



Sandia National Laboratories

Corrective Measures Study

Appendix H: MWL Alternative V.b – Complete Excavation with Off-site Disposal

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Environmental Restoration Project



**United States Department of Energy
Albuquerque Operations Office**

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1.0 INTRODUCTION

Complete excavation of the Mixed Waste Landfill (MWL) was one of several corrective measures alternatives evaluated during the development of the Corrective Measures Study (CMS) report. This alternative was considered acceptable as a viable approach in initial screening, but dropped out during subsequent alternative screening in Chapter 3 of this report. However, due to community interest, a more-detailed evaluation has been conducted. This evaluation and associated cost estimate, presented herein, essentially follow the criteria established in Chapter 4 of the CMS report. HSWA and EPA guidance, consistent for evaluation of corrective measures alternatives, have been considered for this effort. For consistency with the overall evaluation and report structure, the approach, outlined in the draft SNL/NM Compliance Order has been followed.

As presented in Chapter 4, EPA and NMED have considered five evaluation criteria appropriate for evaluating corrective measures alternatives that address technical measures and management controls for environmental issues at the site. These criteria as follows are discussed in the remainder of this analysis.

1. Long-term reliability and effectiveness
2. Reduction of toxicity, mobility, or volume of wastes
3. Short-term effectiveness
4. Implementability; and
5. Cost.

Additional attention to worker safety, surrounding facilities and the public has also been considered due to the high-risk issues presented in Chapter 3. A second evaluation of costs with more-detailed assumptions including indirect costs has also been developed.

2.0 MWL ALTERNATIVE V.b – COMPLETE EXCAVATION WITH OFF-SITE DISPOSAL

Under this alternative, the landfill would be excavated, mixed waste (MW) and low level waste (LLW) debris separated from soil and packaged, as appropriate, and shipped to an off-site, licensed facility for disposal. Soil would be separated into replaceable¹, mixed waste, and low-level soil waste (LLW) streams. Replaceable soils would be returned to the excavation. Mixed and low-level soils would be

¹ Replaceable soil is defined as soil excavated from the MWL that can be returned to the excavation based on risk-based analysis of laboratory analytical data of soil samples.

disposed off-site. A lower capacity warehouse would be installed for permanent storage of waste streams that do not currently have approved disposal pathways. Excavation and waste management would take place under temporary structures to mitigate exposure risk to the public, surrounding facilities, and environment. Worker safety risk issues would be mitigated with use of robotics, shielding, maximizing distance and limiting time of exposure to radiation. A conceptual layout of on-site facilities is illustrated in Figure J.1. To develop this scenario, it is assumed that this alternative is responsive to corrective action objectives outlined in Chapter 3. Transfer of risk to another facility still remains a concern. Also, significant potential risk to the public with transportation to an off-site facility, along with high associated costs, remain important issues.

2.1 Long-term Reliability and Effectiveness

The excavation alternative to remove contaminated materials from the landfill ranks high for long-term reliability and effectiveness. The potential for contaminant migration from the disposal cells to the groundwater would be essentially eliminated. Biological intrusion and associated contaminant redistribution would also be eliminated. Human intrusion would be controlled with institutional controls. Because of continued on-site warehouse storage of mixed and low-level waste, these waste streams do not currently have an off-site disposal option, which would require long-term security. Classified and unclassified storage may be necessary. Long-term management would be necessary until disposal pathways are established either by technology development and/or reclassification of waste by natural decay and future demilitarization. An estimated 50 years of storage may be necessary before these issues are resolved.

It is assumed that constituent concentrations will be reduced to acceptable risk and/or background levels through excavation and off-site disposal. Therefore, the long-term risk associated with this alternative is anticipated to be below NMED guidelines. Exposure potential due to long-term storage of remaining materials can be managed by implementing adequate administrative and engineering controls.

2.2 Reduction of Toxicity, Mobility, or Volume

Excavation of the disposal trenches and pits would effectively reduce the toxicity, mobility and volume of waste from the MWL. Waste items would be segregated into manageable waste streams by varied degrees of toxicity. A waste inventory of the MWL has been developed. This inventory has been distributed into several waste streams to evaluate toxicity and disposal pathways. Appendix J.1 includes the waste inventory and distribution spreadsheet. Toxicity would be transferred from the MWL site to

other sites including off-site disposal facilities and the on-site, secured warehouse. Disposal pathways are limited by waste acceptance criteria developed by off-site facilities and; therefore, some waste items may not currently have a defined disposal option. A secure, high bay warehouse would be constructed and managed for these waste items.

Waste volume would be minimized by performing a risk-based approach to excavation. Over excavation would be avoided by focusing excavation on trench and pit areas. Areas not requiring excavation to total depth would be characterized to verify removal of all debris. Soils excavated to expose the waste and perform the operation safely would be stockpiled and considered replaceable. Debris and soils separation combined with on-site characterization would promote segregation of waste streams into manageable waste types and quantities. This should promote waste minimization and more cost-effective disposal options.

By removing the source term, potential mobility of contaminants from the disposal cells to the groundwater would be essentially eliminated if the waste were excavated. Previous characterization studies indicate that any minor contamination remaining below the excavation would likely decay long before reaching the groundwater table. Risk assessments should show that the limits of proposed excavation would be adequate to reduce mobility of remnant contamination.

2.3 Short Term Effectiveness

Worker risk associated with the implementation of excavation was assessed in the context of worker health and safety. This was based on the requirement that all workers would adhere to rigorous DOE, State, and Federal worker safety regulations and that PPE, use of remote excavation methods, and engineered barriers would be designed to protect workers. Of particular concern is inhalation of dust and volatile organic compounds (VOCs), incidental ingestion of soil/dust, and dermal contact with chemical and radiological contaminants. These methods are less effective for control of penetrating gamma radiation and tritium vapors. Other risks to be considered with excavation are risks due to construction (i.e., physical injury) and transportation hazards. Detailed assumptions and calculations for this evaluation are provided in Appendix J.2.

Specific assumptions for PPE include that all work be performed in Level B with supplied air/self-contained breathing apparatus. All vented air from the tents would be filtered through a combination of High Efficiency Particulate Air (HEPA) and Ultra Low Penetrating Air (ULPA) filters. This would be

effective for essentially complete removal of particulates and VOCs, but would not be effective for removal of tritium. Tritium flux is further evaluated below.

Following DOE As Low As Reasonably Achievable (ALARA) principles, adequate distance and shielding or remote handling and/or robotic equipment will be necessary to mitigate health and safety issues with radioactive materials exposure due to the high dose rates associated with debris buried in the classified portion of the landfill.

2.3.1 Radiological Excavation

The risks from the excavation and handling of the radiological material are largely associated with the highest Co-60 source buried in SP-5. Assuming excavation started in 5 years, the radioactivity for the Co-60 sources in SP-5 would be on the order of 1.7 Ci each after approximately 50 years of decay. That would result in unmitigated exposure rates of around 28,000 mrem/hr at 1 ft, for each source. However, these estimations do not account for the shielding provided by the lead burial casks and concrete, but do indicate the worst-case potential for exposure if all shielding/containerization were removed during excavation/remediation.

In order to safely transport these sources to the MWL approximately 50 years ago, when the source strength was more than 100 times greater, significant shielding was used. Four centimeters (cm) of lead represents the tenth-value layer or the thickness of lead required to reduce the exposure rate to one-tenth of the original strength. Eight cm of lead would reduce exposure rates to 1% of the original strength. Concrete has a one-tenth layer value of 20.6 cm. Assuming safe source management practices for sources of this magnitude, at least 3 tenth-value layers had to be used in the combination of lead and concrete as shielding materials. This would effectively reduce the exposure rate to below 0.1% of the original field strength. Based on these assumptions with source shielding intact, these sources are likely to present an exposure rates much less than the refined estimate of 28 mrem/hr at a foot or 1.1 mrem/hr at 5 feet.

As a worst case, initial screening estimate for the radiological COCs under the industrial land use scenario, a total effective dose equivalent (TEDE) was calculated by the RESRAD² code for an industrial worker. An incremental TEDE of 8,900 mrem/yr resulted for the industrial land use scenario. This assumes the whole radioactive inventory is dispersed in the soil, which is a highly conservative assumption since it is almost entirely shielded and containerized solid materials. This dose is almost

² The RESRAD model was used to provide a level of consistency between the scenarios presented in Chapters 3 and 4 as well as Appendix J-2.

entirely associated with gamma radiation from Co-60 and Cs-137 (approximately equal contribution from each nuclide at year 2007, after which Cs-137 begins to dominate due to its longer half-life). As this does not account for engineering and administrative advantages of time, distance, and shielding, it is not likely that exposure could ever reach the conservatively estimated TEDE. The gamma surveys that were conducted in 1996 indicated only three locations had surface contact readings above background, including a maximum reading of 50 mrem/hr at the surface of Pit 35. This survey is likely more reflective of exposure potential for most of the work to be conducted at the site with shielding intact.

The applicable regulatory limit in 10 CFR 835 "Occupational Radiation Protection" is 5,000 mrem/year per worker. This value could possibly be exceeded under the assumptions of no shielding and no mitigation measures. An additional requirement of 10 CFR 835 is to ensure that worker exposures follow ALARA principles. The Nuclear Regulatory Commission (NRC) has also established regulatory requirements for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) clean-up sites of TEDE of 25 mrem per year with exceptions to allow dose limits of up to 100 mrem/year. In addition, Sandia National Laboratories has an ALARA dose limit goal of 100 mrem/year. Following DOE ALARA principles, additional reduction in work dose will need to be considered to decrease the industrial worker dose to below 100 mrem/yr. The calculated dose value for the MWL industrial land use is potentially above these guidelines and would require mitigation measures such as maintaining shielding and working remotely.

Based on these dose limitations, significant engineering and administrative controls will have to be implemented in order to meet these protective guidelines. Considerable efforts will need to be applied to use the principles of time, distance, and shielding to achieve these conservative annual dose goals. The advantages of direct reading instrumentation will be key to actively manage personnel exposures at the site. The industrial worker's dose estimate provided by the model is highly conservative which does not account for technology, such as remote handling used to limit exposure. As an example, the above screening estimate assumed that a worker was exposed to the entire radiological inventory throughout the excavation; however, a majority of the potential radiological exposure may be attributed to a limited amount of material. Realistically, most of the doses represented in the model are governed by the larger Co-60 and Cs-137 sources which will be shielded and require limited amount of time to safely manage these sources. Adherence to DOE and SNL dose guidelines is achievable following ALARA principles using sound health physics-based approaches to limit worker doses.

Although current tritium vapor emanation is minimal, an increase in tritium emissions will occur during excavation. The increase in tritium emissions during excavation may present a possible exposure route for workers both inside and outside the tented area. The average tritium flux beneath the tented area is 19,000 pCi/m²/hr. If this were assumed to be a constant air concentration, the worker cancer risk would be 7.28 E-04 for the duration of the non-planning remediation activities. The dose from tritium inhalation would be 6 mrem/yr. As this does not account for any dilution, and the vent and trailers would be placed to maximize dilution, this is not likely a significant risk concern.

2.3.2 Non-Radiological Excavation

To evaluate risk from transportation and excavation, only vehicle-related consequences that include traffic injuries and fatalities are quantified. No chemical or radionuclide exposure and risk is quantified. National average rates were used to evaluate injury and fatality rates. The total number of shipments for excavation is assumed to be 1,175 loads of excavated waste shipped off site, and 5,900 loads of re-deposited soil to be compacted (1,300 loads). This is associated with a risk of 0.9 injuries and 0.02 fatalities for the duration of these activities.

Evaluation of human health risk as a result of remediation activities is very similar in concept to the determination of risk for transportation activities. Non-chemical-related worker risk can be determined from accident statistics related to specific industries from the U.S. Department of Labor (DOL) and other sources. For the excavation, waste management, and decontamination activities that would be performed at the MWL, the DOL industrial labor classification of construction was used to estimate the injury and fatality rates per man-hour. From the classification and unit risk information gained from DOL statistics, risk models were constructed using the assumption that there is a linear relationship between total effort in man-hours and risk. The expected injury rate is 2.2 and the fatality risk is 0.01 for the duration of these activities.

2.3.3 Summary

In summary, the most significant hazards are those associated with direct gamma radiation and accidents during excavation and transportation of wastes for off-site disposal. Direct gamma radiation would require mitigation measures to minimize worker exposure such as remote handling of concentrated sources, using shielded equipment and containers, maximizing distance and limiting exposure time.

2.4 Implementability

The following section presents the general implementation approach for this alternative. The approach consists of several work phases including planning, permitting, contracting, procurement, support facilities construction, excavation, waste management, transportation, disposal, backfill and closure.

2.4.1 Planning and Support Facilities

Significant planning will be necessary to successfully and safely excavate the MWL. Several administrative and engineering controls will be established prior to excavation. Engineering drawings and calculations will be necessary to verify waste volumes and determine required facility sizing, support functions and utilities. Several documents will be required to implement and permit the work. These documents will include, at a minimum, a site-specific work plan, health and safety plan, waste management plan, quality assurance plan, radiation protection plan and closure plan. Several permits will also be required by federal, state and local authorities. These permits will govern the excavation, waste management and disposal activities. It is assumed that these governing authorities will accept a risk-based remediation approach.

Several contracts will need to be established with an excavation contractor, robotics supplier, equipment vendors, transportation firms and disposal facilities. Long lead-time equipment will need to be procured early in the project to ensure timely delivery with anticipated start of facility construction and excavation.

