished design requirements.
11. Licensed material shall be used at the licensee's facility located in Section 32 of Township South and Range 11 West, Tooele County, Utah.
12. The licensee shall comply with the provisions of Chapter URC-4B "Notices, Instructions and Reports to Workers, by Licensees or Registrants, Inspections" and Chapter URC-24, "Standards for Protection Against Radiation".
13. Except as provided by this condition, the licensee shall maintain the results of sampling, analyses, surveys, and instrument calibration, reports on inspections and audits, employee training records as well as any related reviews, investigations and corrective actions, for 5 years. The licensee shall maintain personnel exposure records in accordance with URC-24-17.



UTAH BUREAU OF RADIATION CONTROL
RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEET

License # UT 2300249

14. The licensee may transport licensed material or deliver licensed material to a carrier for transport in accordance with the provisions of URC-19-500 "Transportation".
15. The use of respirators shall be controlled by a respiratory protection program as stipulated in URC-24-030.
16. The licensee shall calibrate air sampling equipment at intervals not to exceed six months.
17. The licensee shall require written certification from the generator/shipper that wastes for disposal:
 - A. Do not exceed the concentration limit established by Condition 19. of the license;
 - B. Meet the requirements found in Condition 18 and Condition 22 of the license; and
 - C. Contain only naturally occurring radionuclides.
18. A. The licensee shall not receive for storage or disposal any radioactive wastes that exhibit the characteristics of a hazardous material as defined by Subpart C 40 CFR 26 (Utah Hazardous Waste Management Rules 2.1.7) or has as a constituent a listed hazardous waste as defined in Subpart D 40 CFR 261 (Utah Hazardous Waste Management Rules 2.1.8 and 2.1.9).
B. The licensee may receive waste that has been rendered nonhazardous by acceptable methods and therefore not subject to the Resource Conservation and Recovery Act.
19. Radioactive waste for disposal, in which the radioactivity is essentially uniformly distributed, shall not exceed 2000 picocuries per gram of Radium-226.
20. Unless specifically authorized by the Utah Bureau of Radiation Control, sealed sources as defined in URC-12-050, containing naturally occurring radionuclides, shall not be accepted for disposal.
21. Waste containing free standing liquid, except as provided by this condition, shall not be accepted for storage or disposal. Free standing liquid is defined to be as little liquid as possible and in no case shall it exceed more than 0.5 percent, by volume, of liquid per container. (Free standing liquid, does not refer to in-situ moisture.)
22. Unless specifically authorized by the Utah Bureau of Radiation Control, the licensee shall not accept for disposal or storage radioactive wastes generated under the authority of a U.S. Nuclear Regulatory Commission or Agreement State byproduct, source, or special nuclear materials license.



UTAH BUREAU OF RADIATION CONTROL
RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEET

License # UT 2300249

23. The licensee shall scarify the disposal cell floor, consisting of native materials, to a depth of 12 inches. The licensee shall compact the disposal cell floor to not less than 95 percent maximum density as determined by Standard Proctor Method ASTM D-698.
24. The licensee shall place bulk radioactive materials in 12 inch uncompacted lifts.
25. The licensee shall compact the lifts to not less than 90 percent of maximum density as determined by Standard Proctor Method ASTM D-698.
26. The licensee shall not place contaminated structural debris, equipment or prepackaged waste in the bottom lift.
27. Contaminated structural debris, equipment or prepackaged wastes shall consist of less than 10 percent, by volume, of the total lift and shall be essentially uniformly distributed throughout the lift.
28. The licensee shall place any structural debris, equipment or prepackaged waste in the bottom 50 percent, by height, of the disposal cell.
29. The licensee shall compact the radon barrier to not less than 95 percent of maximum density as determined by Standard Proctor Method ASTM D-698.
30. The disposal cell floor and radon barrier shall be plus or minus 3 percent of optimum moisture as determined by Standard Proctor Method ASTM D-698.
31. In place, bulk radioactive waste, shall be plus or minus 5 percent of optimum moisture content as determined by Standard Proctor Method D-698.
32. The licensee shall use rock filter zone and rock armor that has been sized in accordance with Section 3.1.1.2 of the license application dated October 12, 1987 and letter dated December 3, 1987.
33. The licensee shall test rock armor and filter zone rock in accordance with Section 9.1.4 "Procedures", of the license application dated October 12, 1987 and letter dated December 3, 1987.
34. Thirty days prior to commencement of construction activities of any extension of the initial disposal cell or any subsequent cell (as provided in the engineering drawings dated November 12, 1987 and letter dated November 23, 1987), the licensee shall submit to the Utah Bureau of Radiation Control detailed engineering plans and drawings for the trench (cell) in accordance with provisions of the application dated October 12, 1987.



UTAH BUREAU OF RADIATION CONTROL
RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEET

License # UT 2300249

35. Written procedures shall be maintained for operations involving radioactive materials. The procedures shall incorporate operating instructions and appropriate safety precautions for the work. The employee training program shall include detailed review of the operating procedures applicable to the employee's assignments. The requirement for written procedures shall include establishment of procedures for conduct of the radiation safety and environmental monitoring programs, including analytical procedures and instrument calibration requirements. Written procedures and subsequent changes to the procedure shall be reviewed and approved by the facility Health Physics Supervisor and the Project Manager. At least annually, all procedures shall be reviewed to assure continued applicability.
36. The Health Physics Supervisor shall perform and document weekly inspections of the facility and report any findings of non-compliance, affecting radiological safety, to the Project Manager. Items for inspection include: operating procedures, license requirements and safety practices including housekeeping activities.
37. A quarterly report shall be prepared by the facility Health Physics Supervisor for the Project Manager and Company President evaluating employee exposures, effluent releases and environmental data to determine:
- A. If there are any upward trends in personnel exposures for identifiable categories of workers or types of operations or in effluent releases;
 - B. If exposures and effluents might be lowered under the concept of maintaining exposure and effluents as low as reasonably achievable; and
 - C. If equipment for exposure and effluent control is being properly used and maintained
38. The licensee shall submit to the Utah Bureau of Radiation Control within 60 days after July of each year, a summary report of all environmental monitoring data for the preceding 12 months.
39. The licensee shall provide to the Utah Bureau of Radiation Control by June 30 and December of each year, a summary report regarding burial activities during the preceding six months. The report shall include:
- A. By shipment:
 - 1. Name and address of generator and shipper.
 - 2. Volume, in cubic yards, of materials received.



UTAH BUREAU OF RADIATION CONTROL
RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEET

License # UT 2300249

3. Radionuclides and activity of each radionuclide.
8. Volume, in cubic yards, placed in the engineered disposal cell.
40. Truck, railcar, waste hauling and other earthmoving equipment washdown (decontamination) facilities, including evaporation ponds, shall be controlled areas and fenced to prevent range animal intrusion.
41. All burial trenches/cells and waste storage areas, including immediately adjacent drainage structures, shall be controlled areas, surrounded by a 6 foot high, chain link fence, topped with three strand barbed wire. All permanent fence shall be chain link, 6 feet high, spot welded to posts, topped with three strand barbed wire, top tension wire and twisted selvage.
42. The licensee shall conduct a bioassay and occupational airborne radioactive contamination monitoring program in accordance with Section 7.4.8.3 of the submission dated December 28, 1987.
43. The licensee shall conduct contamination surveys in accordance with Section 7.4.2 and Table 7.2 of the letter dated December 28, 1987.
44. The operational environmental monitoring program shall be conducted in accordance with Section 4.4 of the application dated October 12, 1987 and letter dated January 15, 1988.
45. The Project Manager, Health Physics Supervisor and Health Physics Technician(s) shall meet the qualifications and have the responsibilities and duties as described in the letter dated January 26, 1988.
46. Prior to receiving any radioactive wastes for disposal, the licensee shall have a Utah Bureau of Radiation Control approved Quality Assurance Program for construction and operation of the facility.
47. Prior to receiving waste for disposal, the licensee shall have and maintain a Utah Bureau of Radiation Control approved surety arrangement adequate to fund the decommissioning and reclamation of the grounds, equipment, and facilities. These costs, as identified in the submission dated December 15, 1987, shall be reviewed and updated annually within 60 days after July 1, of each year. The surety arrangement shall be updated as necessary to reflect decommissioning and reclamation costs. The licensee shall submit for Utah Bureau of Radiation Control review any revision to the surety at least 60 days prior to the proposed effective date.



UTAH BUREAU OF RADIATION CONTROL
RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEETLicense # UT 2300249

48. Except as specifically provided otherwise by this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Bureau of Radiation Control regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

- A. Application dated October 12, 1987
B. Letter dated January 25, 1988

Feb 2, 1988
Date

Larry F. Anderson
Larry F. Anderson, Director, Bureau of Radiation Control



UTAH BUREAU OF RADIATION CONTROL
RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEETLicense # UT 2300249
Amendment # 01Envirocare of Utah, Inc.
175 South West Temple, #500
Salt Lake City, Utah 84108

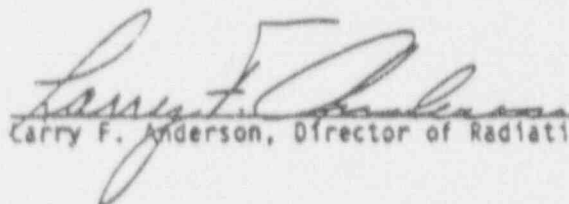
In accordance with letter dated February 17, 1988 and the submission "Quality Assurance" dated February 11, 1988, License Number UT 2300249 is amended as follows.

CONDITION 48.

48. Except as specifically provided otherwise by this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Bureau of Radiation Control regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

- A. Application dated October 12, 1987
- B. Letter dated January 25, 1988
- C. Letter dated February 17, 1988 and the submission "Quality Assurance" dated February 11, 1988

Date

Feb. 25, 1988
Larry F. Anderson, Director of Radiation Control

UTAH BUREAU OF RADIATION CONTROL
RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEETLicense # UT 2300249
Amendment 02

Envirocare of Utah, Inc.
175 South West Temple, #500
Salt Lake City, Utah 84108

In accordance with letter dated July 28, 1988, and phone conversation on August 1, 1988, License Number UT 2300249 is amended as follows:

CONDITION 38.

38. The licensee shall submit to the Utah Bureau of Radiation Control within 60 days after January 1 of each year, a summary report of all environmental monitoring data for the preceding 12 months.

CONDITION 39.

39. The licensee shall provide to the Utah Bureau of Radiation Control within 30 days after June 30 and December 30 of each year, a summary report regarding burial activities during the preceding six months. The report shall include:

A. By shipment:

1. Name and address of generator and shipper.
2. Volume, in cubic yards, of materials received.
3. Radionuclides and activity of each radionuclide.

- B. Volume, in cubic yards, placed in the engineered disposal cell.



UTAH BUREAU OF RADIATION CONTROL
RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEETLicense # UT 2300249
Amendment 02

CONDITION 48.

48. Except as specifically provided otherwise by this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Bureau of Radiation Control regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

- A. Application dated October 12, 1987
- B. Letter dated January 25, 1988
- C. Letter dated February 17, 1988, and the submission "Quality Assurance" dated February 11, 1988.
- D. Letter dated August 1, 1988, and phone conversation memo dated August 1, 1988.

Aug. 11, 1988
Date

Larry F. Anderson
Larry F. Anderson, Director, Bureau of Radiation Control



UTAH BUREAU OF RADIATION CONTROL
RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEET

License # UT 2300249
Amendment # 03

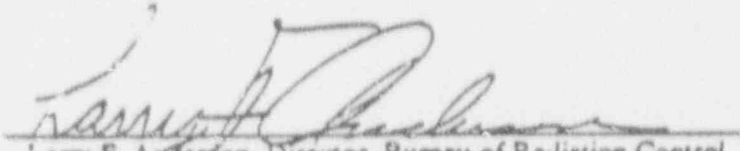
Envirocare of Utah, Inc.
175 South West Temple, #500
Salt Lake City, Utah 84108

In accordance with letters dated September 21, 1988, and October 6, 1988, radioactive material license number UT 2300249 is amended as follows:

CONDITION 48.

48. Except as specifically provided otherwise by this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Bureau of Radiation Control regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.
- A. Application dated October 12, 1987
 - B. Letter dated January 25, 1988
 - C. Letter dated February 17, 1988, and the submission "Quality Assurance" dated February 11, 1988
 - D. Letter dated August 1, 1988, and the phone conversation memo dated August 1, 1988
 - E. Letters dated September 21, 1988, and October 6, 1988

Oct 13, 1988
Date


Larry F. Anderson, Director, Bureau of Radiation Control



UTAH BUREAU OF RADIATION CONTROL
RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEET

License # UT 2300249
Amendment # 04

Envirocare of Utah, Inc.
175 South West Temple, Suite 500
Salt Lake City, Utah 84101

In accordance with letters dated January 6 and January 11, 1989, and pursuant to license condition number 47, radioactive material license number UT 2300249 is amended as follows:

CONDITION 10.

10. The licensee shall not possess, at any time, more than 300,000 cubic yards of radioactive waste material for disposal. This includes all wastes in storage or active processing except those buried in accordance with finished design requirements.

CONDITION 48.

48. Except as specifically provided otherwise by this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Bureau of Radiation Control regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.
- A. Application dated October 12, 1987
 - B. Letter dated January 25, 1988
 - C. Letter dated February 17, 1988, and the submission "Quality Assurance" dated February 11, 1988
 - D. Letter dated August 1, 1988, and the phone conversation memo dated August 1, 1988
 - E. Letters dated September 21, 1988, and October 6, 1988
 - F. Letters dated January 6 and January 11, 1989

Date

Larry F. Anderson
Larry F. Anderson, Director, Bureau of Radiation Control



UTAH BUREAU OF RADIATION CONTROL
RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEET

License # UT 2300249
Amendment # 02

Envirocare of Utah, Inc.
175 South West Temple, Suite 500
Salt Lake City, Utah 84101

In accordance with letter dated January 9, 1989, radioactive material license number UT 2300249 is amended as follows:

CONDITION 48.

48. Except as specifically provided otherwise by this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Bureau of Radiation Control regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

- A. Application dated October 12, 1987
- B. Letter dated January 25, 1988
- C. Letter dated February 17, 1988, and the submission "Quality Assurance" dated February 11, 1988
- D. Letter dated August 1, 1988, and the phone conversation memo dated August 1, 1988
- E. Letters dated September 21, 1988, and October 6, 1988
- F. Letters dated January 6 and January 11, 1989
- G. Letter dated January 9, 1989

CONDITION 49.

49. The licensee may make ministerial changes in radiation safety and environmental monitoring procedures that were described in the license application or an amendment, which are not potentially important to safety. The licensee shall maintain a written record of each change, including the following information:

- 1. effective date
- 2. reason for change
- 3. a copy of the old procedures, etc., and new procedures
- 4. a summary of radiation safety matters considered before implementing the change
- 5. signatures of approval of the R.S.O. and management's representative.

Jan 18, 1989 Larry F. Anderson
Date Larry F. Anderson, Director, Bureau of Radiation Control



UTAH BUREAU OF RADIATION CONTROL
RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEET

License # UT 2300249
Amendment # 06

Envirocare of Utah, Inc.
175 South West Temple, Suite 500
Salt Lake City, Utah 84101

License number UT 2300249 is administratively amended as follows:

CONDITION 17.

17. The licensee shall require written certification from the generator/shipper that wastes do not exceed the concentration limit established by Condition 19 of the license and that wastes meet the requirements found in Condition 18 of the license.

CONDITION 22.

22. The licensee may receive and possess for storage only, accelerator produced radioactive material or source material or byproduct material or special nuclear materials in quantities not sufficient to form a critical mass. Before receiving these licensed materials, the licensee, on a case-by-case basis, shall obtain prior approval from the Utah Bureau of Radiation Control.

Feb 24, 1989
Date

Larry F. Anderson
Larry F. Anderson, Director, Bureau of Radiation Control



UTAH BUREAU OF RADIATION CONTROL
RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEET

License # UT 2300249
Amendment # 07

Envirocare of Utah, Inc.
215 South State, Suite 1160
Salt Lake City, Utah 84116

In accordance with letter dated January 26, 1990, radioactive material license number UT 2300249 is amended as follows:

ITEM 2.

2. Address 215 South State, Suite 1160
Salt Lake City, Utah 84111

CONDITION 48.

48. Except as specifically provided otherwise by this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Bureau of Radiation Control rules shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the rules.

- A. Application dated October 12, 1987
- B. Letter dated January 25, 1988
- C. Letter dated February 17, 1988, and the submission "Quality Assurance" dated February 11, 1988
- D. Letter dated August 1, 1988, and the phone conversation memo dated August 1, 1988
- E. Letters dated September 21, 1988, and October 6, 1988
- F. Letters dated January 6 and January 11, 1989
- G. Letter dated January 9, 1989
- H. Letter dated January 26, 1990

Jan. 26, 1990 Larry F. Anderson
Date Larry F. Anderson, Director, Bureau of Radiation Control



UTAH BUREAU OF RADIATION CONTROL
RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEETLicense # UT 2300249
Amendment # 08Care of Utah, Inc.
South Street, Suite 1160
Lake City, Utah 84111

In accordance with letter dated June 28, 1990, radioactive material license number UT 2300249 is amended as follows:

CONDITION 48.

48. Except as specifically provided otherwise by this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Bureau of Radiation Control rules shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the rules.

- A. Application dated October 12, 1987
- B. Letter dated January 25, 1988
- C. Letter dated February 17, 1988, and the submission "Quality Assurance" dated February 11, 1988
- D. Letter dated August 1, 1988, and the phone conversation memo dated August 1, 1988
- E. Letters dated September 21, 1988 and October 6, 1988
- F. Letters dated January 6 and January 11, 1989
- G. Letter dated January 9, 1989
- H. Letter dated January 26, 1990
- I. Letter dated June 28, 1990

7-20-90
Date
Kenneth L. Alkema, Director, Division of Environmental Health

UTAH BUREAU OF RADIATION CONTROL
RADIOACTIVE MATERIAL LICENSE
SUPPLEMENTARY SHEET

License # UT-2300249
Amendment # 09

Envirocare of Utah, Inc.
215 South State Street, Suite 1160
Salt Lake City, Utah 84111

in accordance with Utah Radiation Control Rule R447-19-101, radioactive material license number UT 2300249 is amended as follows:

CONDITION 18.

18. A. The licensee may receive for treatment, storage and disposal any Naturally Occurring Radioactive Waste as authorized by this license that contains hazardous constituents as permitted by "RCRA hazardous waste operations permit" issued by the Executive Secretary of the Utah Bureau of Solid and Hazardous Waste and the "HSWA permit" issued by the U.S. Environmental Protection Agency.
- B. The licensee shall dispose of these wastes in the "mixed waste" disposal facility only.