Construction of support facilities will be a significant effort in itself. In order to address worker, public and environmental risk issues, it is proposed that the entire excavation and required waste management operations be conducted in temporary structures or structurally supported tents. Construction of these tents will include installation of ventilation systems with combination HEPA and ULPA filtration components. Figure J.1 illustrates a general layout of the support facilities required to safely excavate the MWL. The excavation, debris management, and soil management areas will be housed in separate tent structures. Administrative and on-site laboratory facilities will be housed in mobile trailers.

Administrative and engineering controls will be functionally tested prior to excavation. Required worker training will be verified and refreshed as necessary. Task hazard analyses will be reviewed and associated proper procedures practiced. Trial excavation and waste handling processes will be conducted

to verify proper, intended equipment and labor function. Readiness review sessions will be conducted with surrounding facilities, and regulatory and QA/QC personnel as necessary.

The planning phase of this project is a significant effort lasting approximately 5 years. This phase will include preparation of plans, engineering, permitting, contracting, procurement, facility construction, function testing and process proving and readiness review.

2.4.2 Excavation of Unclassified Area

Excavation will begin in the unclassified area. Conventional equipment will be used to excavate Trenches A through G in this area. A typical cross-section of the trenches is included in Appendix J.3. Combined with this cross-section, the Excavation Plan in Appendix J.3 was used to estimate the volume of approximately 53,587 cubic yards (cy) of debris and soil to be removed from the unclassified area. Table J-1 summarizes the breakdown of waste streams, please refer to Appendix J.3 for more details on these volumes and the costs associated. A spreadsheet detailing supporting calculations for these volumes is presented in Appendix J.3.

Table J-1 Soil and Debris Estimated to be Removed During Unclassified Area Excavation

Type of Waste	Volume (cy)
Soil	
LLW	28,428
Replaceable	13,083
Debris	
LLW	5,392
MW	2,275
Small Sources (high)	1,032
Large Sources (high)	600
TRU Waste	21
Classified	462
Tritium	777
Depleted Uranium	765
Beryllium	84
PCBs	245
Lead	423
TOTAL	53,587

The top 3 feet of fill material over the landfill and side slope soils will be removed as needed during excavation and stockpiled separately as replaceable soil. This soil will be temporarily stored outside the tent system in the designated replaceable soil storage area until backfill operations commence (Figure J.1). These soils will be protectively managed with best management practices for dust suppression and stormwater management.

A conventional excavator will excavate the debris and soil and place this material on a commercially available mechanical screening device to separate the debris from the soil. It is anticipated that this area can be excavated at approximately 300 cy per week. Soils will be sampled and transported to the unclassified soils storage tents located west of the excavation (Figure J.1). It is anticipated that these soils will be stored in operationally efficient volumes (approximately 100 cy loose) within these tents temporarily awaiting characterization, and packaging for transport to an off-site disposal facility. Debris will be moved to the debris segregation area located east of the excavation for processing. See Section 2.4.4 for a description of waste segregation and management processes. An on-site laboratory will be used to analyze the soil and debris as necessary to meet the waste acceptance criteria for off-site disposal. This laboratory will also provide incidental analyses to support health and safety professionals.

Based on performance at SNL's Chemical Waste Landfill, excavation of the unclassified area will progress at approximately 300 cy per week. Excavation and initial screening of 53,600 cy of debris and soil will therefore take approximately 3.5 years to complete.

2.4.3 Excavation of Classified Area

Excavation will continue in the classified area after the unclassified area has been completely excavated. Remote equipment and/or robotics will be used to excavate the pits and surrounding soils in the classified area. A typical cross-section of the pits is included in Appendix J.3. Combined with this cross-section, the Excavation Plan in Appendix J.3 was used to estimate the volume of approximately 17,556 cy of debris and soil will be removed from the classified area. Table J-2 summarizes the breakdown of waste streams. A spreadsheet of supporting calculations for these volumes is presented in Appendix J.3.

Table J-2 Soil and Debris Estimated to be Removed During Classified Area Excavation

Type of Waste	Volume (cy)
Soil	
LLW	9,597
MW	5,352
Concrete	400
Debris	
LLW	757
MW	233
Small Sources (high)	58
Large Sources (high)	47
TRU Waste	52
Classified	163
Tritium	175
Depleted Uranium	454
Beryllium	134
PCBs	6
Lead	128
TOTAL	17,556

An evaluation and cost estimate for remote and/or robotics excavation of the classified area has been developed and is presented in Appendix G of the CMS report. This evaluation has been incorporated herein with some augmentation. The soil and debris volume in the Appendix G study was reported at 27,354 cy. The excavation approach discussed herein is based on a volume of 17,600 cy. The difference in volume can be attributed to a different set of excavation assumptions. See Appendix J.3. The CMS Appendix G study also assumed an excavation rate of 300 cy/wk. The excavation rate assumed for this evaluation has been decreased to 150 cy/wk, based on experience at the Chemical Waste Landfill coupled with additional effort required for radiological constituents, depth of excavation and handling of large, heavy objects. A larger, track mounted, remote-controlled crane (100 ton) and front-end loader have also been added to the estimate. The 100-ton crane was added to lift concrete encased sources as a whole. Additionally, a vibrating screen would be used instead of the stationary Grizzly. This mechanized screen would be retrofitted for remote start and stop functions.

The Appendix G robotics evaluation also assumed that the classified area would be in line of sight from the office trailer for safe operations of the remote control console. This assumption has been voided with the construction of temporary tent structures required to promote safer operations. To address this issue, costs have been included to fabricate a truck-mounted console, totally enclosed with shielding and positive, breathing air pressure. Appropriate air locks will be included to maintain safe worker environment. This mobile control vehicle will be positioned for required viewing of excavation inside the tent structure at a safe distance required for radiation protection.

Based on a production rate of 150 cy/wk, excavation and initial screening of 17,600 cy of debris and soil will take approximately 2.5 years to complete. Waste management activities will progress concurrent with excavation and continue for another 2 years after excavation is complete.

2.4.4 Waste Management

Waste management encompasses all activities necessary to prepare wastes for ultimate disposal or long-term storage. Such activities will begin immediately following excavation at the MWL, and ultimately include waste screening/segregation; sampling/analysis; treatment; characterization; and packaging. Based upon the known waste inventory, a waste management process flow diagram (Figure J.2) has been developed to show the complexity of activities that would be necessary to achieve the goals of the alternative. Described below are the waste management activities necessary to assure that all waste storage/disposal, waste acceptance criteria, transportation regulations, and NMED mixed waste requirements are fully compliant.

Screening/Segregation: Initial screening and sorting of excavated materials will separate soils likely to be replaceable, soil/debris waste, and special wastes noted in Figure J.2. Much of the replaceable soil will initially be segregated as described above. Soil/debris waste mixtures will immediately be screened to separate the two to the extent practical. Screened debris wastes will mostly include such materials as paper, plastic, rubber, glass, and small metal items. Following screening, this waste will be examined so that prohibited items can be removed. Prohibited items do not meet the waste acceptance criteria of off-site disposal facilities.

Segregated soils will be placed in 100 cy piles that are individually sampled and analyzed using an on-site mobile laboratory for both chemical and radioactive analyses. Based upon these results, individual soil piles will be segregated as being either replaceable, MW or LLW.

Special waste items will be segregated initially as the excavation progresses based upon item size, packaging (e.g., large box, drum, etc.) physical appearance (e.g., lead brick or object, shape, etc.) and/or radiation level. Each such object is carefully and appropriately removed to a separate shielded or unshielded holding area for further sorting, characterization, processing/treatment, and packaging. Special waste objects will, for the most part, present the greatest potential radioactive and or chemical hazards, and highest associated waste management costs due to the more extensive individual handling required (Figure J.2).

Sampling/Analysis: As noted above, a mobile on-site radioactive assay and chemical analysis laboratory will be located immediately adjacent to the excavation site. This laboratory will conduct all sample analyses to sort/segregate soil and wastes (replaceable, LLW, MW), and characterize such wastes to the extent possible or allowed by an on-site facility.

Treatment: Following inspection, miscellaneous small debris MW will be shredded and, to the extent possible based on the volume of MW soil, recombined with MW soil such that the resultant mixture contains no more than 10% debris by volume. Envirocare classifies this waste as “soil” for disposal purposes. As such, it can be packaged and shipped in bulk to their site for disposal at a lower cost.

Various treatments will be required for many of the special item wastes. Because many of these wastes will be mixed, such treatments may require a Resource Conservation and Recovery Act (RCRA) permit to be issued by NMED. Treatment processes currently anticipated would include size reduction (e.g., cutting, crushing, etc.) of oversized objects, demilitarizing (e.g., shredding, crushing, etc.) classified items, and treatment to remove chemical hazards (e.g., react, immobilize, encapsulate, etc.) to comply with Land Disposal Restrictions (LDR) and/or disposal site WAC. As shown in Figure J.1, size reduction treatment will be accomplished at the excavation site in an appropriate enclosed facility. Chemical and some classified item treatments may necessitate generally more substantial facilities at Sandia. Size reduction of higher radiation items will require a shielded, remote-type of material handling operation. At least a portion of the small classified waste may be shredded along with the small debris waste prior to being recombined with MW soil.

Characterization: Characterization includes those specific activities needed to show full compliance with the WAC of a disposal or storage site. As such, characterization is waste type (i.e., LLW, MW, TRU) specific. Characterization includes sampling and analysis to verify the presence of regulated hazardous constituents; inspections to verify the absence of prohibited waste items; assay to determine isotopic contaminants and amounts; and verification of proper packaging and documentation. For LLW and MW, Sandia and/or the excavation contractor will accomplish all tasks that could be completed on-site. For waste shipped to Envirocare, in addition to on-site characterization, actual waste samples must be provided to Envirocare. Laboratories approved by the State of Utah will accomplish all sample analyses. The on-site mobile laboratory thus would be Utah certified. For all suspected TRU wastes, the DOE will contract with a vendor group previously qualified to accomplish WIPP waste characterization in accordance with the rigorous requirements of the WIPP Waste Analysis Plan and WAC. Mobile vendor facilities will be brought to Sandia at some future time for this work. Consequently, an approved MW storage facility will need initially to be provided for all such suspect TRU waste.

Packaging: The optimal packaging for MW soil shipped to Envirocare is to use 20-25 cy Intermodal Containers with plastic liners. Such containers are fully re-useable, and are shippable by both truck or rail (six per gondola car). Low-level soil waste will be packaged in “super sacks” (approx. 10 cy capacity) for shipment as bulk soil for disposal at Envirocare.

Debris MW not able to be recombined with MW soil will be packaged in lined B-25 boxes (96 cf). Debris LLW will be packaged in lined 4' x 4' x 7' or 2' x 4' x 7' boxes, as determined by weight restrictions. Debris TRU waste will be packaged in High Density Polyethylene (HDPE)-lined 55-gallon drums for disposal at Waste Isolation Pilot Plant (WIPP).

2.4.5 Backfill

Final soil samples of the excavation bottom and slopes will be collected for analyses to support a pre-backfill risk assessment. This sampling and analysis effort will be conducted concurrent with post-excavation waste management activities. Once the excavation bottom is approved for backfill, risk-approved (replaceable) soils will be used as backfill. Clean soil from a nearby borrow source will then be hauled in and placed in compacted lifts to fill the excavation. The top lift will be graded appropriately to shed stormwater.

2.4.6 Closure

Closure of the site will be pursued after confirmation of proper decontamination of the equipment, waste management areas and tent structures are confirmed. Structures will be dismantled and properly disposed. Institutional controls will be maintained as needed if small quantity, long-term storage of waste without disposal pathways is required.

2.4.7 Schedule

The evaluation presented herein is based on a planning phase and a field activities phase. Table J-3 summarizes the estimated durations for each activity discussed in this evaluation.

Table J-3 Estimated Durations Based on Activity

Activity	Estimated Duration (yrs)
Planning	5
Unclassified Excavation	3.5
Classified Excavation	2.5
Waste Management	2
Backfill/Closure	1

The risk calculations presented in Section 2.3 were based on the 9-yr duration of excavation, waste management and backfill/closure activities. Please refer to the early text for a more detailed description of what each of these activities includes.

3.0 COST

Rough order of magnitude (ROM) Costs were estimated using the Remedial Action Cost Engineering and Requirements software (RACER 2002), Version 4.0. Direct costs for the Excavation Alternative are summarized in Table J-4. The total direct cost is estimated at \$346,000,000. The total indirect cost is \$272,000,000 and based on the RACER default settings. These costs, essentially considered Net Present Value, reflect “current dollars” and do not include out year escalation. Other than maintaining the long-term storage structure (included in Post Closure Institutional Controls), there are no operations and maintenance costs for Excavation. See Appendix J.3 for cost details and assumptions.

Table J-4. Estimated Costs for Excavation Alternative

Project Phase	Cost
Planning and Permits	\$ 8,000,000
Mobilization and Facility Construction	\$24,000,000
Excavation of Nonclassified Area	\$112,000,000
Excavation of Classified Area	\$133,000,000
On-Site Laboratory Analyses	\$18,000,000
Off-Site Laboratory Analyses	\$2,000,000
Waste Management	\$18,000,000
Demobilization and Site Cleanup	\$18,000,000
Post Closure Institutional Controls	\$13,000,000
Indirect/Markup	\$272,000,000
Net Present Value Cost	\$ 618,000,000

4.0 SUMMARY

An evaluation of the Excavation Alternative was conducted based on the following criteria:

- Long-term reliability and effectiveness;
- Reduction of toxicity, mobility, or volume;
- Short-term effectiveness;
- Implementability; and
- Cost.