CONDITION 48.

48. Except as specifically provided otherwise by this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Bureau of Radiation Control rules shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the rules.
- A. Application dated October 12, 1987
 - B. Letter dated January 25, 1988
 - C. Letter dated February 17, 1988, and the submission "Quality Assurance" dated February 11, 1988
 - D. Letter dated August 1, 1988, and the phone conversation memo dated August 1, 1988
 - E. Letters dated September 21, 1988 and October 6, 1988
 - F. Letters dated January 6 and January 11, 1989
 - G. Letter dated January 9, 1989
 - H. Letter dated January 26, 1990
 - I. Letter dated June 28, 1990

Dec 3, 1990
D-1

Larry F. Anderson
Larry F. Anderson, Director, Bureau of Radiation Control



Appendix C

**Bureau of Radiation Control
Radionuclide Material License
Amendment No. 10**

UTAH DEPARTMENT OF HEALTH
BUREAU OF RADIATION CONTROL
RADIOACTIVE MATERIAL LICENSE

Pursuant to Chapter 1, Title 26-1-27 of the Utah Code, and the Utah Department of Health Rules for the Control of Ionizing Radiation, and in reliance of statements and representations heretofore made by the licensee designated below, a license is hereby issued authorizing such licensee to transfer, receive, possess and use the radioactive material designated below; and to use such radioactive material for the purpose(s) and at the place(s) designated below. This licensee is subject to all applicable rules, and orders now or hereafter in effect and to any conditions specified below.

	LICENSEE	) 3. License Number
1. Name	Envirocare of Utah, Inc.	) UT 2300249
		) Amendment #10, in its entirety
) *****
2. Address	215 South State Street	) 4. Expiration Date
	Suite 1160	) February 28, 1996
	Salt Lake City, Utah 84111) *****
		) 5. License Category 4-e
) *****

6. Radioactive material (element and mass number)	7. Chemical and/or physical form	8. Maximum concentration in waste for disposal
A. Silver-110m	A. Volumetric bulky materials or structural debris.	A. $5.6E+02$ pCi/g
B. Americium-241	B. Volumetric bulky materials or structural debris.	B. $2.3E+02$ pCi/g
C. Americium-243	C. Volumetric bulky materials or structural debris.	C. $1.7E+03$ pCi/g
D. Beryllium-7	D. Volumetric bulky materials or structural debris.	D. $3.8E+04$ pCi/g
E. Calcium-45	E. Volumetric bulky materials or structural debris.	E. $4.0E+08$ pCi/g
F. Cadmium-109	F. Volumetric bulky materials or structural debris.	F. $4.6E+04$ pCi/g
G. Cobalt-56	G. Volumetric bulky materials or structural debris.	G. $3.6E+02$ pCi/g
H. Cobalt-57	H. Volumetric bulky materials or structural debris.	H. $1.9E+04$ pCi/g



UTAH BUREAU OF RADIATION CONTROL
 RADIOACTIVE MATERIAL LICENSE
 SUPPLEMENTARY SHEET

License # UT 2300242

6. Radioactive material (element and mass number)	7. Chemical and/or physical form	8. Maximum concentration in waste for disposal
I. Cobalt-58	I. Volumetric bulky materials or structural debris.	I. $1.6E+03$ pCi/g
J. Cobalt-60	J. Volumetric bulky materials or structural debris.	J. $3.6E+02$ pCi/g
K. Chromium-51	K. Volumetric bulky materials or structural debris.	K. $6.8E+04$ pCi/g
L. Cesium-134	L. Volumetric bulky materials or structural debris.	L. $1.2E+03$ pCi/g
M. Cesium-137	M. Volumetric bulky materials or structural debris.	M. $5.6E+02$ pCi/g
N. Europium-152	N. Volumetric bulky materials or structural debris.	N. $1.7E+03$ pCi/g
O. Europium-154	O. Volumetric bulky materials or structural debris.	O. $1.4E+03$ pCi/g
P. Iron-55	P. Volumetric bulky materials or structural debris.	P. $1.8E+06$ pCi/g
Q. Mercury-203	Q. Volumetric bulky materials or structural debris.	Q. $1.0E+04$ pCi/g
R. Potassium-40	R. Volumetric bulky materials or structural debris.	R. $1.0E+04$ pCi/g
S. Iridium-192	S. Volumetric bulky materials or structural debris.	S. $2.5E+03$ pCi/g
T. Manganese-54	T. Volumetric bulky materials or structural debris.	T. $5.6E+03$ pCi/g



UTAH BUREAU OF RADIATION CONTROL
 RADIOACTIVE MATERIAL LICENSE
 SUPPLEMENTARY SHEET

License # UT 2300249

6. Radioactive material (element and mass number)	7. Chemical and/or physical form	8. Maximum concentration in waste for disposal
U. Niobium-94	U. Volumetric bulky materials or structural debris.	U. 1.6E+02 pCi/g
V. Nickel-59	V. Volumetric bulky materials or structural debris.	V. 7.0E+02 pCi/g
W. Nickel-63	W. Volumetric bulky materials or structural debris.	W. 2.0E+06 pCi/g
X. Lead-210	X. Volumetric bulky materials or structural debris.	X. 2.3E+05 pCi/g*
Y. Polonium-210	Y. Volumetric bulky materials or structural debris.	Y. 2.0E+04 pCi/g
Z. Radium-226	Z. Volumetric bulky materials or structural debris.	Z. 2.0E+03 pCi/g*
AA. Radium-228	AA. Volumetric bulky materials or structural debris.	AA. 1.8E+03 pCi/g
BB. Radium-228 1 year	BB. Volumetric bulky materials or structural debris.	BB. 1.2E+03 pCi/g*
CC. Radium-228 5 years	CC. Volumetric bulky materials or structural debris.	CC. 6.7E+02 pCi/g*
DD. Radium-228 10 years	DD. Volumetric bulky materials or structural debris.	DD. 5.6E+02 pCi/g*
EE. Ruthenium-106	EE. Volumetric bulky materials or structural debris.	EE. 1.9E+04 pCi/g*
FF. Antimony-124	FF. Volumetric bulky materials or structural debris.	FF. 7.9E+02 pCi/g
GG. Antimony-125	GG. Volumetric bulky materials or structural debris.	GG. 5.3E+03 pCi/g
HH. Tin-113	HH. Volumetric bulky materials or structural debris.	HH. 7.3E+05 pCi/g



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6. Radioactive material (element and mass number)	7. Chemical and/or physical form	8. Maximum concentration in waste for disposal
II. Strontium-90	II. Volumetric bulky materials or structural debris.	II. $2.0E+04$ pCi/g
JJ. Thorium-230	JJ. Volumetric bulky materials or structural debris.	JJ. $1.5E+04$ pCi/g
KK. Thorium-232	KK. Volumetric bulky materials or structural debris.	KK. $6.8E+02$ pCi/g*
LL. Uranium-234	LL. Volumetric bulky materials or structural debris.	LL. $3.7E+04$ pCi/g
MM. Uranium-235	MM. Volumetric bulky materials or structural debris.	MM. $7.7E+02$ pCi/g
NN. Uranium-236	NN. Volumetric bulky materials or structural debris.	NN. $3.6E+04$ pCi/g
OO. Uranium-238	OO. Volumetric bulky materials or structural debris.	OO. $2.8E+04$ pCi/g
PP. Uranium-natural	PP. Volumetric bulky materials or structural debris.	PP. $1.8E+04$ pCi/g
QQ. Uranium-depleted	QQ. Volumetric bulky materials or structural debris.	QQ. $1.1E+05$ pCi/g
RR. Zinc-65	RR. Volumetric bulky materials or structural debris.	RR. $1.1E+04$ pCi/g

* Daughters are assumed to be present at same concentrations in equilibrium.

9. AUTHORIZED USE

Radioactive material as radioactive waste may be received, stored and disposed of by land burial. The licensee shall not accept low-level radioactive waste generated outside the region comprised of the party states to the Northwest Interstate Compact on Low-Level Radioactive Waste Management ("Compact") namely Alaska, Hawaii, Idaho, Montana, Oregon, Utah and Washington, unless the provisions of Articles IV and V of the Compact are met. Prior to receiving any such shipments, the licensee shall submit to the Utah Bureau of Radiation Control documentation evidencing compliance with these Compact provisions.



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CONDITIONS

10. Licensed material shall be used at the licensee's facility located in Section 32 of Township 1 South and Range 11 West, Tooele County, Utah.
11. The licensee shall not possess at any time, more than 300,000 cubic yards of radioactive waste material which is not disposed of in accordance with the finished design requirements. This includes all wastes in storage or active processing.
12. Licensed material specified in Item 6.A through 6.UU shall not be placed in a disposal cell unless it has been determined that the concentration of radionuclides is approximately homogeneous within the physical form of the waste. This does not pertain to structural debris superficially contaminated with licensed materials.
13. A. If a mixture of radionuclides a, b, and c are present in the waste in the concentrations C_a , C_b , and C_c and if the applicable maximum waste concentrations from Item 8 of this license are MWC_a , MWC_b , and MWC_c respectively, then the concentration in the waste shall be limited so that the following relationship exists.
$$\frac{C_a}{MWC_a} + \frac{C_b}{MWC_b} + \frac{C_c}{MWC_c} \leq 1$$

B. If a single radionuclide is present in the waste, the concentration shall not exceed the applicable value found in Item 8 of this license.
14. A. The licensee may receive for treatment, storage, and disposal any radioactive waste as authorized by this license that contains hazardous constituents as permitted by the "RCRA Hazardous Waste Operations Permit" issued by the Executive Secretary, Utah Solid and Hazardous Waste Committee and "HWSA Permit" issued by the U.S. Environmental Protection Agency.
- B. The licensee shall dispose of these wastes in the "mixed waste" disposal embankment only.
15. Sealed sources as defined in R447-12-3(64) shall not be accepted for disposal.
16. Radioactive waste containing free standing liquid, except as provided by this condition, shall not be accepted for storage or disposal. Free standing liquid is defined to be as little liquid as possible and in no case shall it exceed more than 1.0 percent, by volume, of liquid per container. (Free standing liquid, does not refer to in-situ moisture.)



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17. The licensee shall comply with the provisions of Chapter R447-18, "Notices, Instructions and Reports to Workers by Licensees or Registrants, Inspections" and Chapter R447-15 "Standards for Protection Against Radiation".
18. The licensee may transport licensed material or deliver licensed material to a carrier for transport in accordance with the provisions of R447-19-100 "Transportation".
19. Written procedures shall be maintained and available at the disposal facility for operations involving radioactive materials. The procedures shall incorporate operating instructions and appropriate safety precautions for the work. The employee training program shall include detailed review of the operating procedures applicable to the employee's assignments. The requirement for written procedures shall include establishment of procedures for conduct of the radiation safety and environmental monitoring programs, including analytical procedures and instrument calibration requirements. Written procedures and subsequent changes to the procedure shall be reviewed and approved by the Corporate Radiation Safety Officer and the Project Manager. At least annually, all procedures shall be reviewed to assure continued applicability.
20. The Corporate Radiation Safety Officer shall perform and document weekly inspections of the facility and report any findings of non-compliance, affecting radiological safety, to the Project Manager. Items for inspection include: operating procedures, license requirements and safety practices.
21. The licensee shall conduct contamination surveys in accordance with Table 7.2 of the license amendment application dated September 20, 1990.
22. The licensee shall conduct a bioassay and occupational airborne radioactive contamination monitoring program in accordance with Section 7.4.8.3 of the license amendment application dated September 20, 1990.
23. The use of respirators shall be controlled by a respiratory protection program as stipulated in R447-15-103.
24. The licensee shall calibrate air sampling equipment at intervals not to exceed six months.
25. The operational environmental monitoring program shall be conducted in accordance with Section 4.5, Table 4.7 and Figure 4.6 of the license amendment application dated September 20 1990.



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26. Vehicles, facilities, equipment or other items for unrestricted use shall not be released from the licensee's control if contamination measurements exceed the following limits:

Nuclide ^a	Column I Average ^{b, c, f}	Column II Maximum ^{b, d, f}	Column III Removable ^{b, e, f}
U-nat, U-235, U-238, and associated decay products	5,000 dpm alpha/ 100 cm ²	15,000 dpm alpha/ 100 cm ²	1,000 dpm alpha/ 100 cm ²
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/ 100 cm ²	300 dpm/ 100 cm ²	20 dpm/ 100 cm ²
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1,000 dpm/ 100 cm ²	3,000 dpm/ 100 cm ²	200 dpm/ 100 cm ²
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above	5,000 dpm beta- gamma/100 cm ²	15,000 dpm beta- gamma/100 cm ²	1,000 dpm beta- gamma/100 cm ²

- a Where surface contamination by both alpha- and beta-gamma emitting nuclides exists, the limits established for alpha- and beta-gamma emitting nuclides should apply independently.
- b As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.
- c Measurements of average contaminant should not be averaged over more than one square meter. For objects of less surface area, the average should be derived for each such object.
- d * The maximum contamination level applies to an area of not more than 100 cm².
- e The amount of removable radioactive material per 100 cm² of surface area should be determined by wiping the area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.
- f The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters shall not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.



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27. A quarterly report shall be prepared by the Corporate Radiation Safety Officer for the Project Manager and Company President evaluating employee exposures, effluent releases and environmental data to determine:
 - A. If there are any upward trends in personnel exposures for identifiable categories of workers or types of operations or in effluent releases;
 - B. If exposures and effluents might be lowered under the concept of maintaining exposures and effluents as low as reasonably achievable; and
 - C. If equipment for exposure and effluent control is being properly used and maintained.
28. In accordance with R447-25-33, the licensee shall submit annual reports to the Bureau of Radiation Control by the end of the first calendar quarter of each year for the preceding year. The reports shall include:
 - A. Specification of the quantity of each of the principal contaminants released to unrestricted areas in liquid and in airborne effluents during the preceding year;
 - B. The results of the environmental monitoring program;
 - C. A summary of licensee disposal unit survey and maintenance activities; and
 - D. A summary of the volume, radioisotopes and their activities for materials disposed of.
29. Except as provided by this condition, the licensee shall maintain the results of sampling, analyses, surveys, and instrument calibration, reports on inspections and audits, employee training records as well as any related reviews, investigations and corrective actions, for 5 years. The licensee shall maintain personnel exposure records in accordance with R447-15-401.
30. Operations shall be conducted by or under the supervision of Vernon E. Andrews, Corporate Radiation Safety Officer, or other individuals designated by the Corporate Radiation Safety Officer upon successful completion of the licensee's training program.
31. The licensee shall staff the operations of the facility in accordance with the organization chart (Figure 8.1) of the license amendment application dated September 20, 1990.
32. The licensee staff shall meet the qualifications as described in Section 8.2 and shall have the responsibilities as described in Section 8.1.2 of the license amendment application dated September 20, 1990.



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33. The licensee shall not initiate disposal operations in newly excavated areas until the Bureau of Radiation Control has inspected and approved the cell/embankment floor.
34. The licensee shall provide "as built drawings" of the facility, at intervals not to exceed six months. Drawings shall be submitted by March 30 and September 30 of each year.
35. Radioactive waste which have been off loaded shall be placed in the appropriate disposal embankment, stored in Bureau approved containers or stored in a manner approved by the Bureau.
36. The licensee shall place bulk radioactive materials in 12 inch uncompacted lifts.
37. In-place bulk radioactive waste shall be compacted at a moisture content of less than 5 percent over optimum, as determined by the Standard Proctor Method ASTM D-698.
38. The licensee shall compact the lifts to not less than 90 percent of maximum density as determined by Standard Proctor Method ASTM D-698.
39. Structural debris as radioactive waste shall conform to the following dimensions: all debris shall be less than 12 inches in at least one dimension, and no longer than 8 feet in any one dimension.
40. The licensee shall place any structural debris, equipment or prepackaged waste in the bottom 50 percent, by height, of the disposal cell.
41. Contaminated structural debris, equipment or prepackaged wastes shall consist of less than 10 percent, by volume, of the total lift and shall be essentially uniformly distributed throughout the lift.
42. The licensee shall scarify the disposal cell floor, consisting of native materials, to a depth of 12 inches. The licensee shall compact the disposal cell floor to not less than 95 percent maximum density as determined by Standard Proctor Method ASTM D-698.
43. The licensee shall not place contaminated structural debris, equipment or prepackaged waste in the bottom lift.
44. The disposal cell floor and radon barrier shall be plus or minus 3 percent of optimum moisture as determined by Standard Proctor Method ASTM D-698.
45. The licensee shall compact the radon barrier to not less than 95 percent of maximum density as determined by Standard Proctor Method ASTM D-698.



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46. The licensee shall use rock filter zone and rock armor that has been sized in accordance with Section 3.1.1.2 and 9.2.5 of the license amendment application dated September 20, 1990.
47. The licensee shall test rock armor and filter zone rock in accordance with the provisions found in Section 9 of the license amendment application dated September 20, 1990.
48. Truck, railcar, waste hauling and other earth moving equipment washdown (decontamination) facilities, including evaporation ponds, shall be controlled and fenced to prevent intrusion.
49. All burial embankments and waste storage areas, including immediately adjacent drainage structures, shall be controlled areas, surrounded by a 6 foot high, chain link fence, topped with twisted selvedge. All permanent fence shall be chain link, 6 feet high, topped with three strand barbed wire, top tension wire and twisted selvedge.
50. The licensee shall utilize a manifest ("Radioactive Waste Shipment and Disposal Record", Envirocare Form E-100) containing the information required in R447-15-311(2) and (3).
51. The licensee shall not accept radioactive waste for storage and disposal unless the licensee has received a complete "Radioactive Waste Shipment and Disposal Record" (Form #E-100) from the shipper.
52. The licensee shall maintain copies of completed manifests or equivalent documentation until the Bureau of Radiation Control authorizes their disposition.
53. The licensee shall immediately notify the Bureau of Radiation Control or the Bureau's on-site representative of any waste shipments where a violation of applicable regulations or license conditions has been found.
54. The licensee shall require anyone who transfers radioactive waste to the facility comply with the requirements in R447-15-311(4)(a) through (h).
55. The licensee shall acknowledge receipt of the waste within one week of receipt by returning a signed copy of the manifest or equivalent documentation to the shipper. The shipper to be notified is the licensee who last possessed the waste and transferred the waste to the licensee. The returned copy of the manifest or equivalent documentation shall indicate any discrepancies between materials listed on the manifest and materials received.
56. The licensee shall notify the shipper (i.e., the generator, the collector, or processor) and the Bureau of Radiation Control when any shipment or part of a shipment has not arrived within 60 days after the advance manifest was received.



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57. The licensee shall maintain a record for each shipment of waste disposed of at the site. As a minimum, the record shall include:
- A. The date of disposal of the waste;
 - B. The location of waste in the disposal site;
 - C. The condition of the waste packages received;
 - D. Any discrepancy between the waste listed on the shipment manifest or shipping papers and the waste received in the shipment;
 - E. A description of any evidence of leaking or damaged packages or radiation or contamination in excess of applicable regulatory limits; and
 - F. A description of any repackaging operations of any of the waste packages in the shipment.
58. In accordance with R447-25-31 the licensee shall maintain a Utah Bureau of Radiation Control Surety (Trust) Agreement adequate to fund the decommissioning and reclamation of the grounds, equipment and facilities. These costs, identified in Section 10 of the license amendment application dated September 19, 1990, shall be reviewed and updated annually and a report submitted to the Utah Bureau of Radiation Control within 60 days after July 1, of each year. The surety arrangement shall be updated as necessary to reflect decommissioning and reclamation costs.
59. The licensee shall fulfill and maintain compliance with all conditions and shall meet all compliance schedules stipulated in Ground Water Quality Discharge Permit, number UGW 450005, issued by the Executive Secretary of the Utah Water Pollution Control Committee.
60. One (1) year prior to the anticipated closure of the site, the licensee shall submit a final version of the site closure, decontamination and decommissioning plan. As part of this plan, the licensee shall demonstrate by measurements and/or modeling that concentrations of radioactive materials which may be released to the general environment, after site closure, will not result in an annual dose exceeding 25 millirem to the whole body, 75 millirem to the thyroid, and 25 millirem to any other organ of any member of the public.



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61. Except as specifically provided otherwise by this license, the licensee shall possess and use radioactive material described in Item 6, 7, and 8 of this license and conduct site operations in accordance with statements, representations, operating procedures, and disposal criteria, heretofore made by the licensee or his authorized representative in application for and subsequent to issuance of Utah Radioactive Material License No. UT 2300249 and amendments thereto.

March 21, 1991 Larry F. Anderson
Date Larry F. Anderson, Director, Bureau of Radiation Control



Appendix D

**Bureau of Solid and Hazardous Waste
Mixed Waste License Summary**



STATE OF UTAH PLAN APPROVAL

Permittee:

Envirocare of Utah, Inc.

Tooele County, Utah

EPA Identification Number UTD982598898

Pursuant to the Utah Solid and Hazardous Waste Act, (the Act), 26-14-1, et. seq., Utah Code Annotated 1953, as amended and the Utah Administrative Code (UAC) (R450-1 through R450-13 and R450-50) as adopted by the Utah Solid and Hazardous Waste Committee, (the Committee), a plan approval (herein after called "permit") is issued to Envirocare of Utah, Inc. (hereafter called the "Permittee"), to operate a hazardous waste treatment and storage facility in Tooele County, Utah, at latitude 40° 41' 000" North and longitude 111° 06' 030" West. The U.S. Environmental Protection Agency (U.S. EPA) has authorized the Executive Secretary to issue such a permit under Section 3006(b) of the Resource Conservation and Recovery Act (RCRA).

The Permittee must comply with all the terms and conditions of this permit. The permit consists of the conditions contained herein (including the portions of the application attached and incorporated by reference), and the applicable portions of R450-1 through R450-13, R450-50, and R450-101 contained in the permit. Applicable rules are those which are in effect on the date of issuance of this permit.

This permit is based on the premise that the information submitted in the application dated July 22, 1987 as modified by subsequent amendments dated April 25, 1988 and July 25, 1989 (hereafter referred to as the application), is accurate and that the facility will be operated as specified in the referenced portions of the application, except as modified by the conditions herein. Portions of the application are attached and incorporated herein by reference, wherever noted, as part of this permit. Any inaccuracies or misrepresentations found in the application may be grounds for the termination or modification of this permit (see R450-3-9.). The Permittee must inform the Executive Secretary of any deviation from, or changes in the information in the application which would affect the Permittee's ability to comply with the applicable regulations or permit conditions.



This permit is effective as of November 30, 1990 and shall remain in effect until November 30, 2000, unless revoked and reissued (R450-3-9.1(a)(b)(c)) or terminated (R450-3-9.2.), or continued in accordance with R450-3-5(d).

Signature: _____

Dennis R. Downs

Date: _____

11/30/90

Dennis R. Downs
Executive Secretary
Utah Solid and Hazardous Wastes Committee



NOTE TO ENVIROCARE'S PART B PERMIT CERTIFICATE:

The Envirocare site is licensed by the Utah Bureau of Radiation Control for disposal of radioactive waste. The site is also licensed by the Utah Bureau of Radiation Control and permitted by the Utah Bureau of Solid and Hazardous Waste for disposal of "mixed" (hazardous/radioactive) waste.

Anyone wishing to visit the site should contact the Permittee to make arrangements for a site tour and to determine that all safety requirements are met prior to entering the site.

Inspectors who will have extensive contact with the site should contact both the Utah Bureau of Radiation Control and the Utah Bureau of Solid and Hazardous Waste to determine that all safety requirements i.e., safety equipment, safety training, and/or physical, are met prior to entering the site.

ENVIROCARE OF UTAH, INC.
HAZARDOUS WASTE LIST

RCRA Wastes

EPA Waste No.		Hazard Code
D001	Ignitability	(I)
D002	Corrosivity	(C)
D003	Reactivity	(R)
D004	Arsenic	(E)
D005	Barium	(E)
D006	Cadmium	(E)
D007	Chromium	(E)
D008	Lead	(E)
D009	Mercury	(E)
D010	Selenium	(E)
D011	Silver	(E)
D012	Endrin (1,2,3,4,10,10-hexachloro-1,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo, endo-5,8-dimethano naphthalene)	(E)
D013	Lindane (1,2,3,4,5,6, hexa-chloro-cyclohexane, gamma isomer)	(E)
D014	Methoxychlor (1,1,1-Trichloro-2,2-bis[p-methoxyphenyl]ethane)	(E)
D015	Toxaphene (C ₁₀ H ₁₂ Cl ₈ ? technical chlorinated camphene, 67-69 percent chlorine)	(E)
D016	2,4-D (2,4-dichlorophenoxyacetic acid)	(E)
D017	2,4,5-TP (Silvex) (2,4,5-trichloro-phenoxypropionic acid)	(E)
D018	Benzene	(E)
D019	Carbon Tetrachloride	(E)
D020	Chlordane	(E)
D021	Chlorobenzene	(E)
D022	Chloroform	(E)
D023	o-Cresol	(E)
D024	m-Cresol	(E)
D025	p-Cresol	(E)

ENVIROCARE OF UTAH, INC.
HAZARDOUS WASTE LIST
(continued)

D026	Cresol	(E)
D027	1,4-Dichlorobenzene	(E)
D028	1,2-Dichloroethane	(E)
D029	1,1-Dichloroethylene	(E)
D030	2,4-Dinitrotoluene	(E)
D031	Heptachlor (and its hydroxide)	(E)
D032	Hexachlorobenzene	(E)
D033	Hexachlorobutadiene	(E)
D034	Hexachloroethane	(E)
D035	Methyl Ethyl Ketone	(E)
D036	Nitrobenzene	(E)
D037	Pentachlorophenol	(E)
D038	Pyridine	(E)
D039	Tetrachloroethylene	(E)
D040	Trichloroethylene	(E)
D041	2,4,5-Trichlorophenol	(E)
D042	2,4,6-Trichlorophenol	(E)
D043	Vinyl Chloride	(E)

HAZARDOUS WASTE FROM NON-SPECIFIC SOURCES:

F001 The following spent halogenated solvents used in degreasing:

Tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004 and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

F002 The following spent halogenated solvents:

Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2-trichloroethane; and all spent solvent mixtures/blends containing, before use, a total of one or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

ENVIROCARE OF UTAH, INC.
HAZARDOUS WASTE LIST
(continued)

F003 The following spent non-halogenated solvents:

Xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above non-halogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above non-halogenated solvents, and, a total of ten percent or more (by volume) of one or more of those solvents listed in F001, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

F004 The following spent non-halogenated solvents:

Cresols and cresylic acid, nitrobenzene; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

F005 The following spent non-halogenated solvents:

Toluene, methyl ethyl ketone, carbon disulfide, isobutanol, and pyridine; benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, or F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

F006 Waste-water treatment sludges from electroplating operations except from the following processed: (1) Sulfuric acid anodizing for aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum.

F019 Waste-water treatment sludges from the chemical conversion coating of aluminum.

ENVIROCARE OF UTAH, INC.
HAZARDOUS WASTE LIST
(continued)

- F008 Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.
- F010 Quenching bath residues from oil baths from metal heat treating operations where cyanides are used in the process.
- F012 Quenching waste water treatment sludges from metal heat treating operations where cyanides are used in the process.
- F024 Wastes, including but not limited to, distillation residues, heavy ends, tars, and reactor clean-out wastes from the production of chlorinated aliphatic hydrocarbons, having carbon content from one to five, utilizing free radical catalyzed processes. [This listing does not include light ends, spent filters and filter aids, spent desiccants, wastewater, wastewater treatment sludges, spent catalysts, and wastes listed as K wastes.]
- F028 Residues resulting from the incineration or thermal treatment of soil contaminated with EPA Hazardous Waste Nos. F020, F021, F022, F023, F026 and F027.
- F039 Multi-Source Leachate

HAZARDOUS WASTE FROM SPECIFIC SOURCES:

- K050 Heat Exchanger Bundle Cleaning Sludge from the petroleum refining industry.
- K051 API separator sludge from the petroleum refining industry.
- K052 Tank bottoms (leaded) from the petroleum refining industry.
- K061 Emission control dust/sludge from the primary production of steel in electric furnaces.
- K069 Emission control dust/sludge from the secondary lead smelting.

ENVIROCARB OF UTAH, INC.
HAZARDOUS WASTE LIST
(continued)

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION
SPECIES, CONTAINER RESIDUES, AND SPILL RESIDUES:

P002	1-Acetyl-2-Thiourea	H
P003	Acrolein	H
P004	Aldrin	H
P005	Allyl Alcohol	H
P010	Arsenic Acid	H
P011	Arsenic Pentoxide	H
P012	Arsenic Trioxide	H
P013	Barium Cyanide	H
P014	Benzenethiol	H
P015	Beryllium Dust	H
P017	Bromoacetone	H
P020	Dinoseb	H
P021	Calcium Cyanide	H
P022	Carbon Disulfide	H
P024	p-Chloroaniline	H
P027	3-Chloropropionitrile	H
P028	Benzyl Chloride	H
P029	Copper Cyanide	H
P030	Cyanides (soluble cyanide salts), n.o.s.	H
P034	2-Cyclohexyl-4,6-Dinitrophenol	H
P037	Dieldrin	H
P039	Disulfoton	H
P046	alpha, alpha-Dimethylphenethylamine	H
P047	4,6-Dinitro-2-Methylphenol	H
P048	2,4-Dinitrophenol	H
P050	Endosulfan	H
P051	Endrin	H
P056	Fluorene	H
P059	Heptachlor	H
P060	Isodrin	H
P071	Methyl Farathion	H
P074	Nickel Cyanide	H
P075	Nicotine & Salts	H
P077	p-Nitroaniline	H
P082	N-Nitrosodimethylamine	H
P085	Octamethylpyrophosphoramide	H
P089	Parathion	H
P094	Phorate	H
P097	Famphur	H
P098	Potassium Cyanide	H
P099	Potassium Silver Cyanide	H
P101	Propanenitrile	H
P102	Propargyl Alcohol	H
P104	Silver Cyanide	H
P106	Sodium Cyanide	H
P107	Strontium Sulfide	H
P108	Strychnine & Salts	H

ENVIROCARE OF UTAH, INC.
HAZARDOUS WASTE LIST
(continued)

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUES, AND SPILL RESIDUES
(continued):

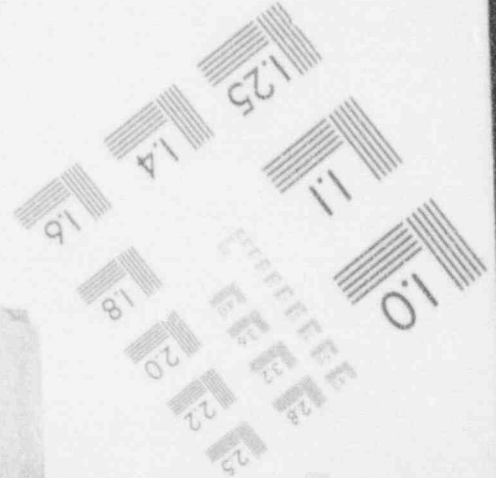
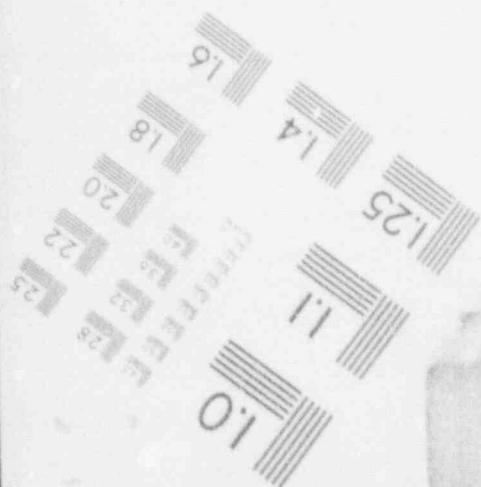
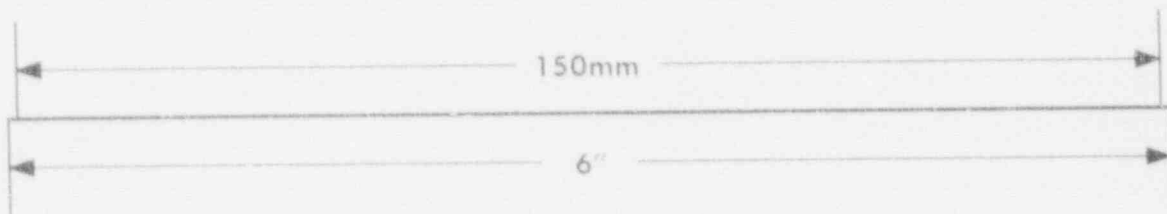
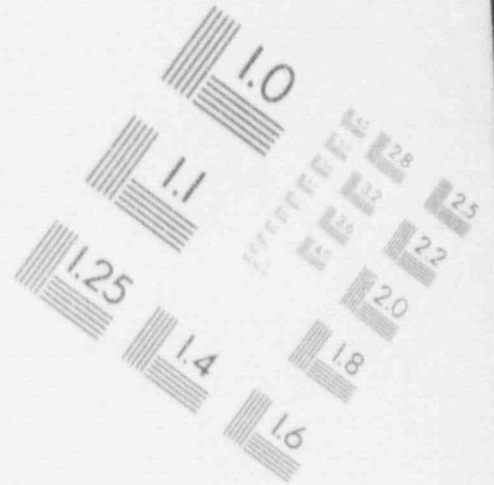
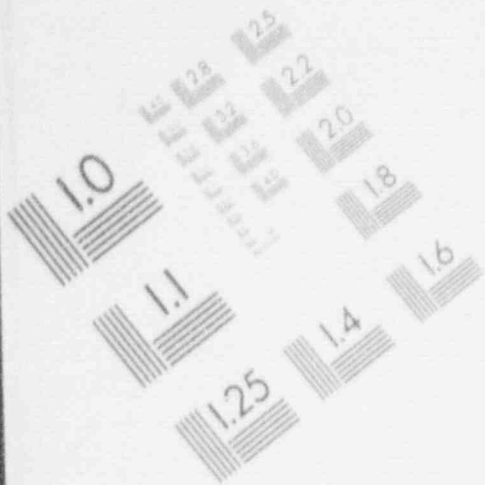
P111	Tetraethyl Pyrophosphate	H
P113	Thallium (III) Oxide	H
P114	Thallium Selenite	H
P115	Thallium (I) Sulphate	H
P119	Ammonium Vanadate	H
P120	Vanadium (V) Oxide	H
P121	Zinc Cyanide	H
P122	Zinc Phosphide (>10%)	H
P123	Toxaphene	H

COMMERCIAL CHEMICAL PRODUCTS, MANUFACTURING CHEMICAL INTERMEDIATES, OR OFF-SPECIFICATION COMMERCIAL CHEMICAL PRODUCTS:

U002	Acetone	T
U004	Acetophenone	T
U005	2-Acetylaminofluorene	T
U007	Acrylamide	T
U009	Acrylonitrile	T
U012	Aniline	I, T
U018	Benzo(a)anthracene	T
U019	Benzene	T
U021	Benzidine	T
U022	Benzo(a)pyrene	T
U027	Bis(2-chloroisopropyl)ether	T
U028	Bis(2-Ethylhexyl) Phthalate	T
U029	Bromomethane	T
U030	4-Bromophenyl Phenyl Ether	T
U031	n-Butyl Alcohol	I
U032	Calcium Chromate	T
U036	Chlordane	T
U037	Chlorobenzene	T
U038	Chlorobenzilate	T
U039	4-Chloro-3-methyl Phenol	T
U041	Epichlorohydrin	T
U042	2-Chloroethylvinyl Ether	T
U043	Vinyl Chloride	T
U044	Chloroform	T
U045	Chloromethane	T
U047	2-Chloronaphthalene	T
U048	2-Chlorophenol	T
U050	Chrysene	T
U052	Cresols/Cresylic Acid	T
U057	Cyclohexanone	I