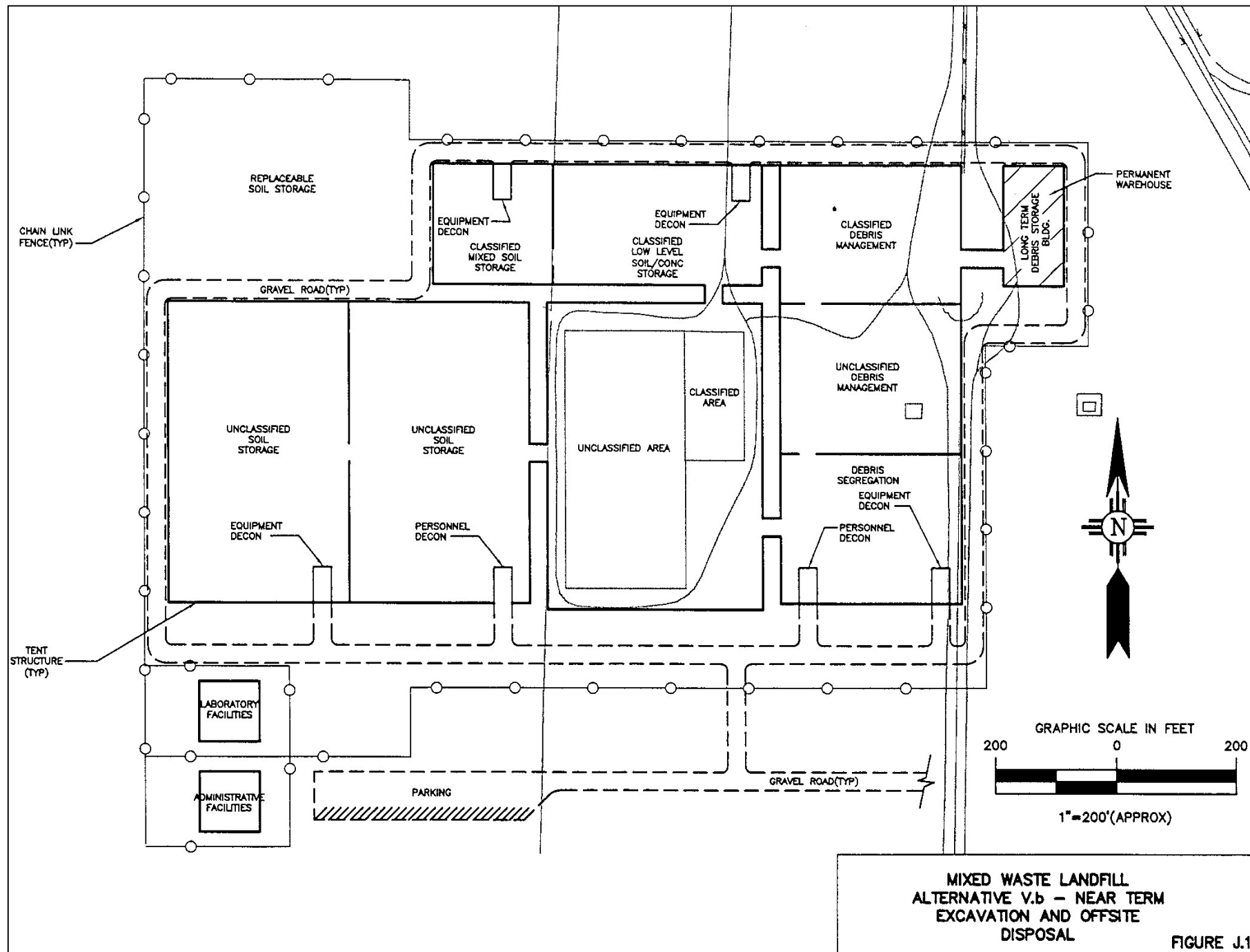
Table J-5 summarizes the results of this evaluation. The overall risk for Excavation is very high when compared to the other alternatives presented in Chapter 4 of the *Mixed Waste Landfill Corrective Measures Study* (Draft, October 25, 2002).

Table J-5. Summary Evaluation MWL Excavation Alternative

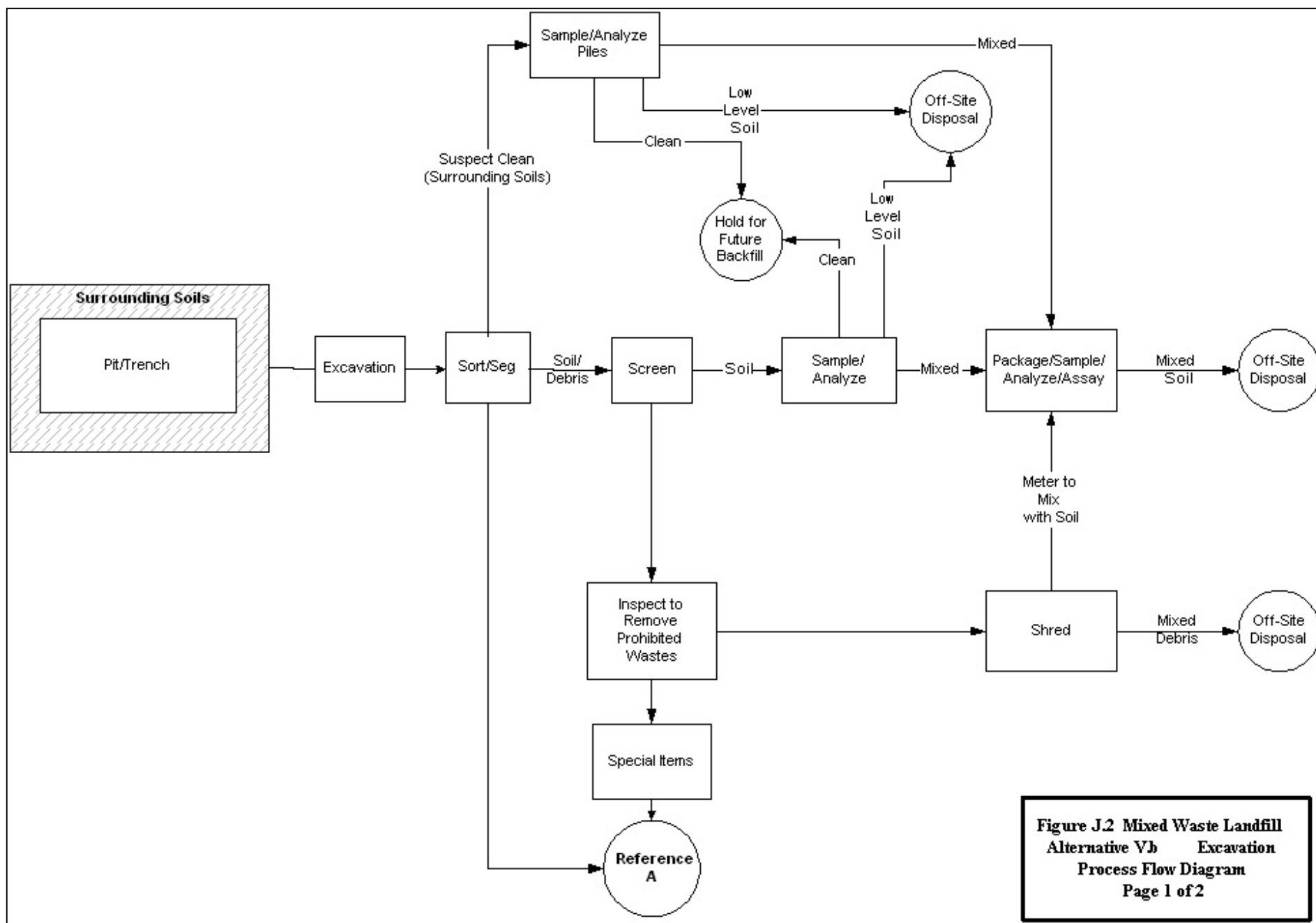
Evaluation Criteria	Summary
Long-term Reliability and Effectiveness	
Magnitude of remaining risk(s) after implementation of the alternative.	Non-rad: HI = 0.07; Excess cancer risk = 3E-6; Risk below NMED Guidelines
	Rad: TEDE = 0.3 mrem/yr; Excess cancer risk = 2E-6; below EPA guidelines
	Ecorisk insignificant
Extent of long-term monitoring	Risk approaches 0 assuming COCs are removed to background screening levels Groundwater monitoring will continue for 30 years, long-term storage structure will be maintained for approximately 50 years.
Uncertainties associated with leaving waste in place	Very Low
Potential for failure of alternative	Very Low
Reduction in Toxicity, Mobility, and Volume	
Reduction in Toxicity	Reduction in on-site toxicity, toxicity transferred to off-site facility
Reduction in Mobility	Reduced by removal of waste from landfill disposal cells; however, transferred to off-site facility
Reduction in Volume	Potential increase in volume due to mixing during excavation
Short-term Effectiveness	
Short-term reduction in existing risk(s)	Non-rad: risk below NMED guidelines – exposure mitigated through PPE
	Rad: TEDE increased by <100 mrem/yr during excavation; Excess cancer risk increased by < 7.28 E-04
	Ecorisk unchanged
Short-term risk(s) posed to site workers, the community, and the environment during implementation of the alternative	Transportation: injuries: 0.9 & fatalities: 0.02 Implementation: injuries: 2.2 & fatalities: 0.01
Implementability	
Availability of materials, equipment, and contractors	Specialty Contractor
Technical and administrative difficulties	Significant; excavation and characterization activities present significant challenges
Permits and approvals	Surface Disturbance; Radiological; long-term waste storage; air quality; RCRA; TSCA; DOT
Cost	
Total Direct & Indirect	\$ 618,000,000

Figures

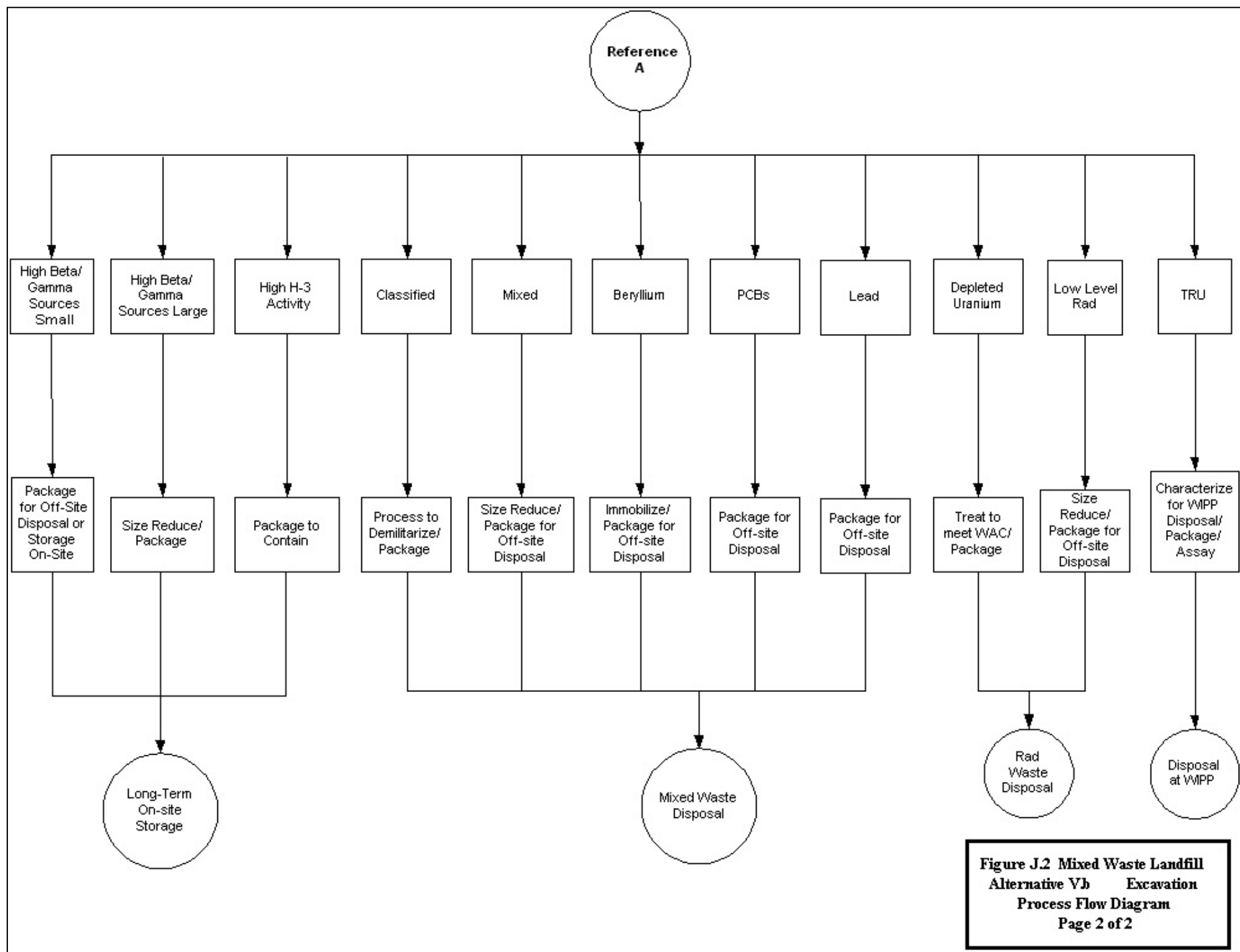
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**Figure J.2 Mixed Waste Landfill
Alternative Vb Excavation
Process Flow Diagram
Page 2 of 2**

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Appendix J.1- Waste Inventory and Distribution

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Summary

The waste summary and distribution is a listing of the individual items contained in each trench or pit.