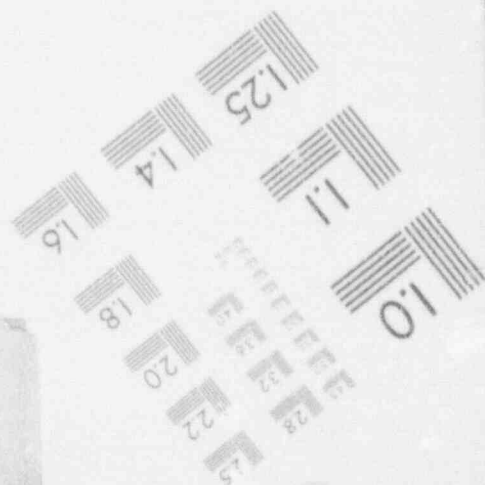
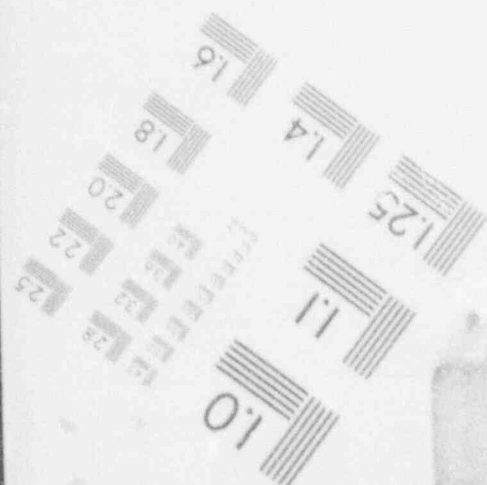
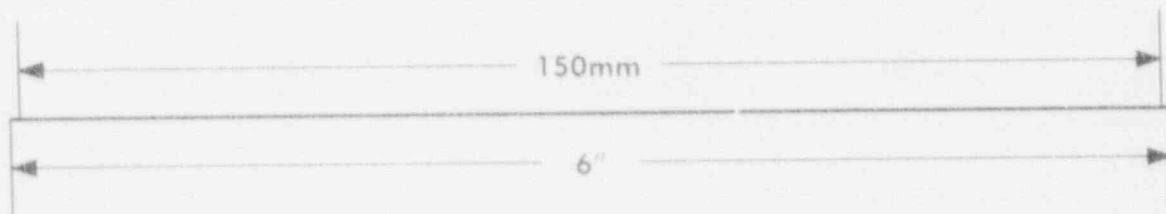
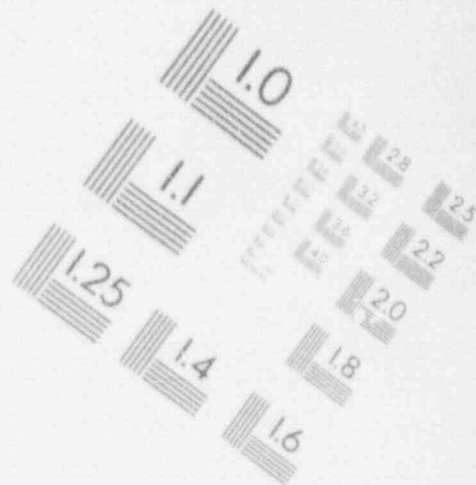
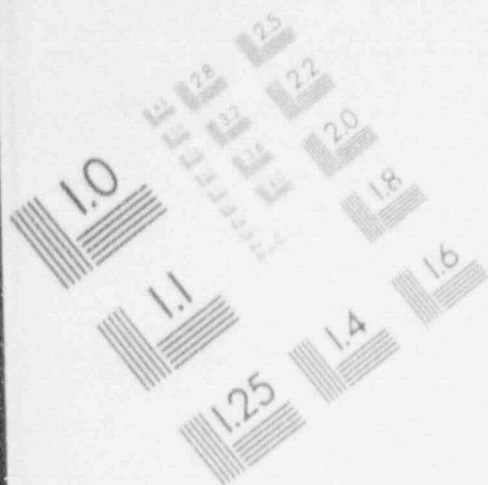
1

IMAGE EVALUATION
TEST TARGET (MT-3)



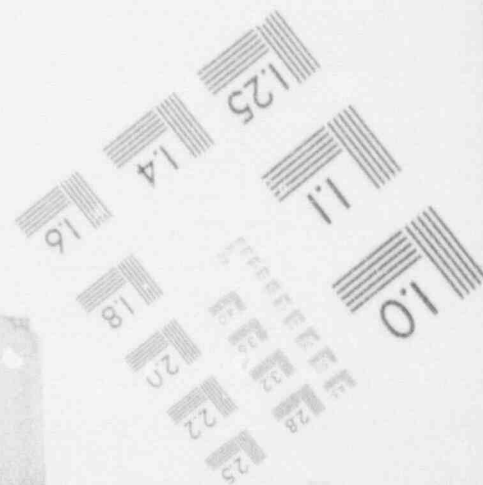
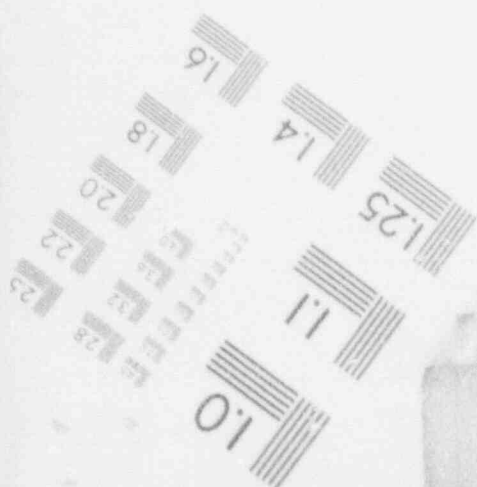
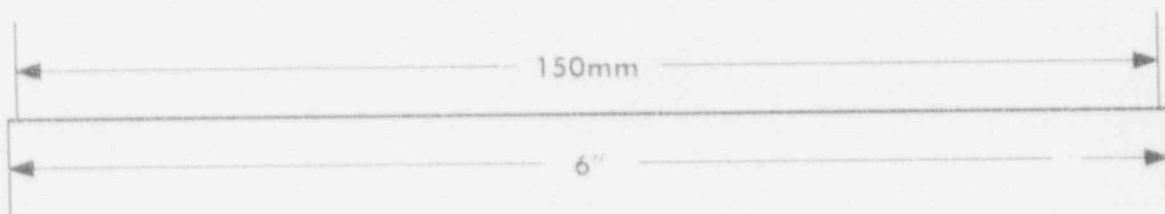
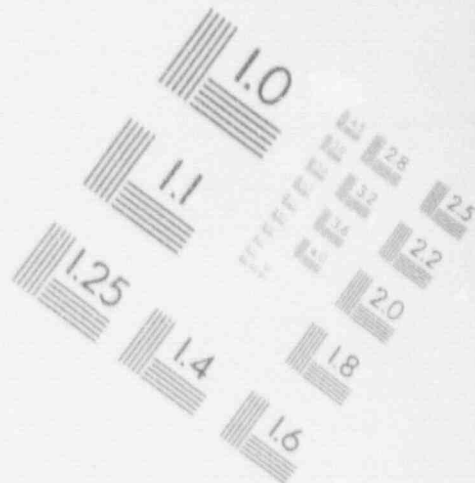
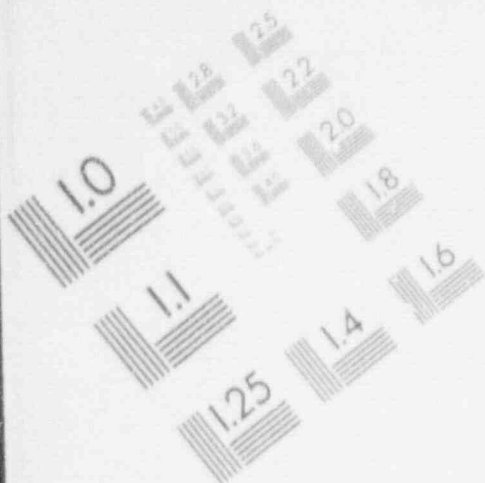
1

IMAGE EVALUATION
TEST TARGET (MT-3)



1

IMAGE EVALUATION
TEST TARGET (MT-3)



ENVIROCARE OF UTAH, INC
HAZARDOUS WASTE LIST
(continued)

U060	DDD	T
U061	DDT	T
U062	Diallate	T
U063	Dibenz(a,h)anthracene	T
U064	Dibenzo(a,i)pyrene	T
U066	1,2-Dibromo-3-Chloropropane	T
U067	1,2-Dibromoethane	T
U068	Dibromomethane	T
U069	Di-n-Butylphthalate	T
U070	o-Dichlorobenzene	T
U071	m-Dichlorobenzene	T
U072	p-Dichlorobenzene	T
U073	3-3'-Dichlorobenzidine	T
U074	1,4-Dichloro-2-Butene	I, T
U075	Dichlorodifluoroethane	T
U076	1,1-Dichloroethane	T
U077	1,2-Dichloroethane	T
U078	1,1-Dichloroethylene	T
U079	1,2-Dichloroethylene	T
U080	Methylene Chloride	T
U081	2,4-Dichlorophenol	T
U082	2,6-Dichlorophenol	T
U083	1,2-Dichloropropane	T
U084	1,3-Dichloropropene	T
U085	1,2:3,4-Diepoxybutane	I, T
U088	Diethylphthalate	T
U089	Diethylstilbesterol	T
U091	3,3'-dimethoxybenzidine	T
U093	Dimethylaminoazobenzene	T
U094	7,12-Dimethylbenz(a)anthracene	T
U095	3,3'-Dimethylbenzidine	T
U101	2,4-Dimethylphenol	T
U102	Dimethylphthalate	T
U105	2,4-Dinitrotoluene	T
U106	1,6-Dinitrotoluene	T
U107	Di-n-Octyl Phthalate	T
U108	1,4-Dioxane	T
U109	1,2-Diphenylhydrazine	T
U112	Ethyl Acetate	T
U115	Ethylene Oxide	T
U117	Ethyl Ether	T
U118	Ethyl Methacrylate	T
U119	Ethylmethane Sulfonate	T
U120	Fluoranthene	T
U121	Trichlorofluoromethane	T
U127	Hexachlorobenzene	T
U128	Hexachlorobutadiene	T
U129	Lindane (Hexachlorocyclohexane)	T
U130	Hexachlorocyclopentadiene	T
U131	Hexachloroethane	T

ENVIROCARE OF UTAH, INC.
HAZARDOUS WASTE LIST
(continued)

U132	Hexachlorophene	T
U135	Hydrogen Sulfide	T
U137	Indeno(1,2,3-cd)pyrene	T
U138	Iodomethane	T
U140	Isobutyl Alcohol	I, T
U141	Isosafrole	T
U142	Kepone	T
U144	Lead Acetate	T
U145	Lead Phosphate	T
U146	Lead Subacetate	T
U147	Maleic Anhydride	T
U149	Malononitrile	T
U151	Mercury	T
U152	Methacrylonitrile	I, T
U154	Methanol	I
U155	Methapyrilene	T
U157	3-Methylcholanthrene	T
U158	4,4'-Methylene Bis(2-Chloroaniline)	T
U159	Methyl Ethyl Ketone	I, T
U161	Methyl Isobutyl Ketone	I
U162	Methyl Methacrylate	I, T
U165	Naphthalene	T
U166	1,4-Naphthalenedione	T
U167	1-Naphthylenamine	T
U168	2-Naphthylenamine	T
U169	Nitrobenzene	I, T
U170	4-Nitrophenol	T
U171	2-Nitropropane	I, T
U172	N-Nitroso-di-n-butylamine	T
U174	N-Nitrosodiethylamine	T
U179	N-Nitrosopiperidine	T
U180	N-Nitrosopyrrolidine	T
U181	5-Nitro-o-Toluidine	T
U182	Paraldehyde	T
U183	Pentachlorobenzene	T
U184	Pentachloroethane	T
U185	Pentachloronitrobenzene	T
U187	Phenacetin	T
U188	Phenol	T
U190	Phthalic Anhydride	T
U191	2-Picoline	T
U192	Pronamide	T
U194	1-Propanamine	I, T
U196	Pyridine	T
U197	p-Benzoquinone	T
U201	Resorcinol	T
U203	Safrole	T
U204	Selenium Dioxide	T
U205	Selenium Sulfide	T
U207	1,2,4,5-Tetrachlorobenzene	T

ENVIROCARE OF UTAH, INC.
HAZARDOUS WASTE LIST
(continued)

U208	1,1,1,2-Tetrachloroethane	T
U209	1,1,2,2-Tetrachloroethane	T
U210	Tetrachloroethylene	T
U211	Carbon Tetrachloride	T
U212	2,3,4,6-Tetrachlorophenol	T
U214	Thallium (I) Acetate	T
U215	Thallium (II) Carbonate	T
U216	Thallium (I) Chloride	T
U217	Thallium (I) Nitrate	T
U220	Toluene	T
U221	Toluenediamine	T
U223	Toluene Diisocyanate	R, T
U225	Bromoform	T
U226	1,1,1-Trichloroethane	T
U227	2-Ethoxyethanol	T
U228	Trichloroethylene	T
U230	2,4,5-Trichlorophenol	T
U231	2,4,6-Trichlorophenol	T
U232	2,4,5-T	T
U233	2,4,5-TP Silvex	T
U234	1,3,5-Trinitrobenzene	R, T
U235	Tris(2,3-Dibromopropyl) Phosphate	T
U237	Uracil Mustard	T
U238	Ethyl Carbamate (Urethane)	T
U239	Xylene	I
U240	2,4-Dichlorophenoxyacetic acid	T
U242	Pentachlorophenol	T
U243	Hexachloropropene	T
U247	Methoxychlor	T
U328	2-Methyl Benzenamine	T
U359	1,1,2-Trichloroethane	T

(Note: Non-radioactive hazardous wastes must not be mixed with radioactive wastes to avoid or circumvent the land disposal restrictions.)

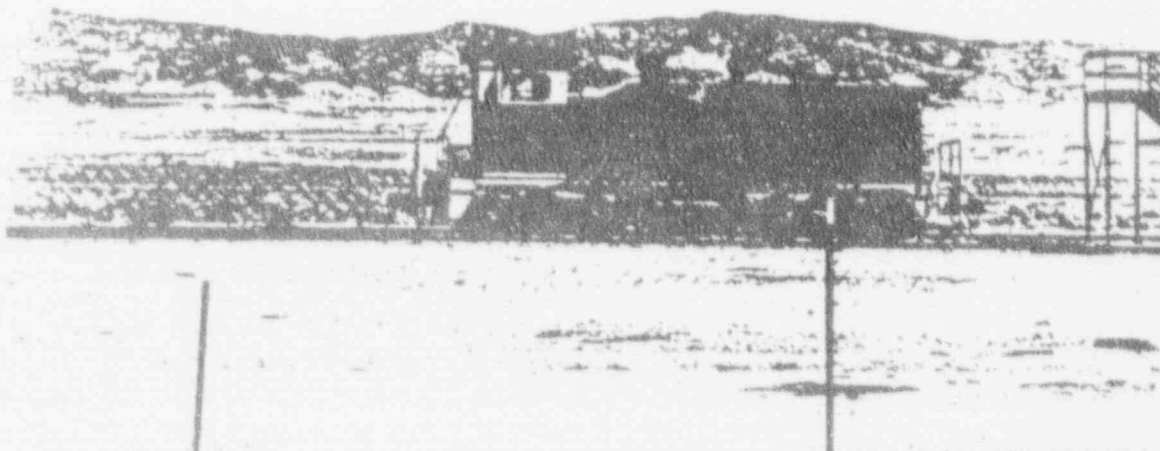
Appendix E
Facility Photographs

Appendix E
Site Photographs



Photograph 1

View of northeast corner of Envirocare of Utah, Inc. (Envirocare) site showing car dump (rollover) used to unload waste soil and other bulk material from gondola rail cars.



Photograph 2

A view of locomotive just north of rollover used to move rail cars from Union Pacific Railroad Company spur to the Envirocare property.



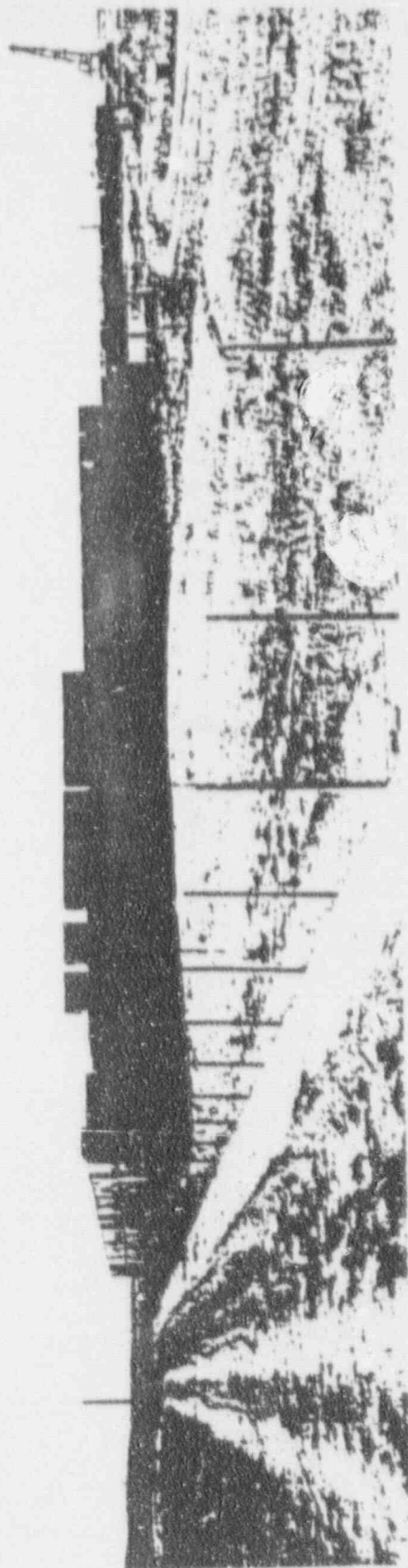
Photograph 3

Off-road truck used to haul waste soil and other bulk material from the rollover to the storage or disposal areas.



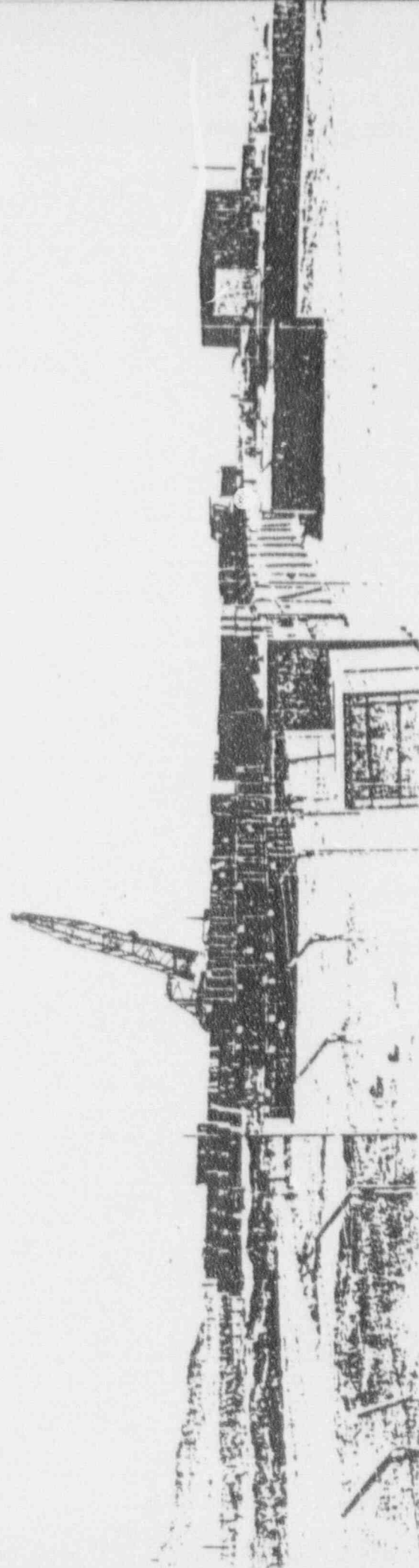
Photograph 4

Portion of container storage area located west and adjacent the active portion of "Current Envirocare Embankment" as shown in Appendix D on Page D-2.



Photograph: 5

Portion of container storage area (looking west) located in southwest corner of active portion of Current Envirocare Embankment.



Electrolyte uptake by root cells

View of Brookings, looking from
the south end of the point, and
across the river to the bridge, the
city, and the hills in the distance.



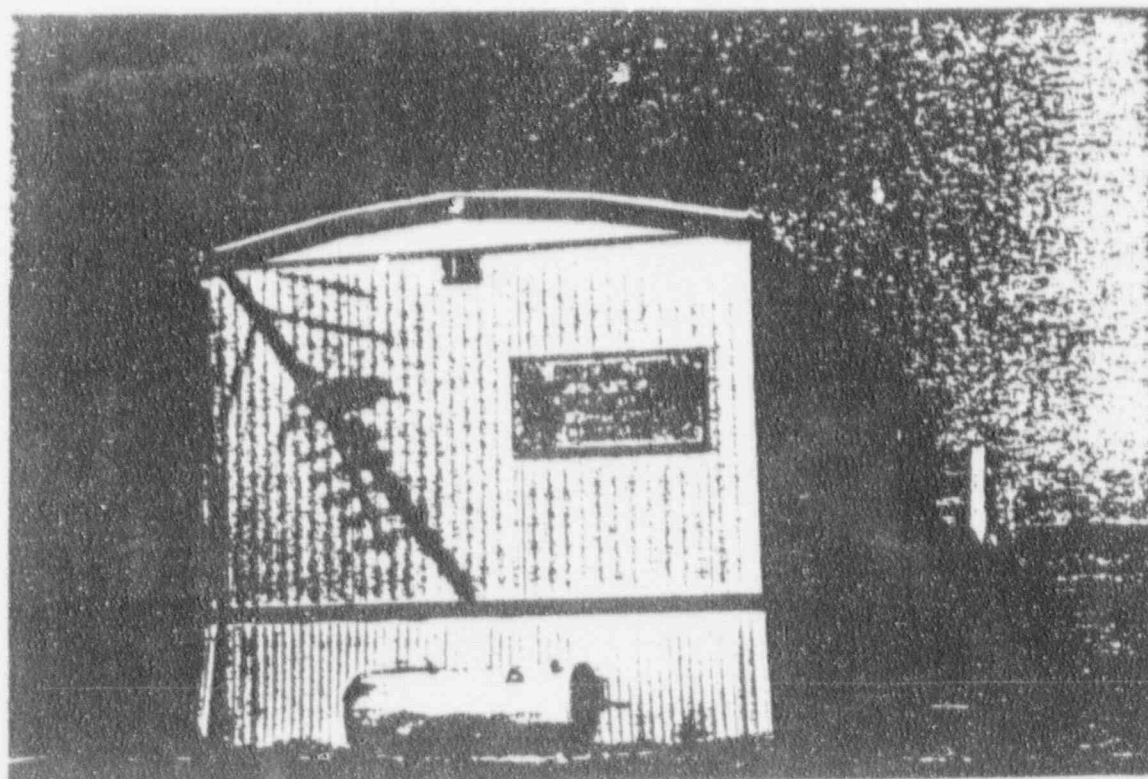
Photographs 1A and 1B

View (looking north) of active disposal and cover storage (on far right side of photograph) areas



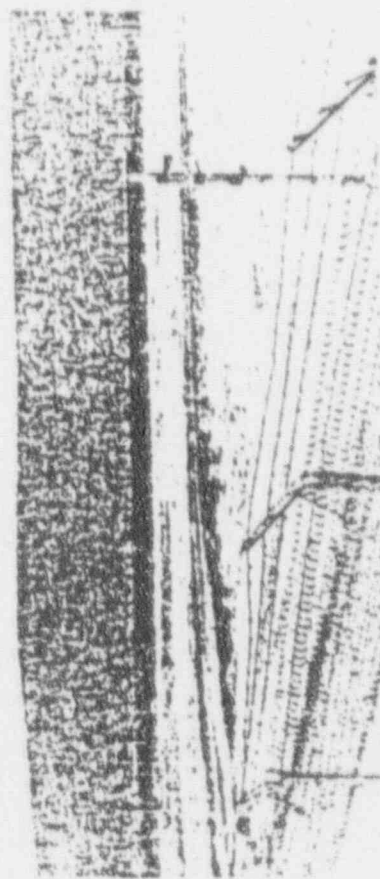
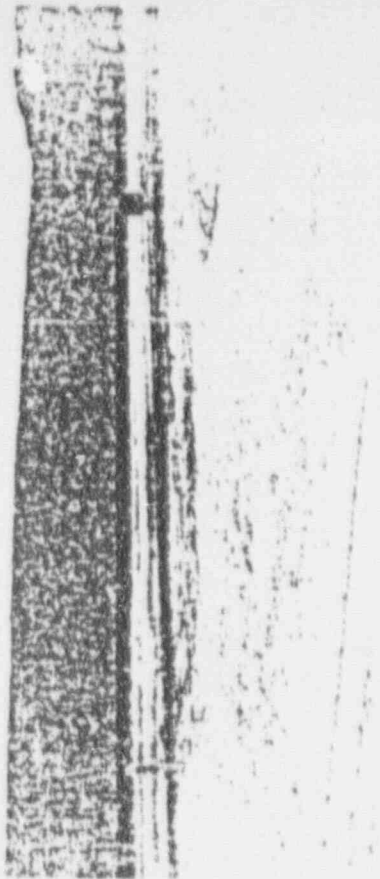
Photograph 8

View (looking southeast) from the controlled area to the proposed low-level radioactive and mixed waste disposal location. The disposal cell(s) are proposed to be located to the left and in the forefront of the metal building shown in the distance.



Photograph 9

Site offices for the Utah Bureau of Radiation Control



Photographs 10A and 10B

View (looking north and east) of the channel of the active eruption just north of the active eruption

Appendix F

Review of Envirocare of Utah, Inc.'s Groundwater Monitoring Network

Appendix F
Review of Envirocare of Utah, Inc.'s
Groundwater Monitoring Network

A report by Delta Geotechnical Consultants, Inc. (Delta) dated November 29, 1989 presents a hydrogeologic study of the Envirocare of Utah, Inc. (Envirocare) facility. This report was submitted in support of Envirocare's mixed waste landfill permit application. We reviewed the report as part of a due-diligence audit of Envirocare's Naturally Occurring Radioactive Material (NORM) waste disposal facility. The Delta report provides a description of the regional site setting (topography, climate, geology, and hydrogeology), local hydrogeologic conditions (such as hydrostratigraphy, water level data, uncertainty in water level elevation, directions and rates of groundwater flow, and possible changes in conditions between 1981 and 1989), vertical and horizontal transit time estimates for contamination migration, and recommendations for improving the existing groundwater monitoring network.

The letter transmitting Delta's report depicts the hydrogeologic conditions as well characterized by data obtained from existing reports and ongoing measurements of depth to water. Figure 1 (Figure 5 from the Delta report) shows the monitoring well locations and designations at the time of the report. In their transmittal letter, Delta cites that a "general northerly trend in flow direction is evident." This flow direction is portrayed in Figure 2 (Figure 7 from the Delta report). Our review of the information presented in Delta's report and other available references on the area (1) could not reach a similar conclusion regarding groundwater flow direction, and (2) suggests that hydrogeologic conditions are not well characterized by existing information.

The water elevation in all accessible monitoring wells was surveyed as part of Delta's investigation. These water level measurements are presented in Figure 3 (Figure 6 from the Delta report). Our review of Figure 3 suggests that no flow direction trend is apparent from these data, a conclusion shared by Delta's investigators. The groundwater flow direction is controlled by the hydraulic gradient (the slope of the water table surface). To determine the hydraulic gradient in a particular hydrostratigraphic unit, monitoring wells should be completed only in that unit. Since many of Envirocare's monitoring wells are screened in more than one hydrostratigraphic unit, the resulting water level

information does not represent a single unit and actual conditions are unclear by current well construction techniques.

Using Delta's information and available public references, we have identified some alternative interpretations not discussed by Envirocare or its consultants. For example, the topography slopes gently from east to west at 25 feet per mile and groundwater recharge occurs in the mountains to the east. In similar situations, groundwater flow parallels the surface topography. A first approximation of the hydraulic gradient suggests it should be from east to west. Neither Envirocare nor Delta address this direction in the design of the existing or proposed groundwater monitoring network.

Based on our understanding of the disposal operation and local hydrostratigraphic conditions, seepage from the NORM-waste disposal embankment would enter the sand unit, migrate downward until it met a less permeable layer, and then flow laterally along that layer. The sand unit is underlain by a silty clay unit that is several orders of magnitude less permeable. Using boring logs and well completion records for the existing monitoring wells, we contoured the elevations of the base of the sand unit (Figure 4). The surface of the silty clay unit slopes in a west-southwestern direction. Since the sand unit is locally above the water table, seepage infiltrating from the embankment would be controlled to some extent by the top of the less permeable silty clay surface beneath the sand unit. Flow along this surface would be in a west-southwestern direction. Again, neither Envirocare nor Delta address this flow direction.

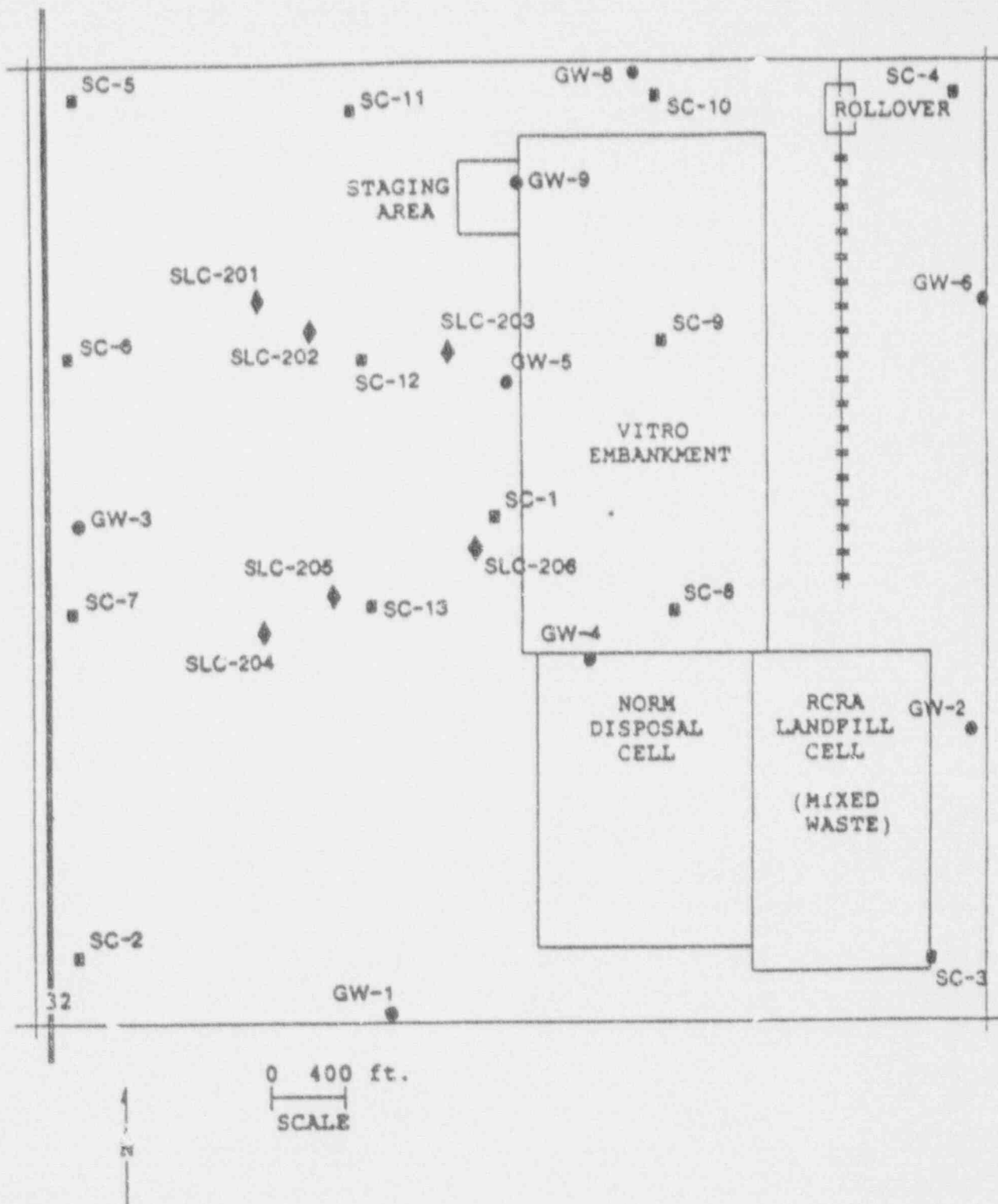
A review of Figure 5 (Figure 8 from the Delta report) shows the placement of existing monitoring wells plus the new wells proposed by Delta to monitor the mixed waste embankment. Few monitoring wells exist west or southwest of either the NORM- or mixed-waste disposal embankments. Considering that the groundwater flow direction is not well established, we believe the existing and proposed networks are deficient. Monitoring wells are required adjacent to the facilities on the west, southwest, and south to define the actual hydraulic gradient. Additionally, monitoring wells should be constructed in each hydrostratigraphic unit. Instead, more than one hydrostratigraphic unit is monitored by many existing wells and the existing and proposed monitoring wells are concentrated to the north, northeast, and northwest of the active NORM disposal operations.

Another conclusion presented in Delta's transmittal letter is that contaminants released from the landfill would reach a monitoring well 100 feet downgradient of the point of release in 6.4 years for the worst case scenario or take 191 years under the most probable scenario. If groundwater flow is in a west or southwest direction, the nearest monitoring wells are at distances in excess of about 2,000 feet. Based on Delta's groundwater flow estimates, contaminated flow would take about 400 years to be detected by the existing groundwater monitoring network (assuming worst case velocity conditions). To determine real time impacts of the NORM-waste disposal operation on the groundwater, monitoring wells should be placed within 50 to 100 feet of the operating face of the embankment. Considering Envirocare's estimates of groundwater flow rate, it makes sense for monitoring wells to be located close to the landfill to detect potential contaminant migration and to assess its impact to public health and the environment.

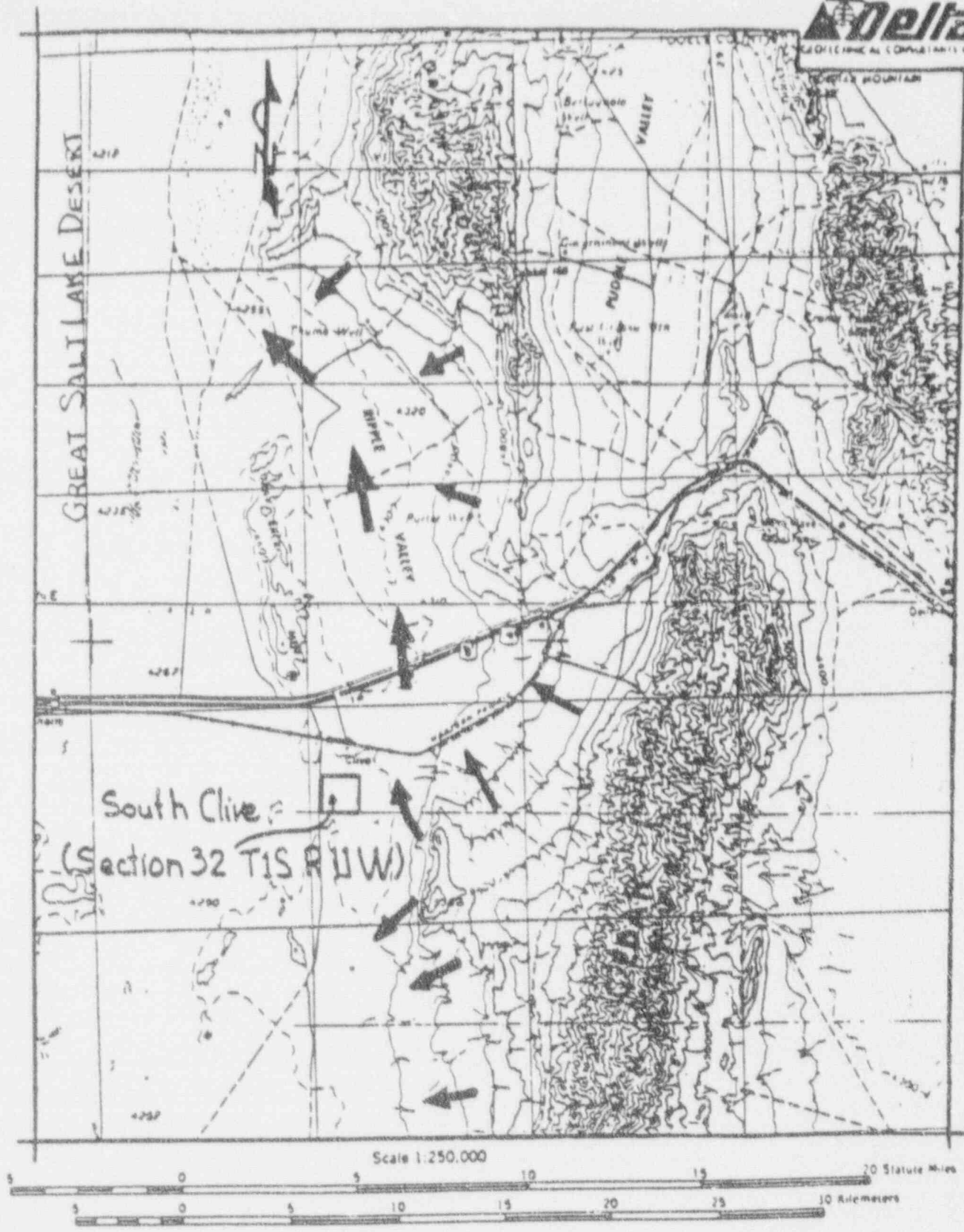
In summary, our review of Delta's report suggests the following:

- Hydrogeologic conditions of the Envirocare facility are not well characterized.
- Delta's portrayal of groundwater flow in a northern direction cannot be confirmed by existing information.
- Other possible directions of groundwater flow (to the west and southwest) are not adequately assessed by the existing or proposed monitoring well network.