Each of the items were classified into the following waste streams,

- Low Level Waste (LLW) – Radioactive waste or debris not classified as high-level waste, transuranic waste, spent fuel, or byproduct materials such as uranium and thorium mill tailings. Items identified in this stream include all known or suspected LLW not included in other specific waste streams below.
- Mixed Waste – Hazardous waste or debris as defined by RCRA containing or contaminated with source, byproduct, or special nuclear material.
- Small Sized Sources (high radiation) – Physically small (i.e., 55-gallon drum and smaller) items that emit high levels of penetrating radiation if not adequately shielded.
- Large Sized Sources (high radiation) - Physically large (i.e., larger than a 55-gallon drum) items that emit high levels of penetrating radiation if not adequately shielded.
- Transuranic Waste (TRU) – Waste or debris known or suspected of containing elements with atomic numbers greater than 92 and half lives greater than 20 years, in concentrations greater than 100 nCi/g of alpha emitting isotopes.
- Classified – Debris that is known or suspected as resulting from classified activities.
- Tritium – Any debris contaminated with or containing tritium.
- Depleted Uranium – Any debris contaminated with or containing depleted uranium. Although specifically identified, depleted uranium may be also classified as low level waste.
- Beryllium (BE) – Any debris contaminated with or containing beryllium.
- Polychlorinated Biphenyl (PCB) – Any debris that is potentially known to contain PCBs (e.g., light bulbs, oils).
- Lead – Any debris contaminated with or containing lead; noting that a majority of lead will be in place for shielding debris contaminated with or containing high radioactive activity. Use of lead as shielding may not be considered waste.

Once classified, the total number of items in each waste stream were counted and compared to the total items in all waste streams to calculate a percentage of the total debris volume. This percentage was then multiplied by the total debris volume to estimate the volume of each waste stream. The table on the following page presents a summary of these calculations. See Appendix J.3 for estimated soil volume.

Table J.1.1 MWL Alternative V.b – Waste Debris Volume

	Waste Debris Volume (yd³)											
	LLW	Mixed	Small Sized Sources (high)	Large Sized Sources (high)	TRU Waste	Classified	Tritium	Depleted Uranium	BE	PCB	Lead	Total Waste
Unclassified	5,392	2,275	1,032	600	21	462	777	765	84	245	423	12,076
Classified	757	233	58	46	52	163	175	454	134	6	128	2,207
Total	6,149	2,508	1,090	646	73	625	952	1,219	218	251	551	14,283
% of Total	43%	18%	8%	5%	1%	4%	7%	9%	2%	2%	4%	100%

**Table J.1.2 - MWL Alternative V.b-
Waste Inventory and Distribution**

Trench/Pit	Designation	Debris Volume (yd ³)	Item	LLW	Mixed	Small Sized Sources	Large Sized Sources	TRU Waste	Classified	Tritium	Depleted Uranium	Be	PCB	Lead	Total Counted
			Column Categories For Counting	1	2	3	4	5	6	7	8	9	10	11	
A	Unclassified	1345	Differential Amplifiers		x										
			thermocouples		x										
			compressors		x										
			multiple fission products and tritium contaminated fume hoods, ducting, motors, fans, and plenums	x			x			x					
			TV cameras, tripods, and telemetry components		x										
			MFP contaminated cooling systems, coils, surge tanks (5' D x 11' H), piping, pumps, couplings, and valves				x								
			experimental stainless steel canisters	x											
			17 each 55-gallon drums containing MFP contaminated demineralizer resin			x									
			2 each 55 gallon drums of MFP contaminated concrete			x									
			empty oxygen cylinders	x											
			boxes of fluorescent light bulbs		x								x		
			roll-up door and associated equipment from a TA-5 kiva	x											
			shield door from reactor pit		x									x	
			voltage controlled oscillators, calibrators, and gyros		x										
			irradiated diodes, transistors, capacitors, resistors, circuit boards, voltage regulators, and other miscellaneous electrical components		x										
			tritium luminary dials							x					
			military radium altimeters and gauges	x											
			Ni-63 tube	x											
			parachute	x											
			Sr-90 nuclear cells	x											
			flash heating equipment and associated parts		x										
			MFP, contaminated L shaped aluminum chassis				x								
			depleted uranium in graphite matrix								x				
			stainless steel ducting	x											
			61 each spark gap tubes (100mrem/hr on contact)	x											
			aluminum sleeve with lead ballast		x									x	
			tritium beds and valves	x						x					
			shock jigs with tubes	x											
			31 each 0.5 Ci Kr-85 tubes and cells	x											
			one each 20'x2' D heat exchanger, coolant pumps, piping and valving		x										
			air conditioners		x										
			tritium targets (10ci each) and tubes (100 mCi each)							x					
			wooden ladder	x											
			MFP, DU, and tritium contaminated vacuum cleaners		x	x				x	x				
			vacuum pumps and skids	x											
			stainless steel sample tubes	x											
			irradiated metal samples (5rem/hr on contact)		x										
			ion generators	x											
			5 gallons of oil absorbed on vermiculite in sealed A/N can		x									x	
			128 sq. ft of sheet metal	x											
			skid loaded with 300lb of paraffin		x										
			12 each skids of MFP contaminated concrete blocks, MFP contaminated lead bricks			x								x	
			2,600 kg DU								x				
			Routine operational and miscellaneous decontamination waste		x										
			Total Items	18	17	4	3	0	0	5	3	0	1	4	55
			% of total debris volume	33%	31%	7%	5%	0%	0%	9%	5%	0%	2%	7%	100%

**Table J.1.2 - MWL Alternative V.b-
Waste Inventory and Distribution**

Trench/Pit	Designation	Debris Volume (yd ³)	Item	LLW	Mixed	Small Sized Sources	Large Sized Sources	TRU Waste	Classified	Tritium	Depleted Uranium	Be	PCB	Lead	Total Counted
			debris volume (cu yd)	440	416	98	73	-	-	122	73	-	24	98	1,345
B	Unclassified	1393	High efficiency particulate air (HEPA) filters, fiberglass filters, final and prefilters		x										
			MFP, DU and tritium contaminated vacuum cleaners		x	x				x	x				
			cables		x										
			ultra sonic air samplers	x											
			irradiated diodes, transistors, capacitors, resistors, circuit boards, voltage regulators, and other miscellaneous electrical components		x										
			MFP and tritium contaminated fume hoods, ducting, motors, fans, and plenums				x			x					
			boxes of fluorescent light bulbs		x								x		
			sanding disks		x										
			neutron generator tubes	x											
			backing plates from TA-5 experimental apparatus	x											
			packing materials and wooden shipping crates	x											
			metal drums from Nevada Test Site containing DU								x				
			alpha contaminated gas bottles	x											
			empty liquid scintillation vials	x											
			Ta-182 contaminated platinum tungsten scrap	x											
			heater elements		x										
			10 Ci tritium targets							x					
			neutron generator magnets	x											
			14 each empty steel gas cylinders contaminated with DU	x							x				
			9 each MFP contaminated ceramic tubes			x									
			1.5 gallons of solvents absorbed on vermiculite in sealed A/N cans		x										
			6 each small storage cabinets	x											
			vacuum system components including water circulators, valves, diffusion pumps, fittings, gas analyzers, and vacuum pumps	x											
			gas sample bottles from NTS		x										
			tritium contaminated tools							x					
			DU metal shavings and cuttings								x				
			Victoreen Sr-90 ion chambers	x											
			glove box and work bench		x										
			demineralizer vessel from reactor				x								
			neutron radiograph equipment	x											
			thermal reflecting rings	x											
			micro scales	x											
			Kr-85 light sources	x											
			11 kg deuterium containing g 0.25 Ci of tritium							x					
			1 gallon toluene absorbed on vermiculite in sealed A/N can		x										
			static meter	x											
			Ta-182 pellets	x											
			demineralization and radiography tubes	x											
			Total Items	19	11	2	2	0	0	5	4	0	1	0	44
			% of total debris volume	43%	25%	5%	5%	0%	0%	11%	9%	0%	2%	0%	100%
			debris volume (cu yd)	602	348	63	63	-	-	158	127	-	32	-	1,393
C	Unclassified	1175	Nuclear fuel-shipping cask, cleanup debris	x											
			tritium and C-14 labeled amino acids and tritium labeled uridine							x					
			scrap metal contaminated with DU from burn test	x							x				
			7.1 Ci tritium pellets							x					
			uranyl nitrate	x											
			"Dining Car" test hardware	x					x						

**Table J.1.2 - MWL Alternative V.b-
Waste Inventory and Distribution**

Trench/Pit	Designation	Debris Volume (yd ³)	Item	LLW	Mixed	Small Sized Sources	Large Sized Sources	TRU Waste	Classified	Tritium	Depleted Uranium	Be	PCB	Lead	Total Counted
			MFP, DU, and tritium contaminated vacuum cleaners			x				x	x				
			vacuum hose contaminated during cleaning of thorium cloth and thorium cloth debris	x											
			concrete crucibles used in reactor safety studies	x											
			Kr-85 particle size analyzer	x											
			1000 lead brick contaminated with tritium and Na-22		x					x				x	
			42 MFP contaminated lead brick		x									x	
			73 each integrated circuits		x										
			Ba-133 reactor bolts			x									
			flexible glove box ducting	x											
			2 each mechanical vacuum pumps	x											
			Sr-90 contaminated carpet	x											
			Cs-137 spark gaps	x											
			Na-22 cleanup materials, source holders, and (1.5 rem/hr on contact)	x											
			Du contaminated waste containers								x				
			tritium contaminated vacuum system and power supply							x					
			Du billet, hemisphere, and sphere								x				
			Pu-238 contaminated hood exhaust hose					x							
			Co-60 debris from trailer used to support nuclear fuel shipping cask	x											
			MFP contaminated exhaust system prefilters, HEPA filters, and absolute pressure filters			x									
			containerized DU residue, turnings, metal workings, and cuttings								x				
			surge voltage arrester	x											
			tritium contaminated pump							x					
			irradiated diodes, transistors, capacitors, resistors, circuit boards, voltage regulators, and other miscellaneous electrical components		x						x				
			wooden shipping crates	x											
			13 each Po-210 contaminated static eliminators	x											
			one each 62 mCi Se-75 source and one each 1.0 mCi Ta-182 source in sealed /N can	x											
			tritium contaminated fume hood and exhaust plenum							x					
			2.0 kg deuterium absorbed on vermiculite in sealed A/N can	x											
			12 each 55 gallon drums of MFP contaminated spent demineralizer resin			x									
			DU contaminated Lucite table								x				
			4 each TV cameras		x										
			tritium contaminate ion pump							x					
			1 gallon tritium contaminated acetone solidified with Safe-T-Set							x					
			24 kg lithium -6 fluoride		x										
			4 each irradiated high speed cameras, lenses, and one telescope		x										
			one each 0.1 mCi Ra-226/Be source encapsulated in concrete filled A/N can	x								x			
			2 each DU contaminated glove boxes								x				
			32.1 Ci tritium							x					
			377 kg DU								x				
			Trace Eu-152, Ba-133, I-129, Na-22, Sr-90, Ni-63, Tc- 99, Gd-153, Ag-110m, Pm-147, Sr-85, Sb-125, Ta- 182, Ge-68, Mn-54, and Fe-55	x											
			TA-5 routine operational and miscellaneous decontamination waste		x										
			Total Items	20	8	4	0	1	1	10	9	1	0	2	56
			% of total debris volume	36%	14%	7%	0%	2%	2%	18%	16%	2%	0%	4%	100%
			debris volume (cu yd)	420	168	84	-	21	21	210	189	21	-	42	1,175

**Table J.1.2 - MWL Alternative V.b-
Waste Inventory and Distribution**

Trench/Pit	Designation	Debris Volume (yd ³)	Item	LLW	Mixed	Small Sized Sources	Large Sized Sources	TRU Waste	Classified	Tritium	Depleted Uranium	Be	PCB	Lead	Total Counted
D	Unclassified	3152	Compensator and cables from TA-1		x										
			tritium contaminated water and erbium tritide powder							x					
			DU contaminated rocket motors								x	x			
			broken Ra-226 source in plastic holder	x											
			corroded and broken 6-ft aluminum step ladder	x											
			13 each 55 gallon drums containing MFP contaminated spent demineralizer resin			x									
			DU residue, turnings, metal workings, and cuttings								x				
			MFP contaminated tape recorders, transmitters, and video cameras		x	x									
			MFP contaminated compensated ion chamber			x									
			irradiated diodes, transistors, capacitors, resistors, circuit boards, voltage regulators and other miscellaneous electrical components		x										
			4 each aluminum kiva doors from reactor	x			x								
			PEG housing and lid from NTS	x											
			MFP contaminated fuel holsters	x											
			ultra filters and ultra filter plenums	x											
			MFP contaminated hot exhaust system prefilters, absolute pressure filters, and plenums	x											
			HEPA filters	x											
			MFP contaminated conduit and sheet metal	x											
			2 each sealed Cr-57 sources	x											
			TA-1 Bldg 802 construction materials and scrap	x											
			MFP, DU, and tritium contaminated vacuum cleaners	x											
			TA-5 liquid waste disposal system drain pipes				x								
			"Cypress" packaging materials from NTS	x					x						
			"Ming Vaso" rad test debris from NTS	x					x						
			"Snap 27" test debris	x					x						
			"Hudson Moon" cleanup and packaging materials from NTS	x					x						
			"Min Leaf" packaging and clean-up materials from NTS	x					x						
			"Diana Mist" packaging and cleanup materials from NTS	x					x						
			"Thoria" cleanup and packaging materials from NTS	x					x						
			old kiva floor including sheet rock, wood and miscellaneous waste from installation of new kiva floor	x											
			MFP contaminated spent demineralizer columns and cartridges			x									
			"Thoria" crucibles and tubing	x											
			old reactor boiler with associated radiators, piping, and valves				x								
			activated reactor stainless steel support tower, cryostat tube and head				x								
			empty thorium impact capsules	x											
			empty wooden shipping crates for fuel elements	x											
			tritium contaminated power supply, balance, volt meter, ammeter, bridge, vacuum pump, microscope mount, plug-in units, and glass tubes							x					
			neutron radiography tube and beam catcher	x											
			ultra sonic bath and power unit	x											
			obsolete Bell Labs experimental core tube (10 rem/hr on contact)			x									
			TA-5 routine operational and miscellaneous decontamination waste	x											
			Total Items	26	3	5	4	0	7	2	2	1	0	0	50
			% of total debris volume	52%	6%	10%	8%	0%	14%	4%	4%	2%	0%	0%	100%
			debris volume (cu yd)	1,639	189	315	252	-	441	126	126	63	-	-	3,152

**Table J.1.2 - MWL Alternative V.b-
Waste Inventory and Distribution**

Trench/Pit	Designation	Debris Volume (yd ³)	Item	LLW	Mixed	Small Sized Sources	Large Sized Sources	TRU Waste	Classified	Tritium	Depleted Uranium	Be	PCB	Lead	Total Counted
E	Unclassified	1154	38 each 55 gallon drums of MFP contaminates spent demineralizer resin			x									
			7 each 55 gallon drums from Three Mile Island containing MFP contaminated cables, instruments, and electronic components			x									
			11 each Po-210 contaminated static eliminators	x											
			10 gallons Cs-137 solution solidified with Safe-T-Set in sealed A/N can	x											
			oil from lapidary shop solidified with soil in sealed A/N can		x								x		
			irradiated diodes, transistors, capacitors, resistors, circuit boards, voltage regulators, and other miscellaneous electrical components		x										
			6 each irradiated 9ft 10 in long 9in diameter stainless steel storage tubes and holding rings				x								
			activated top and bottom reactor vessel sections				x								
			hydraulic pumps	x											
			ion pumps	x											
			steel frame and motor assembly from kiva door	x											
			burned wood from weapons experiment	x											
			2 each burned empty 55 gallon drums	x											
			MFP contaminated vacuum pumps	x											
			obsolete and old test equipment and materials used in reactor fuel tests			x									
			DU contaminated glove box								x				
			HEPA filters from hot exhaust plenum	x											
			DU contaminated vacuum and filtering system bracket and assembly	x							x				
			DU contaminated machine shop cabinets, work tables filters, and ground cloths	x							x				
			4 each TV cameras		x										
			45 Ci neutron generator tubes			x				x					
			DU contaminated crucibles	x							x				
			janitorial barrels	x											
			vacuum pumps file cabinets	x											
			70 lb thorium contaminated soil	x											
			tritium contaminated ion pump							x					
			one damaged DU contaminated shake table or "vibrator" for sieving powdered DU	x							x				
			10000 lb of decommissioned reactor debris from extensive modifications to the reactor including ventilation ducts, conduit, PVC, nuts and bolts, hot water radiators, metal support parts, concrete insulation, cable, air blowers, camera equipment, light bulbs, metal stands, electronic equipment, vacuum cleaners, pumps, coveralls, lumber, scaffolding, tables, chairs, gauges, regulators, valves, glove boxes, and stainless steel		x		x						x		
			2500 cubic ft of DU contaminated soil	x							x				
			plywood ventilation duct	x											
			Mettler balance	x											
			Sartorius balance	x											
			fume hood	x											
			Magniwhirl bath	x											
			lab furnace	x											
			obsolete fire alarm system and associated electrical equipment		x										
			scrap wire		x										
			11 each 55 gallon drums numbered 1 through 11: drums 1-3 contain 18 nCi/g alpha emitters, drums 4-11 contain 8 nCi alpha emitters	x											
			2 kg thorium	x											
			8 kg DU								x				
			122 Ci tritium							x					

**Table J.1.2 - MWL Alternative V.b-
Waste Inventory and Distribution**

Trench/Pit	Designation	Debris Volume (yd ³)	Item	LLW	Mixed	Small Sized Sources	Large Sized Sources	TRU Waste	Classified	Tritium	Depleted Uranium	Be	PCB	Lead	Total Counted
			Trace amounts of Ce-144, K-40, Zr-95, NB-95, Sr-85, Eu-152, Eu-155, Ni-63, and Po-210	x											
			TA-5 routine operational and miscellaneous decontamination waste		x										
			Total Items	26	7	4	3	0	0	3	7	0	2	0	52
			% of total debris volume	50%	13%	8%	6%	0%	0%	6%	13%	0%	4%	0%	100%
			debris volume (cu yd)	577	155	89	67	-	-	67	155	-	44	-	1,154
F	Unclassified	1980	Tritium and DU contaminated glove boxes							x	x				
			ducting	x											
			stainless steel	x											
			6 each 55 gallon poly drums containing MFP			x									
			contaminated spent demineralizer resin												
			wooden shipping crates	x											
			steel cladding and zirconium insulation	x											
			dilute nitric acid neutralized with CaCO ₃ , Na ₂ CO ₃ , and NaHCO ₃ and solidified with yellow powder material		x										
			electro-glo eletropolishing agent solution with concentrated phosphoric acid neutralized with Na ₂ CO ₃ and NaOH and solidified with yellow powder material		x										
			lab benches	x											
			metal table	x											
			2 each glove boxes	x											
			HEPA and prefilters	x											
			MFP contaminated Hallum cask - 19ft long x 3 ft diameter, 40 tons. Consists of two stainless steel cylinders separated by 8.5 inches of lead shielding in the annulus		x									x	
			MFP contaminated Helicopter cask - weighs 3 tons. The interior cavity is 4 inches in diameter and 17.5 inches high surrounded by 10 inches of lead		x									x	
			2 MFP contaminated casks, IF-100 and IF-200. The 100 cask is 13 ft long x 32 inches in diameter and weights 22 tons. The cask consists of two stainless steel cylinders separated by 8.5 inches of lead shielding in the annulus. The 200 cask is 13 ft long x 3 ft in diameter weighing 25 tons. The cask consists of two stainless steel cylinders separated by 8.5 inches of lead shielding in the annulus		x									x	
			Semi trailer or carriage contaminated with Cs-137.	x											
			TA-5 routine operational and miscellaneous decontamination waste		x										
			count of positives	9	6	1	0	0	0	1	1	0	0	3	21
			% of total debris volume	43%	29%	5%	0%	0%	0%	5%	5%	0%	0%	14%	100%
			debris volume (cu yd)	849	566	94	-	-	-	94	94	-	-	283	1,980
G	Unclassified	1877	Thorium and uranium alloyed aluminum Polaris missile sections	x											
			3 each glove boxes	x											
			one Mettler balance and fume hood contaminated with fission products	x											
			MFP contaminated concrete	x			x								
			2 each 55 gallon poly drums containing MFP contaminated spent demineralizer resin			x									
			fluorescent light bulbs		x								x		
			HEPA and prefilters	x											
			MFP contaminated TV camera		x	x									

**Table J.1.2 - MWL Alternative V.b-
Waste Inventory and Distribution**

Trench/Pit	Designation	Debris Volume (yd ³)	Item	LLW	Mixed	Small Sized Sources	Large Sized Sources	TRU Waste	Classified	Tritium	Depleted Uranium	Be	PCB	Lead	Total Counted
			1000 cubic yards of dirt from the reactor berm removal	x											
			TA-5 routine operational and miscellaneous decontamination waste		x										
			Total Items	6	3	2	1	0	0	0	0	0	1	0	13
			% of total debris volume	46%	23%	15%	8%	0%	0%	0%	0%	0%	8%	0%	100%
			debris volume (cu yd)	866	433	289	144	-	-	-	-	-	144	-	1,877
		12076	Total Debris Volume	5,392	2,275	1,032	600	21	462	777	765	84	245	423	12,076
			% of Total Debris Volume	45%	19%	9%	5%	0%	4%	6%	6%	1%	2%	3%	100%

**Table J.1.2 - MWL Alternative V.b-
Waste Inventory and Distribution**

Trench/Pit	Designation	Debris Volume (yd ³)	Item	LLW	Mixed	Small Sized Sources	Large Sized Sources	TRU Waste	Classified	Tritium	Depleted Uranium	Be	PCB	Lead	Total Counted
SP-1	Classified	16	2 each depleted tritium beds							x					
			3 gallons NaOH		x										
			3 gallons acid waste		x										
			1 poly bottle uranium solution	x											
			out dated standard solutions		x										
			30 gallons tritium water							x					
			miscellaneous chemicals with beta/gamma contamination		x										
			4 kg enriched lithium	x											
			4 kg Li-6	x											
			408 grams U-235	x											
SP-2	Classified	91	Plutonium arc tunnel, 4 ftx4ftx10 ft long with a 2 ftx2 ftx5 ft central section. Glove boxes are attached at each end. 20 microspheres remained in the tunnel when it was buried in 1968	x											
SP-3	Classified	47	Be catcher - contained fine particles of Be and DU when buried in 1968								x	x			
SP-4	Classified	15	Nuclear reactor vessel plates - 6 ft sections used in fission product and Co-60 activation studies (2 rem/hr on contact)				x								
SP-5	Classified	52	10,000 Ci Co-60 source - 12 stainless steel rods, 12 in long x0.5 in diameter, each containing 8 cobalt metal pellets. Each cobalt pellet is 0.5 in long. The pellet are located in the center of each rod with 4 in of lead as shielding filing each end. Each cobalt rod contain 840 Ci in 1961. The Co-60 source was removed from service in1987. The Co-60 source was buried in a 6.7cu ft lead burial cask which was encased in a 24 cu yd concrete burial cask. The original 10,000 Ci source will have decayed to 76 Ci as of 1998 or 6.4 Ci per rod	x	x										
1	Classified	9	DU contaminated weapons components						x		x				
2	Classified	9	Du contaminated debris bed								x				
3a	Classified	9	DU contaminated weapons components, 22 kg DU						x		x				
3b	Classified	9	DU contaminated Mark III missile sections						x		x				
4	Classified	13	DU contaminated weapons components						x		x				
5	Classified	9	DU contaminated weapons components						x		x				
6	Classified	9	DU contaminated weapons components						x		x				
7	Classified	13	DU contaminated weapons components, 846 kg DU						x		x				
8	Classified	9	DU contaminated weapons components						x		x				
9	Classified	70	DU contaminated weapons components						x		x				
10	Classified	70	DU contaminated weapons components, 178 kg DU						x		x	x			
11	Classified	70	7 NTS test shapes, 42 kg DU						x		x				
12	Classified	70	Neutron generator tubes, 1 kg thorium, 103 kg DU	x							x				
13	Classified	70	One each 1800 Ci Co-60 source sealed in a lead and steel burial cask encapsulated in two truckloads of concrete	x	x									x	
			one each 98uCi Ra-226 source	x											
			one each 1.3 uCi Ra-226 source	x											
			two each 5.0 uCi Ra-226 sources	x											
			one each 1.0 uCi Ra-226 source encapsulated in concrete filled A/N can	x											
14	Classified	101	one each sealed 5.0uCi Po-210 source and source holder	x											
			one each sealed 1.0 uCi Po-210 source	x											
			miscellaneous uranium and beryllium waste								x	x			
			"Cypress" test debris from NTS						x						
			DU contaminated vacuum cleaner								x				
			3 Ci tritium water							x					
			100 mCi tritium oxide							x					

**Table J.1.2 - MWL Alternative V.b-
Waste Inventory and Distribution**

Trench/Pit	Designation	Debris Volume (yd ³)	Item	LLW	Mixed	Small Sized Sources	Large Sized Sources	TRU Waste	Classified	Tritium	Depleted Uranium	Be	PCB	Lead	Total Counted
			Pu-238, Po-210, and tritium contaminated miscellaneous operational and lab waste					x		x					
			tritium contaminated pumps and valves							x					
			Pu-238 contaminated air sampler					x							
			Neutron generator tubes, 1 kg thorium, 103 kg DU	x							x				
			a large weapon shell (18 megaton WW2)	x					x			x			
			DU contaminated weapons components						x		x				
			178 kg DU								x				
15	Classified	101	one each 102.1 uCi Ra-226/Be source and one each 5.5 uCi source in a encapsulated in concrete filled 55 gallon drum									x			
			fume hood filters and filter housings	x											
			reactor fuel element ends (5 rem/hr on contact)			x									
			"Cypress" test debris from NTS						x						
			neutron generator tubes and targets	x											
			DU contaminated weapons components								x				
			Pershing missile debris	x								x			
			167 kg DU								x				
			49 grams U-235	x											
			30 Ci tritium							x					
16	Classified	70	one each sealed 2.5 Ci Co-60 source encapsulated in a concrete filled lead cask	x											
			two each non functional 1.5 mCi Ra-226 ionization alphanon gauges encapsulated in a concrete filled A/N can	x											
			9 each Ba-133 reactor bolts			x					x				
			2 each 52 Ci Co-60 pencils encapsulated in a lead lined concrete filled 55 gallon drum		x									x	
			2 each 10.0 uCi Ra-226/Be sources in lead container encapsulated in a concrete filled 5 gallon A/N can		x							x		x	
			one each 1000 Ci Co-60 source encapsulated in a lead lined concrete filled 55 gallon drum		x									x	
			ionization chambers and current regulators	x											
			one each 0.8 mCi Kr-85 source encapsulated in a concrete filled A/N can	x											
			one each 40 mCi Am-241 source encapsulated in a concrete filled A/N can					x							
			one each 18.9 Ci Kr-85 nuclear battery in a steel tube encapsulated in a concrete filled A/N can		x									x	
			reactor control rod guides encapsulated in a lead lined concrete filled A/N can (50 rem/hr on contact)		x		x							x	
			thorium metal scrap	x											
			one each Sb-124 source projectile (10 rem/hr on contact)	x											
			20 each 5.0 uCi Ra-226/Be sources in lead container encapsulated in concrete filled A/N can		x							x		x	
			2 kg thorium oxide	x											
			2,390 kg DU								x				
			75 Ci tritium							x					
17	Classified	70	"Casseto" and "Triga" parts from NTS						x						
			one each 0.5 mCi Ra-226/Be source one each 36 Ci Co-60 source, and one each 6.0 Ci Sr-90 source each in a lead container encapsulated in concrete filled 55 gallon drum		x							x		x	
			11 each Kr-85 cells (8.1 mCi total)	x											
			2 each uranium carbide nose cones	x											
			uranium and zirconium scrap in a 55 gallon drum	x											
			30 Ci tritium lab waste in brass tube							x					
			neutron generator tubes	x											
			dummy DU reservoir								x				
			DU scrap and machine parts								x				
			test specimens brazed to aluminum	x								x			
			fusing and firing assemblies	x								x			