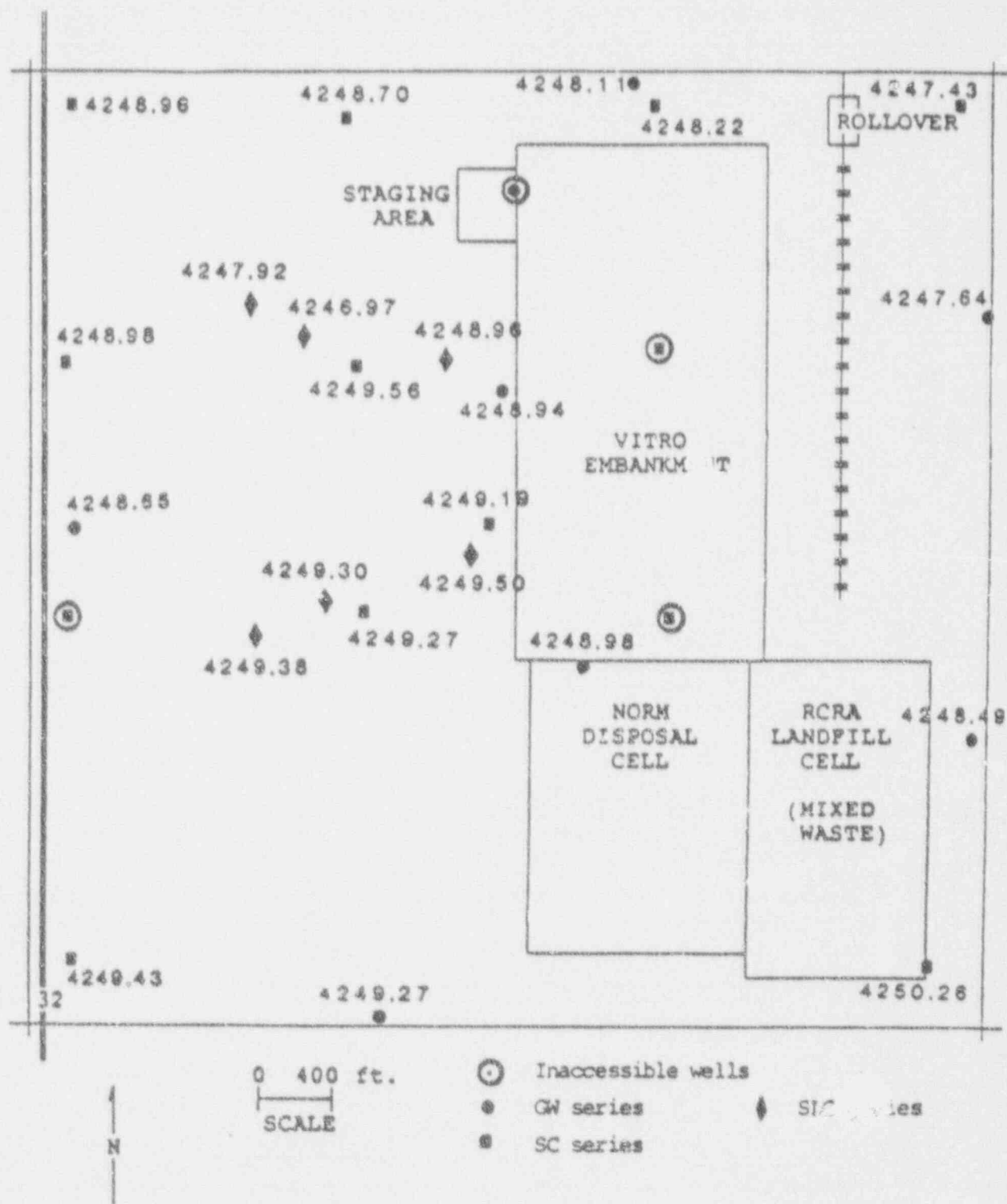
Based on our review, we cannot recommend that waste from Operable Unit VIII of the Denver Radium Site be disposed at the Envirocare facility. We believe that more detailed evaluation of the hydrogeologic information is necessary.



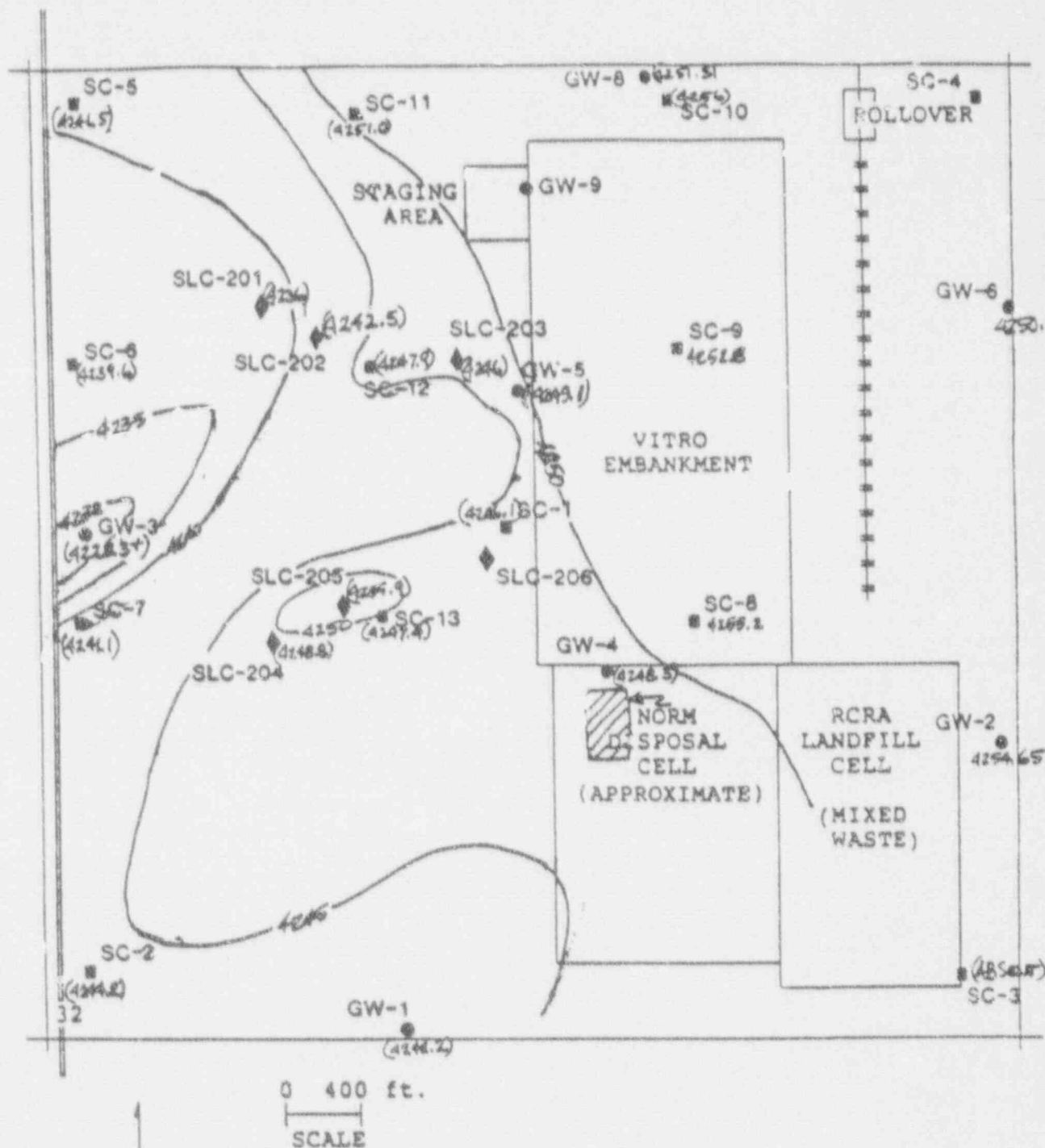
MONITORING WELL LOCATIONS



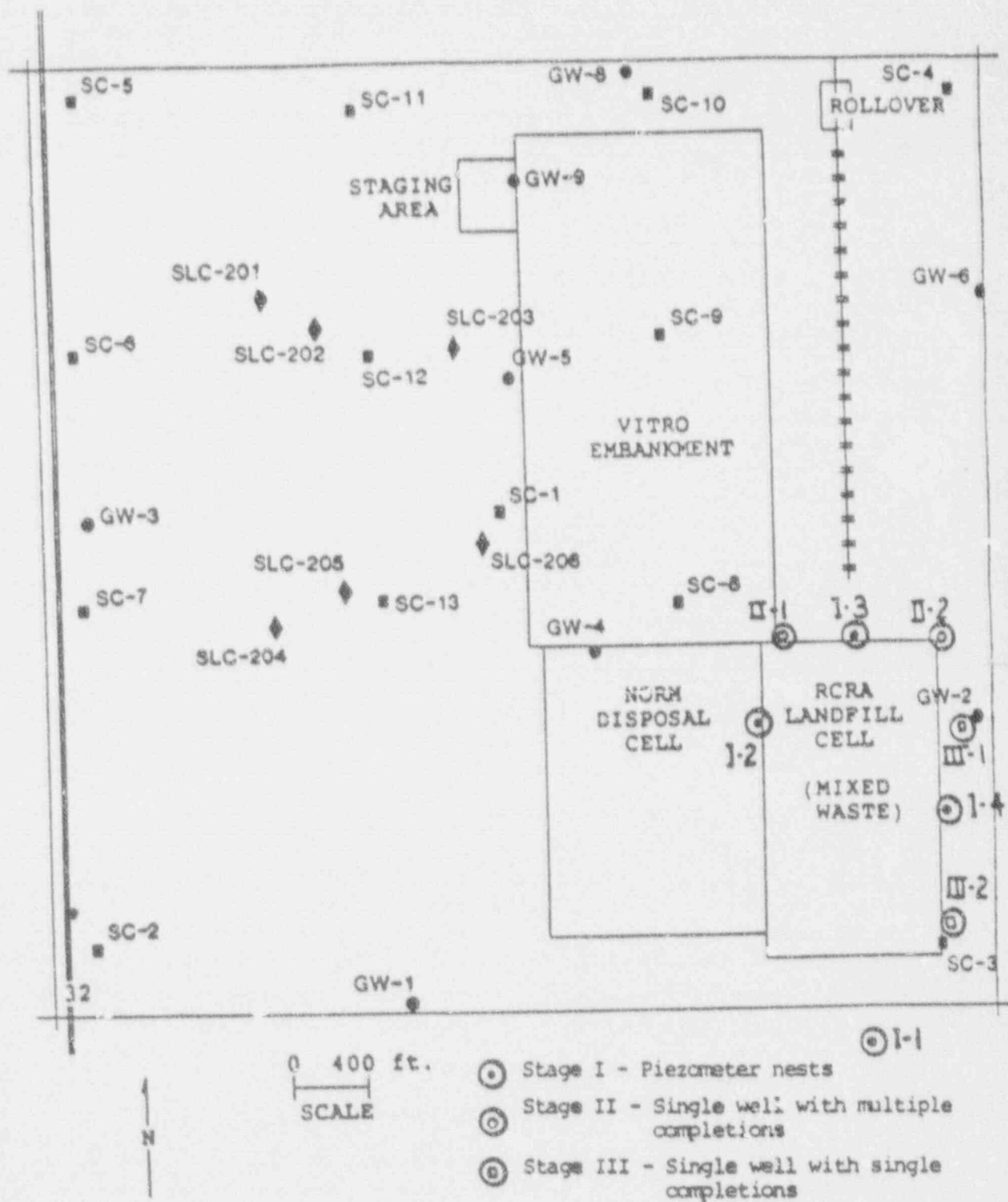
GENERALIZED DIRECTIONS OF GROUNDWATER FLOW



COMPOSITE MAP OF WATER LEVEL ELEVATIONS



CONTOUR MAP ON TOP OF LOWER
SILTY CLAY UNIT



PERKINS COIE

July 15, 1991

COMMENTS OF U.S. ECOLOGY
RE: DOCKET NO. 04008989 -- ENVIROCARE OF UTAH, INC.;
INTENT TO PREPARE A DRAFT ENVIRONMENTAL IMPACT
STATEMENT (DEIS) -- SCOPING PROCESS

I. INTRODUCTION

1. The Nuclear Regulatory Commission (NRC) reported in the Federal Register that Envirocare of Utah, Inc., has filed a revised license application, environmental report and safety analysis report for authorization to receive, store, and dispose of uranium and thorium byproduct material (as defined in section 11e.(2) of the Atomic Energy Act (AEA), as amended) at its site near Clive, Utah. The applicant proposes to dispose of "high-volume, low-activity section 11e.(2) byproduct material" on a site where the applicant currently disposes of naturally occurring radioactive material (NORM) and which has also recently been licensed to dispose of low-level radioactive waste (LLRW) by the Utah Bureau of Radiation Control (UBRC).

2. The UBRC, exercising Utah's Agreement State authority pursuant to section 274(b) of the AEA, 42 U.S.C. § 2021(b), does not possess the regulatory authority to grant

a license for disposal of 11e.(2) byproduct material. The authority to license the disposal of such material at sites in Utah remains with NRC.

3. In its Federal Register notice (56 Fed. Reg. 25,142 (June 3, 1991)), NRC announced a "scoping process" to solicit comments by any interested parties on the scope of the proposed environmental impact statement (EIS) associated with Envirocare's application.

4. U.S. Ecology, Inc., a California corporation headquartered in Louisville, Kentucky, is in the business of managing and disposing of LLRW at two sites in the United States -- the Beatty, Nevada site and the Richland, Washington site. U.S. Ecology believes that the Envirocare application raises numerous important issues as a result of the differences between existing regulatory requirements for disposal of section 11e.(2) byproduct material contained in 40 C.F.R. Part 192 and 10 C.F.R. Part 40, Appendix A and those for disposal of LLRW contained in 10 C.F.R. Part 61 and Utah's conforming regulations. Because both types of wastes are to be disposed of at the same site, these issues must be resolved.

Issues of even broader dimension also are raised. These issues arise in connection with other potentially conflicting

regulatory requirements -- i.e., those applicable to the disposal of "mixed" hazardous and radioactive wastes.

All of these issues must be considered in the context of the scope of Utah's Agreement State status. In particular, Utah licensing decisions that may not square with NRC requirements must be considered. Similarly, these issues and related economic concerns should be addressed as they pertain to LLRW disposal within the Northwest Compact.

This EIS and the scoping process associated therewith provides NRC with an excellent opportunity to address some of these significant issues. Resolution of these issues is important both to Envirocare, as it seeks to expand its disposal capability, and to others involved in the radioactive waste disposal business. Through the EIS, NRC will be able to speak out on the public record to sister agencies (EPA and DOE), Congress, and current and potential licensees about a number of important radioactive waste disposal issues.

U.S. Ecology's comments on the scope of the proposed environmental impact statement associated with Envirocare of Utah's application for a license to dispose of 11e.(2) byproduct material are set forth below.

II. SPECIFIC ISSUES

1. Conflict Among Regulatory Programs. One issue raised by the Envirocare application is the basic incompatibility of NRC's AEA/radioactive waste disposal methodology and philosophy with that used for the disposal of hazardous waste under the Resource Recovery and Conservation Act, 42 U.S.C. § 6901 et seq. (RCRA). The problems that result from this incompatibility are well illustrated at the Envirocare site where there will be LLRW, NORM waste, 11e.(2) byproduct material, and "mixed" hazardous and low-level radioactive waste all in extremely close proximity. These important questions must be addressed with care and thoroughness in the EIS for the site.

NRC's letter (with attachment) to Don J. Wolmendorf, Chief - Low-Level Radioactive Waste, State of California Department of Health Services, from Carlton Kammerer, Director, State Programs, dated November 27, 1990 clearly demonstrates this basic incompatibility, notwithstanding the obligatory textual reference to the NRC/EPA joint regulatory guidance for disposal of "mixed" waste. NRC's concluding sentence in the package to Mr. Wolmendorf is a prime example of the problems with the so-called joint guidance:

For reasons cited above, it is desirable to avoid the potential complications associated with liners and leachate collection systems by avoiding their use altogether, except as

required by EPA for hazardous waste disposal in accordance with the Resource Conservation and Recovery Act.

Id. (emphasis added) (see Attachment 1).

2. Government Ownership. Another issue arises in association with the management philosophy of private versus government ownership of the waste disposal facilities at the Envirocare site. Utah has waived its government ownership requirement (R447-15-302) for Envirocare's NORM/LLRW disposal cell. It has done so on the basis that Utah law requires private ownership of hazardous waste disposal units and makes no provision for State ownership of radioactive waste disposal units. This issue becomes vastly more complicated where there are a variety of different types of waste disposal cells in close proximity to each other.

NRC's LLRW regulations require that a applicant submit evidence that arrangements have been made for assumption of ownership in fee by the Federal or a State government before a license can be issued. 10 C.F.R. Part 61.14(a) & (b). See also, NUREG 1199 at 1-4. The Nuclear Waste Policy Act provides the Secretary of Energy with "authority to assume title and custody of low-level radioactive waste and the land on which such waste is disposed of" (42 U.S.C. § 10171(b)(1)) but does not require the Secretary to accept such title and custody. The Uranium Mill Tailings Radiation Control Act (UMTRCA) requires state or federal ownership of 11e.(2)

byproduct material disposal sites. (42 U.S.C. § 2014). Thus, it appears that Utah's decision not to require state or federal ownership for Envirocare's NORM/LLRW disposal cell (a determination that is also presumably applicable to its "mixed waste" disposal cell) is inconsistent with the statutory requirement applicable to any 11e.(2) cell at the Clive site. Questions that must therefore be answered include: Can Utah follow such an approach in waiving the requirement for government ownership? Would NRC consider a waiver of the ownership requirement for the 11e.(2) cell since Utah has waived it for the NORM/LLRW cell? If not, how would the fact that federal or state ownership will be required for one cell but not the other(s) impact the final disposal picture at the site? How will this waiver impact DOE's willingness to accept clear title to an 11e.(2) cell at Envirocare's site when that license is terminated? All of these issues should be addressed in the EIS.

3. Inconsistencies Among Waste Control Horizons.

Another example of differences that need to be addressed are the long-term control horizons associated with the radioactive waste disposal (300-500 years for LLRW, 200-1000 years to the extent practicable for 11e.(2) byproduct material waste, and thousands of years for high-level radioactive waste). These must be compared to the short-term horizons associated with a RCRA hazardous waste disposal. The differences in specific

regulatory control requirements between NRC's LLRW and 11e.(2) regulatory programs on the one hand, and the differences between both of those programs and the RCRA hazardous waste regulations on the other, are too numerous to list in these scoping comments. NRC must address in the EIS the major complications that can result from the relationship of these various programs when cells for different wastes exist at the same site. These differences range from broad philosophical differences (i.e., passive controls/natural materials/long time frames versus active controls/synthetic materials/shorter time frames) to highly specific requirements for protection against groundwater contamination and limits on radionuclide emissions. Some of the differences are likely to be obvious, some subtle, and some will be very significant. In any event, they must all be addressed.