**Table J.1.2 - MWL Alternative V.b-
Waste Inventory and Distribution**

Trench/Pit	Designation	Debris Volume (yd ³)	Item	LLW	Mixed	Small Sized Sources	Large Sized Sources	TRU Waste	Classified	Tritium	Depleted Uranium	Be	PCB	Lead	Total Counted
			DU contaminated weapon components						x		x				
			3 kg thorium oxide	x											
			457 kg DU	x							x				
18	Classified	70	Pu-238 contaminated paper gloves, small equipment, components, wire, and sockets					x							
			12 each spark gap tubes	x											
			7 each 10 uCi Ra-226/Be sources in a lead container encapsulated in concrete filled 55 gall on drum		x							x		x	
			Pu-238 contaminated vacuum pump					x							
			radioactive rock	x											
			electrical cables from junction box		x									x	
			reactor fuel elements ends (5 rem/hr on contact)				x								
			neutron generator tubes	x											
			Pershing missile test debris	x								x			
			DU contaminated weapons components						x		x				
			155 mm gun projectile with a Sb-124 source	x											
			762 kg DU								x				
			45 Ci tritium							x					
19	Classified	70	Tritium contaminate buckets , clothing, swipes, rags, paper, work gloves, vacuum cleaner, and decontamination materials	x						x					
			reactor fuel element ends (5 rem/hr on contact)				x								
			one each Sb-124 source projectile (10 rem/hr on contact)	x											
			neutron generator tubes	x											
			scrap metal, DU contaminated muffle furnace	x							x				
			irradiated diodes, transistors, capacitors, resistors, circuit boards, voltage regulators, and other miscellaneous electrical components		x										
			one each 3.5 uCi Co-60 source and one each 4.1 uCi Co-60 source in a lead container encapsulated in concrete filled 55 gallon drum		x									x	
			Pershing missile test debris	x								x			
			tritium bed							x					
			scrap iron	x											
			Pu-238/239 contaminated filters					x							
			621 kg DU								x				
			60 Ci tritium							x					
21	Classified	70	two each 3.4 uCi Co-60 sources, one each 31.8 uCi Sr-90 source, one each 100 uCi Co-60 source, one each leaking Sb-124 source and one each spent Cs-137 source in a lead container encapsulated in concrete filled 55 gallon drum		x									x	
			NTS irradiated material	x					x						
			DU contaminated paper, towels, and poly bottles								x				
			plutonium oxide contaminated filters, towels, tape, paper, cleaning and decontamination materials,	x				x							
			4 each irradiated thermal batteries		x									x	
			oil diffusion pump and baffle										x		
			irradiated diodes, transistors, capacitors, resistors, circuit boards, voltage, regulators, and other miscellaneous electrical components		x										
			neutron generator tubes	x											
			Pershing missile test debris	x								x			
			Du contaminated weapons components						x		x				
			16 kg thorium	x											
			1731 kg DU 0.1 grams Pu-238			x					x				
			30 Ci tritium							x					
24	Classified	70	"Hudson Moon" and "Mint Leaf" test debris from NTS						x						
			3 each 500 uCi Ra-226 ionization alphasatron gauges encapsulated in a concrete filled A/N can	x											
			one each 45 Ci Co-60 source in a lead shield housing		x									x	

**Table J.1.2 - MWL Alternative V.b-
Waste Inventory and Distribution**

Trench/Pit	Designation	Debris Volume (yd ³)	Item	LLW	Mixed	Small Sized Sources	Large Sized Sources	TRU Waste	Classified	Tritium	Depleted Uranium	Be	PCB	Lead	Total Counted
			irradiated diodes, transistors, capacitors, resistors, circuit boards, voltage regulators, and other miscellaneous electrical components		x										
			reactor fuel element ends (5 rem/hr on contact)			x									
			tritium contaminated General Electric vacuum system, trigger gauge, transducers, hoods, vacuum pump, and panels							x					
			Pu-238, Pu-239, U-235, and U-238 contaminated glove box, gamma probe, and stereo microscope					x							
			neutron generator tubes	x											
			Pershing missile test debris	x								x			
			Du contaminated weapons debris						x		x				
			140 kg DU								x				
			60 Ci tritium							x					
25	Classified	70	Stainless steel sample cylinders	x											
			tritium contaminated flexible vent							x					
			Pu-239 contaminated microscope slide and slide clamps			x									
			"Hudson Moon" and "Mint Leaf" test debris from NTS						x						
			irradiated diodes, transistors, capacitors, resistors, circuit boards, voltage regulators, and other miscellaneous electrical components		x										
			one each 3.5 Ci Ir-192 source encapsulated in concrete filled 5 gallon A/N can	x											
			Ta-182 wire, needles, and foil in lead pigs		x									x	
			4 each 10 uCi Ra-226/Be sources in a lead container encapsulated in concrete filled 55 gallon drum	x								x		x	
			one each 30 Ci Ir-192 source encapsulated in concrete filled 10 gallon A/N can	x											
			Ba-133 reactor bolts			x									
			DU ballast, machine chips, cuttings, and turnings								x				
			hepa filters and prefilters	x											
			DU contaminated penetration vehicles												
			one each Pu-238 contaminated stereo microscope, glove box, balance, and manipulator arm					x							
			reactor fuel element ends (5 rem/hr on contact)				x								
			DU contaminated ceramic base plates and electric furnace								x				
			irradiated scrap nickel and reactor material		x										
			DU contaminated sputtering shield, O-rings, and steel wool								x				
			15 each irradiated fission chambers			x									
			Be contaminated glove box and balance									x			
			irradiated floor and exhaust hood coverings	x											
			tritium contaminated ion pump							x					
			MFP contaminated transistors, diodes, resistors, circuits, paper, and plastic		x										
			one each iridium iriditron, one each 11.6 uCi Ra-226 dew pointer in brass cylinder one each DU aft simulator								x				
			neutron generator tubes	x											
			SRAM missile test debris						x			x			
			DU contaminated weapons components						x		x				
			1431 kg DU								x				
			76.5 Ci tritium							x					
26	Classified	70	Co-57 contaminated cleanup debris	x											
			DU machine chips, turnings, cuttings								x				
			irradiated diodes, transistors, capacitors, resistors, circuit boards, voltage regulators, and other miscellaneous electrical components		x										
			5 each carbon rings	x											
			DU contaminated cloth, towels, and paper								x				
			MFP contaminated machining wastes	x											

**Table J.1.2 - MWL Alternative V.b-
Waste Inventory and Distribution**

Trench/Pit	Designation	Debris Volume (yd ³)	Item	LLW	Mixed	Small Sized Sources	Large Sized Sources	TRU Waste	Classified	Tritium	Depleted Uranium	Be	PCB	Lead	Total Counted
			4 each 4.0 Ci Co-60 sources in a lead container encapsulated in concrete filled 55 gallon drum		x									x	
			100 uCi Na-22	x											
			DU contaminated Pershing missile debris								x	x			
			DU contaminated Sierra Army Depot debris								x				
			18 each 1.8 uCi Ra-226 ionization alphasources encapsulated in concrete filled 32 gallon A/N can	x							x				
			Ta-182 wires in a lead pig		x									x	
			3 each Victoreen Sr-90 ion chambers	x											
			DU contaminated penetration ballast, noses, and aft simulators								x				
			5 each sealed 389 uCi Ba-133 sources	x											
			5 each sealed 160 uCi Ra-226 sources	x											
			2 each sealed 10 uCi Ra-226 check sources	x											
			2 each sealed 2.2 uCi Cs-137 check sources	x											
			3 each sealed 4.6 uCi Co-60 solution in glass ampules	x											
			one each sealed 1.0 uCi Sr-90 solution in a glass ampule	x											
			one each sealed 0.6 uCi Kr-85 gas in a glass ampule	x											
			firing and fusing sets	x											
			DU contaminated weapons components						x		x				
			5,525 kg DU								x				
			88.5 Ci tritium							x					
27	Classified	70	one each DU nose ballast								x				
			one each tritium contaminated shipping container							x					
			DU plates								x				
			3 each empty steel gas cylinders	x											
			tritium targets							x					
			2 each DU penetrators								x				
			enriched uranium tensile bars alloyed with Fe-50	x											
			1 kg thorium oxide	x											
			neutron generator tubes	x											
			155 mm gun debris	x											
			3,246 kg DU								x				
			81 Ci tritium							x					
28	Classified	70	6 each 55 gallon drums obtaining DU debris								x				
			Cs-137 contaminated debris in sealed A/N can	x											
			one each 100 uCi Victoreen Sr-90 ion chamber	x											
			10 each irradiated headers	x											
			DU contaminated tapered cantilever and double cantilever								x				
			neutron generator tubes	x											
30	Classified	4	20 each 0.4 Ci neutron activated aluminum reflector plates encapsulated in concrete	x											
			4 each 187 Ci Co-60 neutron activated stainless steel tubes encapsulated in concrete	x											
			activated stainless steel pipe containing reactor instrumentation(1,000 rem/hr on contact)				x								
			thoria capsules and fragments	x											
31	Classified	70	Cs-137 contaminated reactor waste in sealed A/N can			x									
			8 each DU ballast plugs								x				
			DU machine chips, turnings, and cuttings								x				
			19 each highly oxidized DU plates								x				
			miscellaneous operational and cleanup wastes including towels, paper, packing material wire, gloves, and tape	x											
			one each 10 uCi Ra-226 ionostat	x											
			one each 45 mCi Kr-85 ion generator	x											
			prefilters from exhaust systems	x											
			one each 4 mCi Ra-226/Be source	x								x			
			4 each DU plates								x				
			3 each uranium/zirconium samples	x											

**Table J.1.2 - MWL Alternative V.b-
Waste Inventory and Distribution**

Trench/Pit	Designation	Debris Volume (yd ³)	Item	LLW	Mixed	Small Sized Sources	Large Sized Sources	TRU Waste	Classified	Tritium	Depleted Uranium	Be	PCB	Lead	Total Counted
			one each 16 mCi Se-75 source in steel block	x											
			2 each 55 gallon drums contaminated with DU oxide								x				
			quartz cloth contaminated with thorium	x											
			1 gallon toluene absorbed on vermiculite in sealed A/N can		x										
			Neutron generator tubes and targets	x											
			DU contaminated weapons test debris						x		x				
			Pershing missile test debris	x								x			
			2,460 kg DU								x				
			27.7 Ci tritium							x					
32	Classified	70	two pints deuterium water absorbed on vermiculite in sealed 2 gallon A/N can	x											
			one each 150 mCi Ta-182 source in lead pig		x									x	
			2 each Ta-182 plugs removed from a rain erosion rocket in sealed A/N can	x											
			neutron generator tubes and targets	x											
			DU contaminated inner shield assembly								x				
			Ra-226, Na-22, Ba-133, Co-60, Co-57, Mo-54, mixed isotopes (1.0 mCi) in lead pig		x									x	
			6 each 1.0 mCi Se-75 sources in lead pig		x									x	
			6kg DU contaminated lithium tetra-borate								x				
			10 each Po-210 static eliminators	x											
			25 each 1.0 uCi Sm-151 source in sealed A/N can	x											
			one each 0.1 mCi Pm-147 source in a sealed A/N can	x											
			tritium contaminated glove box							x					
			549 kg DU								x				
			55.6 Ci tritium							x					
			Trace Gd-153, Eu-152, Ce-144, Sr-85, Ba-133, Ag-110m, Tc-99, Ni-63, Na-22, and Pm-147	x											
33	Classified	70	one each 24 kg DU sphere						x		x				
			one each 86 Ci Co-60 source in 4,000 lb lead cask		x									x	
			15 each 70 mCi Co-60 sources, one each 1.0 mCi Pm-147 source, one each 350 mCi Se-75 source, 15 each 85 mCi Cs-137 sources, and 10 each 25 mCi Ra-226 sources encapsulated in concrete filled 55 gallon drums	x											
			thorium contaminated quartz cloth	x											
			200 grams uranium hydride	x											
			one each 50 Ci Kr-85 source encapsulated in a concrete filled A/N can	x											
			activated stainless steel roller plate	x											
			TA-5 hot cell decontamination debris	x											
			one each irradiated balance	x											
			fuel element				x								
			cladding and associated parts from reactor instrumented fuel elements, vacuum system, filters, and tools (2 rem/hr on contact)			x									
			irradiated, disassembled pressure vessel and crucible	x											
			tritium targets and tubes							x					
			Three Mile island radiation detector	x											
			1.6 kg Be									x			
			2,125 kg DU								x				
			822 Ci tritium							x					
			1 kg thorium	x											
34	Classified	70	one each 110 Ci Co-60 radiography source encapsulated in concrete filled A/N can	x											
			one each ultra sonic thermometer consisting of a stainless steel tube loaded with copper, cobalt, tantalum, thoria, nickel, and iron (15 rem/hr on contact)		x										

**Table J.1.2 - MWL Alternative V.b-
Waste Inventory and Distribution**

Trench/Pit	Designation	Debris Volume (yd ³)	Item	LLW	Mixed	Small Sized Sources	Large Sized Sources	TRU Waste	Classified	Tritium	Depleted Uranium	Be	PCB	Lead	Total Counted
			activated stainless steel tubing (2 rem/hr on contact)	x											
			obsolete experimental equipment and parts (3 rem/hr on contact)	x											
			one each Cs-137 contaminated WESF capsule	x											
			neutron generator tubes and targets	x											
			200 grams activated silver		x										
			firing sets	x											
			uranyl nitrate coatings of foil	x											
			trough assembly used in fuel element cleanup	x											
			1,676 kg DU								x				
			328 Ci tritium							x					
35	Classified	70	Neutron generator tubes and targets	x											
			neutron activated brass		x										
			4 each 55 gallon drums DU from White Sands Missile Range								x				
			one each activated stainless steel containment canister	x											
			686 kg DU								x				
			203 Ci tritium							x					
36	Classified	70	Neutron generator tubes and targets	x											
			one each microcomputer		x										
			irradiated diodes, transistors, capacitors, resistors, circuit boards, voltage regulators, and other miscellaneous electrical components		x										
			3 each activated stainless steel containment canisters wrapped in poly ethylene sheeting	x											
			one each weapon shipping and handling container	x											
			thorium contaminated Polaris missile sections	x											
			rings from reactor fuel elements (1.7 rem/hr on contact)				x								
			4 each 55 gallon drums containing wastes contaminated with fission products			x									
			673 kg DU								x				
			13.1 kg lithium	x											
37	Classified		empty, no contents												
U-1	Classified	70	1,589 kg DU in chips, machine turnings, shavings, cuttings, residue, and scrap								x				
U-2	Classified	70	5,119 kg DU in chips machine turnings, shavings, cuttings, residue, and scrap								x				
			one each irradiated melt chamber	x											
			one each copper crucible containing DU scrap		x						x				
U-3	Classified	70	1,114 kg DU in chips, machine turnings, shavings, cuttings, residue, and scrap								x				
			1,000 lbs of burn site DU contaminated soil and debris								x				
			one each DU contaminated 300 lb crucible								x				
		2207													
			Total Items	130	40	10	8	9	28	30	78	23	1	22	379
			% of total debris volume	34%	11%	3%	2%	2%	7%	8%	21%	6%	0%	6%	100%
			debris volume (cu yd)	757	233	58	47	52	163	175	454	134	6	128	2,207
			Project Total	6,149	2,508	1,090	646	73	625	952	1,219	218	251	551	14,283
			Percent of Total	43%	18%	8%	5%	1%	4%	7%	9%	2%	2%	4%	100.00%

Appendix J.2- Risk Calculations and Assumptions

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Table J.2.1 - Tritium Flux Exposure Evaluation

Risk	Inhalation Slope Factor (risk/pCi)	Inhalation Dose Factor (mrem/pCi)	Tritium Conc from Flux (pCi/m3)	Inhalation Rate (m3/day)	Exposure Frequency (days/year)	Exposure Duration (years)	Risk
Cancer Risk for remediation	8.51E-13		1.90E+04	20	250	9	7.28E-04
Dose in mrem/yr		6.40E-08	1.90E+04	20	250	1	6.08E+00

Assumptions:

Average tritium flux for all datapoints beneath the area under the tent

Average tritium flux equals constant air concentration

Air is undiluted (would be diluted upon venting)

Risk = Risk Factor x Concentration x Inhalation Rate x Exposure Frequency x Exposure Duration

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Part I: Mixture Sums and Single Radionuclide Guidelines
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Time = 0.000E+00	15
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Menu	Parameter	Current Value	Default	Parameter Name
Dose conversion factors for inhalation, mrem/pCi:				
B-1	Ac-227+D	6.720E+00	6.720E+00	DCF2(1)
B-1	Am-241	4.440E-01	4.440E-01	DCF2(2)
B-1	Co-60	2.190E-04	2.190E-04	DCF2(3)
B-1	Cs-137+D	3.190E-05	3.190E-05	DCF2(4)
B-1	H-3	6.400E-08	6.400E-08	DCF2(5)
B-1	Np-237+D	5.400E-01	5.400E-01	DCF2(6)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(7)
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(8)
B-1	Pu-238	3.920E-01	3.920E-01	DCF2(9)
B-1	Pu-239	4.290E-01	4.290E-01	DCF2(10)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(11)
B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(12)
B-1	Sr-90+D	1.310E-03	1.310E-03	DCF2(13)
B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(14)
B-1	Th-229+D	2.160E+00	2.160E+00	DCF2(15)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(16)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(17)
B-1	U-233	1.350E-01	1.350E-01	DCF2(18)
B-1	U-234	1.320E-01	1.320E-01	DCF2(19)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(20)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(21)
Dose conversion factors for ingestion, mrem/pCi:				
D-1	Ac-227+D	1.480E-02	1.480E-02	DCF3(1)
D-1	Am-241	3.640E-03	3.640E-03	DCF3(2)
D-1	Co-60	2.690E-05	2.690E-05	DCF3(3)
D-1	Cs-137+D	5.000E-05	5.000E-05	DCF3(4)
D-1	H-3	6.400E-08	6.400E-08	DCF3(5)
D-1	Np-237+D	4.440E-03	4.440E-03	DCF3(6)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(7)
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(8)
D-1	Pu-238	3.200E-03	3.200E-03	DCF3(9)
D-1	Pu-239	3.540E-03	3.540E-03	DCF3(10)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(11)

[illegible]

Dose Conversion Factor (and Related) Parameter Summary (continued)

File: HEAST 1995 Morbidity

Menu	Parameter	Current Value	Default	Parameter Name
D-34	Am-241 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(2,1)
D-34	Am-241 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-05	5.000E-05	RTF(2,2)
D-34	Am-241 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-06	2.000E-06	RTF(2,3)
D-34	Co-60 , plant/soil concentration ratio, dimensionless	8.000E-02	8.000E-02	RTF(3,1)
D-34	Co-60 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-02	2.000E-02	RTF(3,2)
D-34	Co-60 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(3,3)
D-34	Cs-137+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Cs-137+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.000E-02	3.000E-02	RTF(4,2)
D-34	Cs-137+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	8.000E-03	8.000E-03	RTF(4,3)
D-34	H-3 , plant/soil concentration ratio, dimensionless	4.800E+00	4.800E+00	RTF(5,1)
D-34	H-3 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.200E-02	1.200E-02	RTF(5,2)
D-34	H-3 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-02	1.000E-02	RTF(5,3)
D-34	Np-237+D , plant/soil concentration ratio, dimensionless	2.000E-02	2.000E-02	RTF(6,1)
D-34	Np-237+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(6,2)
D-34	Np-237+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(7,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(7,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(8,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(8,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(8,3)
D-34	Pu-238 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(9,1)
D-34	Pu-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(9,2)
D-34	Pu-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(9,3)
D-34	Pu-239 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(10,1)
D-34	Pu-239 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(10,2)
D-34	Pu-239 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(10,3)
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(11,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(11,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(11,3)
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(12,1)
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(12,2)
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(12,3)

D-34	3				3	3	3
D-34	3	Sr-90+D	, plant/soil concentration ratio, dimensionless		3	3.000E-01	3 RTF(13,1)
D-34	3	Sr-90+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)		3	8.000E-03	3 RTF(13,2)
D-34	3	Sr-90+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)		3	2.000E-03	3 RTF(13,3)
D-34	3				3		3

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Summary : Mixed Waste Landfill Industrial (Excavation Scenario - 2003)

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Dose Conversion Factor (and Related) Parameter Summary (continued)
File: HEAST 1995 Morbidity

Menu	Parameter	Current Value	Default	Parameter Name
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(14,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(14,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(14,3)
D-34	Th-229+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(15,1)
D-34	Th-229+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(15,2)
D-34	Th-229+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(15,3)
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(16,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(16,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(16,3)
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(17,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(17,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(17,3)
D-34	U-233 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(18,1)
D-34	U-233 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(18,2)
D-34	U-233 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(18,3)
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(19,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(19,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(19,3)
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(20,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(20,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(20,3)
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(21,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(21,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(21,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5	Am-241 , fish	3.000E+01	3.000E+01	BIOFAC(2,1)
D-5	Am-241 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(2,2)
D-5	Co-60 , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Co-60 , crustacea and mollusks	2.000E+02	2.000E+02	BIOFAC(3,2)
D-5	Cs-137+D , fish	2.000E+03	2.000E+03	BIOFAC(4,1)
D-5	Cs-137+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(4,2)
D-5	H-3 , fish	1.000E+00	1.000E+00	BIOFAC(5,1)
D-5	H-3 , crustacea and mollusks	1.000E+00	1.000E+00	BIOFAC(5,2)
D-5	Np-237+D , fish	3.000E+01	3.000E+01	BIOFAC(6,1)
D-5	Np-237+D , crustacea and mollusks	4.000E+02	4.000E+02	BIOFAC(6,2)

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Summary : Mixed Waste Landfill Industrial (Excavation Scenario - 2003)

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Menu	Parameter	Current Value	Default	Parameter Name
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(7,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(7,2)
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(8,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(8,2)
D-5	Pu-238 , fish	3.000E+01	3.000E+01	BIOFAC(9,1)
D-5	Pu-238 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(9,2)
D-5	Pu-239 , fish	3.000E+01	3.000E+01	BIOFAC(10,1)
D-5	Pu-239 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(10,2)
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(11,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(11,2)
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(12,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(12,2)
D-5	Sr-90+D , fish	6.000E+01	6.000E+01	BIOFAC(13,1)
D-5	Sr-90+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(13,2)
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(14,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(14,2)
D-5	Th-229+D , fish	1.000E+02	1.000E+02	BIOFAC(15,1)
D-5	Th-229+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(15,2)
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(16,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(16,2)
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(17,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(17,2)
D-5	U-233 , fish	1.000E+01	1.000E+01	BIOFAC(18,1)
D-5	U-233 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(18,2)
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(19,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(19,2)
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(20,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(20,2)
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(21,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(21,2)

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Summary : Mixed Waste Landfill Industrial (Excavation Scenario - 2003)

File : Mwex2003_v2.rad

Site-Specific Parameter Summary					
Menu	Parameter	User Input	Default	Used by RESRAD	Parameter Name
AAAAAA					
R011	Area of contaminated zone (m**2)	1.052E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	5.000E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	1.500E+01	2.500E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.800E+01	1.000E+00	---	T(2)
R011	Times for calculations (yr)	2.300E+01	3.000E+00	---	T(3)
R011	Times for calculations (yr)	not used	1.000E+01	---	T(4)