4. Relationship Between 10 C.F.R. Part 61 and Part 40.

There is some question about the authority for licensing Envirocare to dispose of 11e.(2) byproduct material because 10 C.F.R. Part 40 regulations basically deal with uranium production facilities that produce such tailings wastes. Since Envirocare is seeking to license only a disposal facility, NRC's 10 C.F.R. Part 61 regulations also come into play with 10 C.F.R. Part 40. The EIS must address whether and how the differing regulatory requirements interface.

5. Surety Requirements. Another issue with economic and regulatory implications that is raised by Envirocare's application and complicated by the multiple disposal unit nature of its site is the potentially conflicting surety requirements for AEA and RCRA wastes. Surety requirements for 11e.(2) byproduct material and LLRW are most certainly different than those for hazardous waste, particularly considering the long time frames involved with radioactive waste disposal. The problems caused by these differences become especially acute where "mixed waste" is involved. Furthermore, where there is to be private ownership of certain portions of the site (including, under the terms of Utah's waiver, the LLRW portion) rather than mandated government ownership for the 11e.(2) waste, the surety requirement becomes an even more important factor in evaluating a proposed license application. In such a case, the surety must provide financial resources beyond those necessary to simply entomb any waste present at the site awaiting final disposal.

Utah's Safety Evaluation Report (SER) (see Attachment 2) on Envirocare's application for authority to dispose of LLRW states that a waiver of governmental ownership is in part justified because any such requirement is not directly related to public health and safety. The SER also states that

"indisputable", "sound" surety arrangements do provide for protection of public health and safety. (SER at 1-2).¹

The internal logic of Utah's position is difficult to follow. Nonetheless, there can be no question that if the requirement for government ownership is to be waived, then surety arrangements become even more important. Thus, the EIS must address the following questions: What are the various surety arrangements and do they adequately protect the public interest? Do they conflict with one another? Does Utah's surety approval conform with applicable NRC standards?

5. Interstate Compacts. The various activities that have thus far been licensed at the site by the UBRC also raise a number of serious economic and public relations questions with respect to the functions of interstate compacts. For example, should Envirocare be required to make front-end capital investments which are commensurate with and comparable to those made and maintained by other disposers of LLRW for such things as surety and environmental assessment?

The UBRC's SER regarding Envirocare's application for LLRW disposal specifically recognized the incomplete

¹Interestingly Envirocare's request for an exemption from the land ownership requirement specifically states that the requirement "supports the protection of public health and safety or property". Letter to Larry F. Anderson from Khosrow B. Semnani dated October 9, 1987 (Attachment 3).

groundwater characterization at the site and allowed incorporation by reference of portions of DOE's EIS for the Vitro pile, even though there was no explanation of its relevance while still granting the license application. Questions to be addressed in the EIS are: Does the regulatory regime in Utah and its relaxed criteria for licensing Envirocare's various activities raise questions for the Northwest Compact, in particular, and the Compact program as a whole, given the problems with public confidence in the LLRW disposal process throughout the country? Should Envirocare be allowed to maintain confidentiality of the names, amounts and isotopic values of LLRW brought to the site for disposal if some of those wastes would normally go to a sited regional Compact disposal facility?

In its original NORM disposal application, Envirocare claimed it would only be taking low level waste that would not be suitable for disposal in existing sited Compact facilities. Apparently, the amendment to that license to allow disposal of LLRW has changed the nature of the waste that Envirocare may take to include some LLRW that would require DOT labelling and would go to a sited Compact facility. This arrangement must be fully explored in the EIS.

6. Need for Broad Scope to the EIS. Given the broad range of complex regulatory, political, legal and economic

issues associated with the multi-cell disposal facility operations being proposed by Envirocare, NRC should incorporate the broadest possible scope into the EIS. It is necessary to: identify issues of conflicting regulatory authority; identify their impacts on public health and safety; and identify policy judgments that may determine which components of varying regulatory programs are most important and which therefore must take precedence. For example, NRC must discuss how important it considers the governmental ownership requirement to be in the mix of requirement. If NRC views government ownership as significant, then any exemption would need to be considered in accordance with the Commission's 10 C.F.R. Part 51 EIS requirements to justify an exception to UMTRCA's statutory government ownership requirement.

These scoping comments merely scratch the surface of the questions, issues and potential problems that need to be addressed because of the multi-facility nature of the site. A complete and thorough airing of these issues is necessary to assure that the long-term future of the LLRW disposal business is not jeopardized by conflicting policies and requirements.

ENVIRONMENTAL

HEALTH

SK HART

ENGINEERING

October 8, 1987

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BUREAU OF RADIATION CONTROL

Larry F. Anderson, M.P.S.
Director
Bureau of Radiation Control
288 North 1460 West
P.O. Box 16700
Salt Lake City, Utah 84116-0690

Dear Mr. Anderson:

Th^{is} request for exemption or exception from the land ownership requirement of URC-24-135 is filed pursuant to URC-12-125 on behalf of S. K. Hart Engineering ("Hart").

Hart has obtained from the State of Utah, a parcel of land located at Clive, Tooele county, Utah, and more particularly described as follows: Section 32 of Township 1 South, Range 11 West, Salt Lake Base and Meridian containing 640 acres except for:

Beginning at a point located 1120.32 feet N89 59' West along the section line and 329.49 feet South from the Northeast corner of Section 32, Township 1 South, Range 11 West, SLB&M, and running thence N89 56'32" W 1503.72 feet; thence S0 03'28" W 2880.50 feet thence S89 56'32" E 1503.72 feet; thence N0 03'28" E 2880.50 feet to the point of beginning. Containing 99.437 acres, more or less.

Hart intends to use the said parcel for the commercial disposal of waste (e.g., contaminated soil and dry sludge) which contains very low levels of naturally occurring radioactive material that was present in raw ores and has passed through industrial processes. Hart is presently preparing, for submission to the Bureau, its application pursuant to URC-24-135

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for authorization to engage in the operations described above. That application will be filed on or about October 14, 1987.

URC-24-135 states, in part, that: "The Bureau will not approve any material from other persons for disposal on land not owned by a State or the Federal Government." The regulation does not distinguish between the very low level radioactive waste proposed to be handled by Hart and other types of waste which contain far greater concentrations of radioactivity in the material. However, URC-12-125 provides that the Bureau may grant "such exemptions or exceptions from the requirements of these regulations as it determines are authorized by law and will not result in undue hazard to public health and safety or property."

The land ownership requirement of URC-24-135 supports the protection of public health and safety or property. The requirement provides for monitoring, control, and any necessary clean up of radioactive waste sites through government ownership of the land. In the alternative, however, reasonably comparable protection could be provided through surety and/or escrow arrangements which could be required by and incorporated into site licenses. This alternative could provide for the funding and infrastructure necessary to protect public health and safety or property both during active operation of the sites and after they are closed.

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The Colorado Radiation Control Regulations offer another alternative. Those regulations contain specific provision for a "uranium or thorium milling license or tailings license" which call for the ownership by the State or Federal Government of land on which such waste will be placed "prior to termination of the license" (Colorado Department of Health, Rules and REgulations PERTaining to Radiation Control, Part III, Schedule E, Criterion 8).

The waste material described in Criterion 8 of the Colorado Regulations is comparable to the material proposed to be handled by Hart. The Colorado approach provides protection through the licensing process during the operation of disposal sites. It goes on to provide additional protection through government ownership of the land after the sites are closed.

However, neither the State of Utah nor the Federal Government have indicated that they would be interested in and/or willing to own the land described above. In this regard, it is important to recognize that the owner of land is absolutely liable for damage to others or their property caused by the storage of hazardous materials on his premises, and that the land owner's liability extends to punitive damages and damages for mental suffering (see Branch v. Western Petroleum, 657 P.2d, 267

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(Utah 1982). The Colorado approach clearly would subject the State or Federal Government to greater risk than would a simple exemption or exception from the land ownership requirement of URC-24-135.

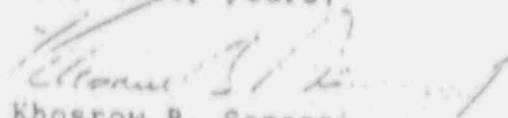
Furthermore, current thinking with regard to hazardous wastes require siting on privately owned land. Regulating concerns are directed towards proper site operation, closure and long term (30 years) monitoring. Recently released Joint NRC/EPA guidelines for mixed waste also require use of the foregoing rationale.

The application of Hart will provide for the surety and/or escrow arrangements necessary to protect against undue hazard to public health and safety or property and to support abatement of future problems, if any. We submit that an exemption or exception from the land ownership requirement of URC-24-135 based on such surety and/or escrow arrangements is wholly consistent with the public health and safety and current thinking in the field of hazardous waste siting and should be granted. The public would be protected by regulation under the licensing process during the period of active waste storage operations, and by the surety and/or escrow arrangements during such operations and thereafter. Accordingly, we hereby request

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that Hart be granted an exemption or exception from the land ownership requirement of URC-24-135.

Very truly yours,


Khosrow B. Semnani

GOVERNOR BRIEFING PAPER
LOW LEVEL RADIOACTIVE WASTE REPOSITORY

Over the past six months the Division of Environmental Health has become aware of and conducted initial discussions with proponents of a low level radioactive waste repository to be co-located with the Vitro tailings repository in western Tooele County. The proposal is unique in that it anticipates taking only waste containing less than 2000 pCi/gram of activity and only naturally occurring radioactive materials (NORM). Materials in this activity range are considered non-radioactive by the U.S. Department of Transportation and require no special treatment or placarding when transported. They are also not accepted at currently operating low level radioactive waste sites due to their low radioactivity.

The developer, S.K. Hart Engineering, has taken several significant steps preparatory to filing a license application. It have purchased equipment necessary to operate the site, arranged to purchase the remaining acreage at the Clive site from Tooele County, developed agreements with Tooele County resulting in support of the project by Tooele County Commission. It has also commissioned consultants to develop necessary environmental and licensing documents. It is anticipated that the license application will be submitted on about October 1, 1987.

One major policy issue remains to be resolved prior to licensing. Our Bureau of Radiation Control Regulations provide that lands used for disposal of radioactive waste must be owned by State or Federal government (Section R447-24-135, Utah Administrative Code, copy attached). The land upon which S.K. Hart Engineering proposes to develop a facility will be privately owned. There is a ~~variance~~^{waiver} mechanism in our rules which would allow us to waive the land ownership requirement (Section R447-12-125, Utah Administrative Code; copy attached), and we are writing to seek your guidance about whether we should propose to waive that requirement. If a waiver is proposed, a final decision about whether to grant the waiver will be made after review by the Radiation Advisory Committee.

The public land ownership rule in our Bureau of Radiation Control Regulations was derived from model rules developed by the U.S. Nuclear Regulatory Commission. The assumption behind the provision was that governmental entities would outlast private ones and that it was necessary to assure that there would always be a responsible entity should a problem develop at the site.

Our attorneys, however, have informed us that state ownership of the property upon which a repository was located would unnecessarily complicate any enforcement action taken in the event that there was a problem at the site because it is likely that any party operating a state-owned facility would file counterclaims against the State alleging liability based on ownership. Moreover, given the current trend towards strict liability of landowners regardless of whether their actions caused hazardous substance problems, it is entirely possible that the counterclaims would be successful and that the State would be held partially liable for clean-up costs. Though it is

undoubtedly true that the State or Federal government would end up paying to clean up the site should the operator go bankrupt, our attorneys do not see any need to expose the State to liability if a solvent responsible party is available.

There are presently no licensed low level radioactive sites in Utah. Other states have sited as follows:

1. Washington has a low level site at Hanford. The site is on land leased to the State by the U.S. Department of Energy and in turn leased by the State to the site operator;
2. South Carolina also allows operation of a site at Barnwell. This site is on State property leased to the operator;
3. Texas provides ~~for~~ operation of low level waste sites ~~to be~~ owned by the operator and deeded to the State at closure;
4. Colorado also requires transfer of land used for disposal of low level radioactive waste to the State or Federal government before licenses termination.

All states have imposed fees on site operators which bring substantial revenues to the State.

Currently it appears Utah has two viable alternatives; The first is to grant a variance to the regulations and allow development on private property. This option would eliminate potential future liability should there be a problem with the site. It would allow the liability to remain with the private sector, where the benefits will also have accrued. The second option is to allow development of a repository only on property owned by the State or Federal government. This would place additional institutional control of the site in the hands of that government, along with some risk.

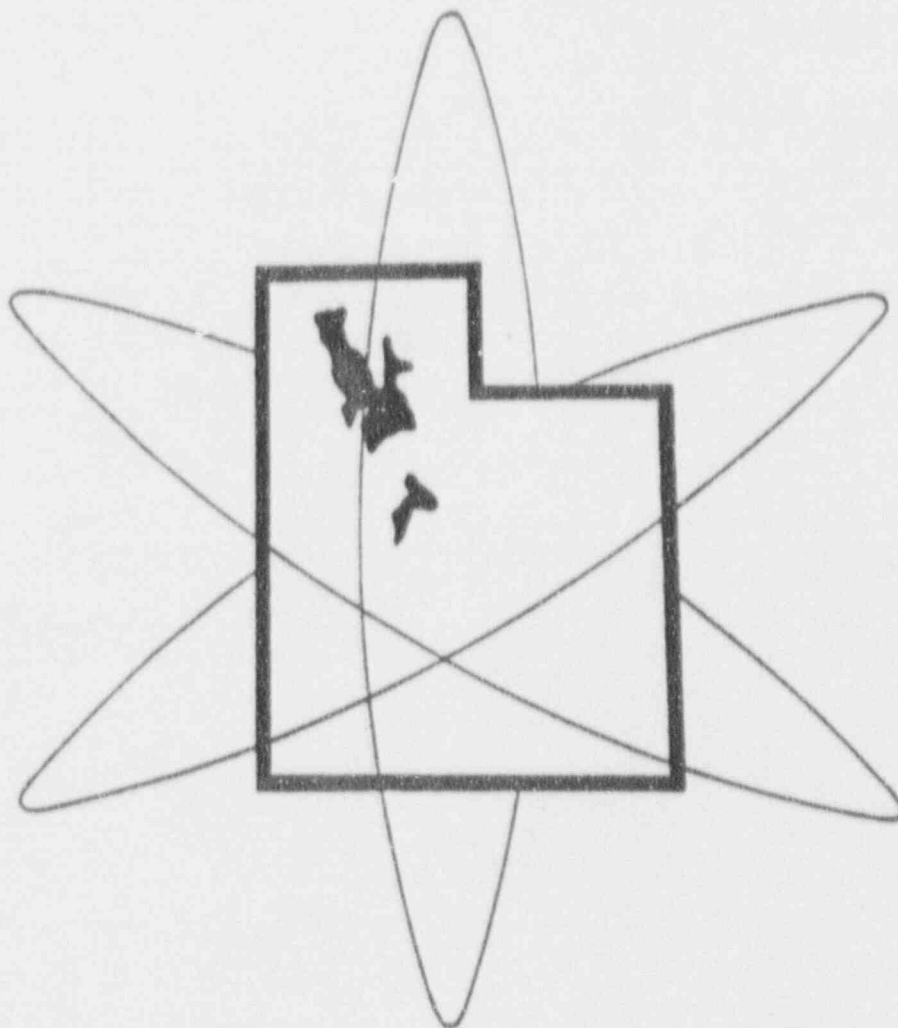
Storage and disposal of hazardous waste is presently allowed on private land.

Surety bonds are required to protect people and environment in the years following closure of the facility.

The Division supports the first option which would allow development of private property and grant a variance from current regulations.

UTAH RADIATION CONTROL

Regulations



PREPARED BY:

UTAH DEPT. OF HEALTH
DIV. OF ENVIRONMENTAL HEALTH
BUREAU OF RADIATION CONTROL

TABLE OF EXEMPT AND TYPE A QUANTITIES

Transport Group*	Exempt Quantity Limit (in millicuries)	Type A Quantity Limit (in curies)
I	0.01	0.001
II	0.1	0.050
III	1	3
IV	1	20
V	1	20
VI	1	1,000
VII	25,000	1,000
Special form*	1	20

NOTE: *The definitions of "transport group" and "special form" are specified in R447-12-210 and R447-12-200(2) respectively.

(3)(a) Each licensee or registrant, upon receipt of a package containing quantities of radioactive material in excess of the Type A quantities specified in R447-24-125(2), other than those transported by exclusive use vehicle, shall monitor the radiation levels external to the package. The package shall be monitored as soon as practicable after receipt, but no later than three hours after the package is received at the licensee's facility if received during the licensee's normal working hours, or 18 hours if received after normal working hours.

(b) If radiation levels are found on the external surface of the package in excess of 200 millirem per hour, or at three feet from the external surface of the package in excess of 10 millirem per hour, the licensee or registrant shall immediately notify, by telephone, telegraph, mailgram or facsimile, the shipper, the final delivering carrier and the Bureau.

(4) Each licensee or registrant shall establish and maintain procedures for safely opening packages in which radioactive material is received, and shall assure that such procedures are followed and that due consideration is given to special instructions for the type of package being opened.

R447-24-130 Waste Disposal, General Requirement.

No licensee shall dispose of any radioactive material except:

- (1) By transfer to an authorized recipient as provided in R447-19-400, or
- (2) As authorized pursuant to R447-24-050, R447-24-135, R447-24-140, or R447-24-150.

R447-24-135 Method of Obtaining Approval of Proposed Disposal Procedures.

Any person may apply to the Bureau for approval of proposed procedures to dispose of radioactive material in a manner not otherwise authorized in this chapter. Each application shall contain a description of the radioactive material, including the quantities and kinds of radioactive material and levels of radioactivity involved, and the proposed manner and conditions of disposal. The application, where appropriate, should also include an analysis and evaluation of pertinent information as to the nature of the environment, including topographical, geological, meteorological, and hydrological characteristics; usage of ground and surface waters in the

general area; the nature and location of other potentially affected facilities; and procedures to be observed to minimize the risk of unexpected or hazardous exposures.

The Bureau will not approve any application for a license to receive radioactive material from other persons for disposal on land not owned by a State or the Federal Government.

R447-24-140 Disposal by Release Into Sanitary Sewerage Systems.

No licensee shall discharge radioactive material into a sanitary sewerage system unless:

- (1) It is readily soluble or dispersible in water;
- (2) The quantity of any radioactive material released into the system by the licensee in any one day does not exceed the larger of:
 - (a) The quantity which, if diluted by the average daily quantity of sewage released into the sewer by the licensee, will result in an average concentration not greater than the limits specified in R447-24-220, Table I, Column 1 or
 - (b) ten times the quantity of such material specified in R447-24-230, of this part;
- (3) The quantity of any radioactive material released in any one month, if diluted by the average monthly quantity of water released by the licensee, will not result in an average concentration exceeding the limits specified in R447-24-220, Table I, Column 2; and
- (4) The gross quantity of radioactive material released into the sewerage system by the licensee does not exceed one curie (1 Ci) per year excluding H-3 and C-14.

Excreta from individuals undergoing medical diagnosis or therapy with radioactive material shall be exempt from any limitations contained in this section: PROVIDED, that the licensee provides for appropriate radiological monitoring whenever any waste line in the licensee's installation which may carry such excreta is opened.

R447-24-145 New Limits for "Disposal of Specific Waste".

Any licensee may dispose of the following licensed material without regard to its radioactivity.

- (1) 0.05 microcuries or less of hydrogen-3 or carbon-14 per gram of medium used for liquid scintillation counting; and
- (2) 0.05 microcuries or less of hydrogen-3 or carbon-14, per gram of animal tissue averaged over the weight of the entire animal; provided however, tissue may not be disposed of under R447-24-145 in a manner that would permit its use either as food for humans or as animal feed.
- (3) Nothing in these regulations however, relieves the licensee of maintaining records showing the receipt, transfer and disposal of such by-product as specified in R447-12-080; and
- (4) Nothing in these regulations relieves the licensee from complying with other applicable federal, state and local regulations governing any other toxic or hazardous property of these materials.

R447-24-150 Disposal by Burial in Soil.

No licensee shall dispose of radioactive material by burial in soil except as specifically approved by the Bureau pursuant to R447-24-135.

R447-12-100 Tests and Surveys.

(1) Each licensee and registrant shall perform upon instructions from the Bureau or shall permit the Bureau to perform such reasonable tests and surveys as the Bureau deems appropriate or necessary including, but not limited to, tests and surveys of:

- (a) Sources of radiation;
- (b) Facilities wherein sources of radiation are used or stored;
- (c) Radiation detection and monitoring instruments; and
- (d) Other equipment and devices used in connection with utilization or storage of licensed or registered sources of radiation.

(2) Additional Requirements. The Bureau may, by rule, regulation, or order, impose upon any licensee or registrant such requirements in addition to those established in these regulations as it deems appropriate or necessary to minimize danger to public health and safety or property.

R447-12-125 Exemptions.

(1) The Bureau may, upon application therefore or upon its own initiative, grant such exemptions or exceptions from the requirements of these regulations as it determines are authorized by law and will not result in undue hazard to public health and safety or property.

(2) Any U.S. Department of Energy contractor or subcontractor and any U.S. Nuclear Regulatory Commission contractor or subcontractor of the following categories operating within this state is exempt from these regulations to the extent that such contractor or subcontractor under his contract receives, possesses, uses, transfers or acquires sources of radiation:

(a) Prime contractors performing work for the Department of Energy at U.S. Government-owned or controlled sites, including the transportation of sources of radiation to or from such sites and the performance of contract services during temporary interruptions of such transportation;

(b) Prime contractors of the Department of Energy performing research in, or development, manufacture, storage, testing or transportation of, atomic weapons or components thereof;

(c) Prime contractors of the Department of Energy using or operating nuclear reactors or other nuclear devices in a United States Government-owned vehicle or vessel; and

(d) Any other prime contractor or subcontractor of the Department of Energy or of the Nuclear Regulatory Commission when the state and the Nuclear Regulatory Commission jointly determine (i) that the exemption of the prime contractor or subcontractor is authorized by law, and (ii) that under the terms of the contract or subcontract, there is adequate assurance that the work thereunder can be accomplished without undue risk to the public health and safety.

R447-12-130 Violations.

UCA-26-23-3

R447-12-140 Elimination of Immediate Hazards.

Where conditions exist that create a clear presence of hazard to the public health that requires immediate action to protect human health and safety in accordance with UCA-26-1-12, an order shall be issued to reduce, discontinue or eliminate such conditions.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

November 27, 1990

Mr. Don J. Womeldorf, Chief
Low-Level Radioactive Waste
State of California
Department of Health Services
714/744 P Street
Sacramento, CA 94234-7320

Dear Mr. Womeldorf:

This is in response to your letter to me, dated November 8, 1990, about comments from the Environmental Protection Agency (EPA) and the need for liners at a low-level radioactive waste disposal facility (LLWDF). Your interpretation of the Nuclear Regulatory Commission (NRC) regulatory requirements in 10 CFR Part 61 is correct regarding the use of liners at a disposal site for LLW. Liners are not required by Part 61 either for mitigation of radionuclide migration or for environmental monitoring, nor are liners considered necessary to meet the performance objectives of Part 61. In fact, in the specific instance of the proposed California LLWDF, a liner may be counterproductive in that it would introduce the potential for accumulation of water within the disposal unit, which would otherwise not likely occur at an arid site and could increase long-term risk to human health and the environment. The basis for our position is described in the enclosure.

In this context it is important to consider several key principles upon which Part 61 is based. The first is to ensure long-term stability of the disposal facility through an appropriate combination of facility design, site characteristics, and waste form. This stability provides for long-term isolation of the LLW in a manner that minimizes contact of emplaced wastes with water. Further, Part 61 is based on minimizing the presence of liquids in waste, the contact of water with waste during receipt and emplacement, and the contact of water with waste after the site is closed. Finally, the Part 61 requirements are directed at selection of a site with suitable and predictable characteristics that promote stability and containment of the waste. Thus, the basic principles embodied in Part 61 are directed at achievement of a stable, passive disposal system that avoids the need for active care and maintenance after site closure. For any given site, the combination of natural site features coupled with disposal facility design, operations, waste classification and waste form requirements will collectively provide for compliance with the performance objectives in

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FOIA - 91-394 . S P Release w/ attachments

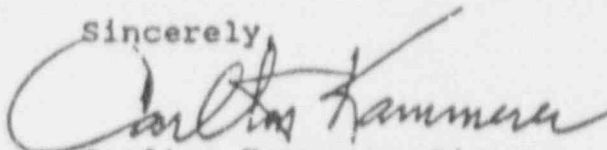
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Part 61. Following closure, only passive surveillance and confirmatory monitoring should be necessary to continue to confirm site performance. NRC has confidence that the California low-level waste regulatory program will ensure that the California LLWDF will provide for the passive stability and performance envisioned in Part 61.

In addition, in your October 25, 1990 letter to Jacqueline Wyland at EPA Region IX, we understand you provided EPA with pertinent information that they may not have had when developing their comments dealing with protection of groundwater and surface water resources. Also, it is our understanding that you have requested additional information on environmental monitoring from US Ecology, the license applicant for the California LLWDF. This additional information could help to mitigate EPA's concerns and will support preparation of the final environmental impact statement.

I trust that this reply responds to your request.

Sincerely,



Carlton Kammerer, Director
State Programs
Office of Governmental and
Public Affairs

Enclosure:

NRC Response to Liner Issue

cc: Daniel McGovern
Regional Administrator, Region IX
U.S. Environmental Protection Agency

Sylvia K. Lowrance, Director
Office of Solid Waste
U.S. Environmental Protection Agency

Richard J. Guimond, Director
Office of Radiation Programs
U.S. Environmental Protection Agency

Stuart Gummer, Chairman
Colorado River Basin Regional Water
Quality Control Board

Douglas Romoli, Project Manager
California Desert District
Bureau of Land Management

NRC Response to California Department of Health Services
Request for Technical and Regulatory Assistance
on the Liner Issue

1. NRC Response

The NRC concurs with the California Department of Health Services' (DHS's) position that flexible membrane liners are not required to comply with NRC's requirements for low-level radioactive waste (LLW) disposal in 10 CFR Part 61. In addition, NRC concurs that liners are not necessary to monitor radionuclide releases or contain the waste for a properly designed disposal facility located in an arid environment as proposed by California. Further, NRC stresses that liners may not even be desirable for California's proposed LLW disposal facility because they could unnecessarily result in violations of NRC's requirements or increase the long-term risk to human health and the environment from the disposal facility. A decision to include liners in the design would significantly increase the engineering effort required to demonstrate that the design, operation, and closure of the facility complies with the performance objectives and technical requirements of 10 CFR Part 61.

2. Discussion

As described in Don J. Womeldorf's November 8, 1990 letter to the NRC, the Environmental Protection Agency (EPA) Region IX has recommended consideration and analysis of a liner and leachate collection system as part of the Southwestern Compact's proposed LLW disposal facility. EPA's rationale for recommending the liner and leachate collection system is that such a system would provide for rapid detection of any radionuclide releases to the vadose zone beneath the facility. Based on an analysis of the EPA recommendation, DHS concluded that liner and leachate collection systems are neither prescriptively required by NRC requirements in 10 CFR Part 61 nor necessary to comply with the performance objectives and technical requirements of Part 61.

NRC's requirements in Part 61 emphasize a systems approach to LLW disposal, including consideration of site characteristics, facility design and operation, waste form and classification, and facility closure. These requirements were developed in the early 1980's based on the lessons learned at the first generation of LLW disposal facilities in this country and on the new technologies emerging for the disposal of hazardous chemical and other wastes. The Commission selected the requirements after extensive analysis of alternative site, design, and waste characteristics.

At the time the Commission promulgated the requirements, the NRC was well aware of the potential adverse consequences of accumulation of water within disposal units as a result of low-permeability foundation materials or other barriers to flow such as flexible membrane liners. This accumulation of water led to releases of radionuclides from disposal units at the commercial LLW disposal facilities at West Valley, New York, and Maxey Flats, Kentucky. Similar

problems had also occurred at the LLW disposal facility operated by the Department of Energy at Oak Ridge, Tennessee. Extensive corrective actions, including pumping and treatment of leachate from the disposal units, continue to be necessary at these sites to prevent unacceptable discharge of contaminated water to the land surface.

Although these problems were caused in part by the low permeability of the natural foundation materials beneath the disposal units and high infiltration rates through unit covers, installation of flexible membrane liners or other engineered barriers to flow could have the same practical effect on accumulation of water within the disposal units. In the supplementary information that accompanied the Part 61 requirements, the Commission stated that:

"... reliance should be placed on siting requirements which will keep water away from wastes, result in low volumes of contaminated water being released, and provide a long travel time for decay. The Commission takes exception to any design which relies on a leachate collection and treatment system to reduce migration. Such a design is expected to result in a requirement for continued active site maintenance, therefore violating the performance objective in 61.44." [47 FR 57446; December 27, 1982]

Based on NRC's continuing oversight of California's LLW regulatory program, it appears that California DHS has adopted an approach that is consistent with the Commission's position and the requirements in Part 61.

The regulatory approach adopted by the Commission in Part 61 allows a license applicant and disposal site operator optimal flexibility in selecting technologies and procedures to ensure protection of the public health and safety and the environment. This approach is reflected in the structure of the requirements, which consist of overarching performance objectives in Subpart C and specific technical requirements on site suitability, design, operations, closure, waste characteristics, environmental monitoring, and other aspects in Subpart D of Part 61.

NRC believes that the regulatory framework embodied in Part 61 provides a more effective approach to minimizing the formation and migration of leachate from LLW disposal facilities than a policy that relies heavily on the use of liners and leachate collection systems. For LLW disposal, NRC does not believe that liners and leachate collection systems will totally eliminate the potential for groundwater contamination. If an applicant proposed a liner and leachate collection system as part of a disposal facility for LLW, the NRC would be concerned that the system could contribute to the accumulation of leachate within the disposal unit, which would require active long term maintenance to remove and treat and, if not removed, could result in unacceptable releases of contaminants to the environment.

Whether for the purpose of monitoring or containing potential radionuclide releases from the disposal facility, liners and leachate collection systems can only be used for LLW disposal facilities if they will not result in

accumulation of water within the disposal unit that would violate the performance objectives and the technical requirements in Part 61. For example, incorporating a liner and leachate collection system in the design for the Southwestern Compact's proposed disposal facility would require the applicant to demonstrate that the performance objectives would not be violated over the long term (e.g., 500 years or more depending on waste characteristics) as a result of water accumulation within the disposal trenches. Such a demonstration would be difficult since water accumulation could theoretically result in a continuing need to pump and treat the leachate, in direct discharge of contaminated leachate to the land surface, or in a concentrated discharge of contaminated leachate to the vadose zone when the liner failed.

Further, an applicant would have to demonstrate that use of a liner and leachate collection system would not violate the specific technical requirements of Subpart D of Part 61. Specifically, the applicant would have to describe how the proposed disposal system complies with the following technical requirements, among others, despite the potential for water accumulation within the disposal unit as a result of the liner:

61.51(a)(1) - "Site design features must be directed toward long-term isolation and avoidance of the need for continuing active maintenance after site closure."

61.51(a)(2) - "The disposal site design and operation must be compatible with the disposal site closure and stabilization plan and lead to disposal site closure that provides reasonable assurance that the performance objectives of Subpart C of this part will be met."

61.51(a)(3) - "The disposal site must be designed to complement and improve, where appropriate, the ability of the disposal site's natural characteristics to assure that the performance objectives of Subpart C of this part will be met."

61.51(a)(4) - "Covers must be designed to minimize to the extent practicable water infiltration, to direct percolating or surface water away from the disposed waste, and to resist degradation by surface geologic processes and biotic activity."

61.51(a)(6) - "The disposal site must be designed to minimize to the extent practicable the contact of water with the waste during storage, the contact of standing water with waste during disposal, and the contact of percolating or standing water with wastes after disposal."

The applicant would need to demonstrate that the facility has been designed, constructed, operated, and closed in a manner that ensures infiltration through the unit cover will be less than the flux rate through the liner over the lifetime of the unit. Such a demonstration would be difficult given the limited operational experience with the long-term performance of flexible membrane liners. The demonstration would also have to include, among other things, a description of how the liner complements and improves the ability of the site's natural characteristics to assure compliance with the performance

objectives and how the design minimizes to the extent practicable contact of percolating or standing water with wastes after disposal despite the potential for accumulation of water within the unit. This could be especially difficult for a disposal facility located in an arid environment, such as proposed by California, where the performance of the disposal system without a liner and leachate collection system may already comply with Part 61 and the inclusion of the liner only increases the potential for accumulation of water within the disposal unit.

The potentially adverse impacts of the liner on performance of the disposal facility and its compliance with Part 61 exist regardless of whether its intended purpose is to contain the waste or facilitate monitoring of radionuclide releases. Alternative monitoring technologies that provide for timely detection of contaminant releases are readily available and yet would not appear to pose the problems caused by liners and leachate collection systems. For example, the NRC is aware of monitoring systems proposed by the Department of Energy for the LLW disposal facility at the Nevada Test Site. DOE's proposed system provides for neutron moisture content logging, gamma spectroscopy, and soil gas sampling within and beneath the disposal unit. For a commercial LLW disposal facility, such monitoring systems could be used to provide "...early warning of releases of radionuclides from the disposal site before they leave the site boundary," in accordance with NRC requirements in 10 CFR 61.53(c), without unnecessarily promoting accumulation of water within the disposal unit. NRC has provided regulatory guidance on acceptable environmental monitoring programs in the Staff Technical Position on Environmental Monitoring.

One final comment is appropriate with respect to the "Joint NRC-EPA Guidance on a Conceptual Design Approach for Commercial Mixed Low-Level Radioactive and Hazardous Waste Disposal Facilities" and its relation to the proposed California LLW disposal facility. The NRC and EPA developed this joint guidance to provide one acceptable conceptual design for disposal of mixed waste in accordance with the requirements of NRC in 10 CFR Part 61 and of EPA in 40 CFR Part 264. It is important to emphasize that the guidance presents a "conceptual" design only; any application adopting this design approach would have to demonstrate compliance with both agencies' requirements. With respect to NRC's requirements in Part 61, an applicant would have to demonstrate that the disposal system does not suffer from the same limitations and potential problems described above for disposal units that include liners and leachate collection systems. In addition, the joint guidance should not be construed as a generic endorsement by NRC or EPA for this type of disposal facility design for LLW other than mixed waste. For the reasons cited above, it is desirable to avoid the potential complications associated with liners and leachate collection systems by avoiding their use altogether, except as required by EPA for hazardous waste disposal in accordance with the Resource Conservation and Recovery Act.

JOHN FAUGHT & ASSOCIATES

PROFESSIONAL CORPORATION
ATTORNEYS AT LAW

Manville Plaza
Suite 1580
717 Seventeenth Street
Denver, Colorado 80202

John D. Faught
Randy L. Sego

Telephone (303) 292-1500
Telecopier (303) 292-4222

September 4, 1991

VIA CERTIFIED MAIL
RETURN RECEIPT REQUESTED

FREEDOM OF INFORMATION
ACT REQUEST

Donnie H. Grimsley, Director
Division of Freedom of Information
and Publication Services
Office of Administration
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

FOIA-91-394
Rec'd 9-18-91

Re: Freedom of Information Act Request

Dear Mr. Grimsley:

This is a formal request for information pursuant to the Freedom of Information Act Request, 5 U.S.C. § 552, and the Federal Regulations pertaining to the U.S. Nuclear Regulatory Commission ("NRC"), 10 C.F.R. Subpart A.

Pursuant to the above, our firm requests all agency records, documents and information within the NRC's possession or control regarding: (1) Envirocare of Utah, Inc., Salt Lake City, Utah ("Envirocare"); and (2) Envirocare's waste management facility located in Tooele County, Township 1 South, Range 11 West (the "Envirocare facility"). The request includes, but is not limited to, all records, documents and information which pertain or relate to the following:

1. Any correspondence between the NRC and other state or federal agencies regarding Envirocare or the Envirocare facility;
2. Permit applications submitted by Envirocare or the Envirocare facility and all documents related or pertaining to such applications;
3. Inspections or investigations conducted of permit applications submitted by or permits issued to Envirocare or the Envirocare facility by the NRC or any other state or federal agency;

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JOHN FAUGHT & ASSOCIATES

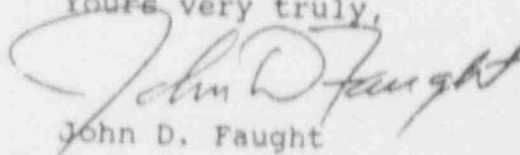
U.S. Nuclear Regulatory Commission
September 4, 1991
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4. Design, construction or operations of the Enviro-care facility, including, without limitation, any NRC documents responding to, analyzing or reviewing the same; and
6. Any determinations or evaluations by NRC or any other agency, or their respective representatives or contractors, regarding whether the Envirocare facility satisfies state and federal requirements for its disposal activities.

It is our desire that the existence and identity of any requested documentation be confirmed in writing and made available to our firm for copying as soon as possible. Further, if any documents are withheld, we request a list of documents withheld and a statement of the reasons for withholding each such document. Our firm will pay whatever reasonable fees may be assessed.

Thank you for your cooperation and attention to this matter.

Yours very truly,



John D. Faught

tlj