R011	3	Times for calculations (yr)	3	not used	3	3.000E+01	3	---	3	T(5)
R011	3	Times for calculations (yr)	3	not used	3	1.000E+02	3	---	3	T(6)
R011	3	Times for calculations (yr)	3	not used	3	3.000E+02	3	---	3	T(7)
R011	3	Times for calculations (yr)	3	not used	3	1.000E+03	3	---	3	T(8)
R011	3	Times for calculations (yr)	3	not used	3	0.000E+00	3	---	3	T(9)
R011	3	Times for calculations (yr)	3	not used	3	0.000E+00	3	---	3	T(10)
	3		3		3		3		3	
R012	3	Initial principal radionuclide (pCi/g): Am-241	3	3.600E+01	3	0.000E+00	3	---	3	S1(2)
R012	3	Initial principal radionuclide (pCi/g): Co-60	3	1.500E+04	3	0.000E+00	3	---	3	S1(3)
R012	3	Initial principal radionuclide (pCi/g): Cs-137	3	1.100E+04	3	0.000E+00	3	---	3	S1(4)
R012	3	Initial principal radionuclide (pCi/g): H-3	3	3.200E+04	3	0.000E+00	3	---	3	S1(5)
R012	3	Initial principal radionuclide (pCi/g): Pu-238	3	3.300E-02	3	0.000E+00	3	---	3	S1(9)
R012	3	Initial principal radionuclide (pCi/g): Pu-239	3	3.600E-02	3	0.000E+00	3	---	3	S1(10)
R012	3	Initial principal radionuclide (pCi/g): Ra-226	3	1.800E+02	3	0.000E+00	3	---	3	S1(11)
R012	3	Initial principal radionuclide (pCi/g): Sr-90	3	8.900E+03	3	0.000E+00	3	---	3	S1(13)
R012	3	Initial principal radionuclide (pCi/g): Th-232	3	3.000E+01	3	0.000E+00	3	---	3	S1(17)
R012	3	Initial principal radionuclide (pCi/g): U-238	3	2.800E+02	3	0.000E+00	3	---	3	S1(21)
R012	3	Concentration in groundwater (pCi/L): Am-241	3	not used	3	0.000E+00	3	---	3	W1(2)
R012	3	Concentration in groundwater (pCi/L): Co-60	3	not used	3	0.000E+00	3	---	3	W1(3)
R012	3	Concentration in groundwater (pCi/L): Cs-137	3	not used	3	0.000E+00	3	---	3	W1(4)
R012	3	Concentration in groundwater (pCi/L): H-3	3	not used	3	0.000E+00	3	---	3	W1(5)
R012	3	Concentration in groundwater (pCi/L): Pu-238	3	not used	3	0.000E+00	3	---	3	W1(9)
R012	3	Concentration in groundwater (pCi/L): Pu-239	3	not used	3	0.000E+00	3	---	3	W1(10)
R012	3	Concentration in groundwater (pCi/L): Ra-226	3	not used	3	0.000E+00	3	---	3	W1(11)
R012	3	Concentration in groundwater (pCi/L): Sr-90	3	not used	3	0.000E+00	3	---	3	W1(13)
R012	3	Concentration in groundwater (pCi/L): Th-232	3	not used	3	0.000E+00	3	---	3	W1(17)
R012	3	Concentration in groundwater (pCi/L): U-238	3	not used	3	0.000E+00	3	---	3	W1(21)
	3		3		3		3		3	
R013	3	Cover depth (m)	3	0.000E+00	3	0.000E+00	3	---	3	COVER0
R013	3	Density of cover material (g/cm**3)	3	not used	3	1.500E+00	3	---	3	DENSCV
R013	3	Cover depth erosion rate (m/yr)	3	not used	3	1.000E-03	3	---	3	VCV
R013	3	Density of contaminated zone (g/cm**3)	3	1.850E+00	3	1.500E+00	3	---	3	DENSCZ
R013	3	Contaminated zone erosion rate (m/yr)	3	0.000E+00	3	1.000E-03	3	---	3	VCZ
R013	3	Contaminated zone total porosity	3	4.000E-01	3	4.000E-01	3	---	3	TPCZ
R013	3	Contaminated zone field capacity	3	2.000E-01	3	2.000E-01	3	---	3	FCCZ
R013	3	Contaminated zone hydraulic conductivity (m/yr)	3	3.650E+03	3	1.000E+01	3	---	3	HCCZ
R013	3	Contaminated zone b parameter	3	4.900E+00	3	5.300E+00	3	---	3	BCZ
R013	3	Average annual wind speed (m/sec)	3	3.630E+00	3	2.000E+00	3			

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW

R015	3	Number of unsaturated zone strata	3	not used	3	1	3	---	3	NS
R015	3	Unsat. zone 1, thickness (m)	3	not used	3	4.000E+00	3	---	3	H(1)
R015	3	Unsat. zone 1, soil density (g/cm**3)	3	not used	3	1.500E+00	3	---	3	DENSUZ(1)
R015	3	Unsat. zone 1, total porosity	3	not used	3	4.000E-01	3	---	3	TPUZ(1)
R015	3	Unsat. zone 1, effective porosity	3	not used	3	2.000E-01	3	---	3	EPUZ(1)
R015	3	Unsat. zone 1, field capacity	3	not used	3	2.000E-01	3	---	3	FCUZ(1)
R015	3	Unsat. zone 1, soil-specific b parameter	3	not used	3	5.300E+00	3	---	3	BUZ(1)
R015	3	Unsat. zone 1, hydraulic conductivity (m/yr)	3	not used	3	1.000E+01	3	---	3	HCUZ(1)
	3		3		3		3		3	
R016	3	Distribution coefficients for Am-241	3		3		3		3	
R016	3	Contaminated zone (cm**3/g)	3	2.000E+01	3	2.000E+01	3	---	3	DCNUCC(2)
R016	3	Unsaturated zone 1 (cm**3/g)	3	not used	3	2.000E+01	3	---	3	DCNUCU(2,1)
R016	3	Saturated zone (cm**3/g)	3	not used	3	2.000E+01	3	---	3	DCNUCS(2)
R016	3	Leach rate (/yr)	3	0.000E+00	3	0.000E+00	3	1.148E-06	3	ALEACH(2)
R016	3	Solubility constant	3	0.000E+00	3	0.000E+00	3	not used	3	SOLUBK(2)
	3		3		3		3		3	
R016	3	Distribution coefficients for Co-60	3		3		3		3	
R016	3	Contaminated zone (cm**3/g)	3	1.000E+03	3	1.000E+03	3	---	3	DCNUCC(3)
R016	3	Unsaturated zone 1 (cm**3/g)	3	not used	3	1.000E+03	3	---	3	DCNUCU(3,1)
R016	3	Saturated zone (cm**3/g)	3	not used	3	1.000E+03	3	---	3	DCNUCS(3)
R016	3	Leach rate (/yr)	3	0.000E+00	3	0.000E+00	3	2.309E-08	3	ALEACH(3)
R016	3	Solubility constant	3	0.000E+00	3	0.000E+00	3	not used	3	SOLUBK(3)
	3		3		3		3		3	
R016	3	Distribution coefficients for Cs-137	3		3		3		3	
R016	3	Contaminated zone (cm**3/g)	3	1.000E+03	3	1.000E+03	3	---	3	DCNUCC(4)
R016	3	Unsaturated zone 1 (cm**3/g)	3	not used	3	1.000E+03	3	---	3	DCNUCU(4,1)
R016	3	Saturated zone (cm**3/g)	3	not used	3	1.000E+03	3	---	3	DCNUCS(4)
R016	3	Leach rate (/yr)	3	0.000E+00	3	0.000E+00	3	2.309E-08	3	ALEACH(4)
R016	3	Solubility constant	3	0.000E+00	3	0.000E+00	3	not used	3	SOLUBK(4)
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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
Distribution coefficients for H-3					
R016	Contaminated zone (cm**3/g)	0.000E+00	0.000E+00	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	not used	0.000E+00	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	0.000E+00	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.136E-04	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
Distribution coefficients for Pu-238					
R016	Contaminated zone (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	2.000E+03	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+03	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.155E-08	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
Distribution coefficients for Pu-239					
R016	Contaminated zone (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	2.000E+03	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+03	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.155E-08	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)
Distribution coefficients for Ra-226					
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.294E-07	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
Distribution coefficients for Sr-90					
R016	Contaminated zone (cm**3/g)	3.000E+01	3.000E+01	---	DCNUCC(13)

R016	3	Unsaturated zone 1 (cm**3/g)	3	not used	3	3.000E+01	3	---	3	DCNUCU(13,1)
R016	3	Saturated zone (cm**3/g)	3	not used	3	3.000E+01	3	---	3	DCNUCS(13)
R016	3	Leach rate (/yr)	3	0.000E+00	3	0.000E+00	3	7.670E-07	3	ALEACH(13)
R016	3	Solubility constant	3	0.000E+00	3	0.000E+00	3	not used	3	SOLUBK(13)
	3		3		3		3		3	
R016	3	Distribution coefficients for Th-232	3		3		3		3	
R016	3	Contaminated zone (cm**3/g)	3	6.000E+04	3	6.000E+04	3	---	3	DCNUCC(17)
R016	3	Unsaturated zone 1 (cm**3/g)	3	not used	3	6.000E+04	3	---	3	DCNUCU(17,1)
R016	3	Saturated zone (cm**3/g)	3	not used	3	6.000E+04	3	---	3	DCNUCS(17)
R016	3	Leach rate (/yr)	3	0.000E+00	3	0.000E+00	3	3.849E-10	3	ALEACH(17)
R016	3	Solubility constant	3	0.000E+00	3	0.000E+00	3	not used	3	SOLUBK(17)
	3		3		3		3		3	
R016	3	Distribution coefficients for U-238	3		3		3		3	
R016	3	Contaminated zone (cm**3/g)	3	5.000E+01	3	5.000E+01	3	---	3	DCNUCC(21)
R016	3	Unsaturated zone 1 (cm**3/g)	3	not used	3	5.000E+01	3	---	3	DCNUCU(21,1)
R016	3	Saturated zone (cm**3/g)	3	not used	3	5.000E+01	3	---	3	DCNUCS(21)
R016	3	Leach rate (/yr)	3	0.000E+00	3	0.000E+00	3	4.608E-07	3	ALEACH(21)
R016	3	Solubility constant	3	0.000E+00	3	0.000E+00	3	not used	3	SOLUBK(21)
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Summary : Mixed Waste Landfill Industrial (Excavation Scenario - 2003)										
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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for daughter Ac-227				
R016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.148E-06	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for daughter Np-237				
R016	Contaminated zone (cm**3/g)	-1.000E+00	-1.000E+00	2.574E+02	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	-1.000E+00	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	-1.000E+00	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	8.966E-08	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for daughter Pa-231				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.608E-07	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for daughter Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.307E-07	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for daughter Ra-228				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(12)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(12,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(12)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.294E-07	ALEACH(12)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(12)
R016	Distribution coefficients for daughter Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(14)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(14,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(14)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.849E-10	ALEACH(14)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(14)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
Distribution coefficients for daughter Th-230					
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(16)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(16,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(16)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.849E-10	ALEACH(16)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(16)
Distribution coefficients for daughter U-233					
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(18)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(18,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(18)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.608E-07	ALEACH(18)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(18)
Distribution coefficients for daughter U-234					
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(19)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(19,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(19)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.608E-07	ALEACH(19)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(19)
Distribution coefficients for daughter U-235					
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(20)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(20,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(20)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.608E-07	ALEACH(20)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(20)
R017	Inhalation rate (m**3/yr)	7.300E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	7.600E-07	1.000E-04	---	MLINH
R017	Exposure duration	2.500E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	1.150E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	1.150E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)

Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)

AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA
Am-241	2.876E-01	0.0000	1.548E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.059E+00	0.0002
Co-60	2.036E+03	0.3119	1.504E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.542E-01	0.0000
Cs-137	3.990E+03	0.6113	2.050E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.683E+00	0.0004
H-3	0.000E+00	0.0000	4.006E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.021E-05	0.0000
Pu-238	8.015E-07	0.0000	1.080E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.363E-04	0.0000
Pu-239	1.993E-06	0.0000	1.552E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.069E-03	0.0000
Ra-226	3.677E+02	0.0563	3.705E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.651E+00	0.0012
Sr-90	2.299E+01	0.0035	6.701E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.534E+00	0.0010
Th-232	8.254E+01	0.0126	5.911E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.214E+00	0.0002
U-238	7.851E+00	0.0012	3.323E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.323E-01	0.0001
iiiiiii	iiiiiii	iiiiiii	iiiiiii	iiiiiii	iiiiiii	iiiiiii	iiiiiii	iiiiiii	iiiiiii	iiiiiii	iiiiiii	iiiiiii	iiiiiii	iiiiiii
Total	6.508E+03	0.9969	1.587E-02	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.993E+01	0.0031

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 2.300E+01 years

0

	Water Dependent Pathways													
	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio-	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.348E+00	0.0002
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.036E+03	0.3119
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.993E+03	0.6117
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.036E-03	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.382E-04	0.0000
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.073E-03	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.753E+02	0.0575
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.953E+01	0.0045
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.376E+01	0.0128
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.486E+00	0.0013
iiiiiii	iiiiiii	iiiiiii	iiiiiii	iiiiiii	iiiiiii	iiiiiii	iiiiiii	iiiiiii	iiiiiii	iiiiiii	iiiiiii	iiiiiii	iiiiiii	iiiiiii
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.528E+03	1.0000

0*Sum of all water independent and dependent pathways.

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Summary : Mixed Waste Landfill Industrial (Excavation Scenario - 2003)

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Dose/Source Ratios Summed Over All Pathways

Parent and Progeny Principal Radionuclide Contributions Indicated

Parent	Product	Branch	DSR(j,t)	(mrem/yr)/(pCi/g)
(i)	(j)	Fraction*	t=	0.000E+00 1.800E+01 2.300E+01
AAAAAA	AAAAAA	AAAAAA	AAAAAA	AAAAAA
Am-241	Am-241	1.000E+00	3.886E-02	3.776E-02 3.746E-02
Am-241	Np-237	1.000E+00	3.904E-08	1.424E-06 1.801E-06
Am-241	U-233	1.000E+00	6.373E-16	6.483E-13 1.043E-12
Am-241	Th-229	1.000E+00	1.840E-18	4.628E-14 9.463E-14
Am-241	äDSR(j)		3.886E-02	3.776E-02 3.746E-02
0Co-60	Co-60	1.000E+00	2.794E+00	2.620E-01 1.357E-01
0Cs-137	Cs-137	1.000E+00	6.176E-01	4.075E-01 3.630E-01
0H-3	H-3	1.000E+00	6.291E-05	4.868E-07 1.261E-07
0Pu-238	Pu-238	1.000E+00	2.683E-02	2.327E-02 2.237E-02
Pu-238	U-234	1.000E+00	3.485E-09	1.203E-07 1.499E-07
Pu-238	Th-230	1.000E+00	2.063E-14	2.023E-11 3.223E-11
Pu-238	Ra-226	1.000E+00	9.539E-16	2.331E-11 4.728E-11
Pu-238	Pb-210	1.000E+00	1.774E-19	9.065E-14 2.273E-13
Pu-238	äDSR(j)		2.683E-02	2.327E-02 2.237E-02
0Pu-239	Pu-239	1.000E+00	2.982E-02	2.980E-02 2.980E-02
Pu-239	U-235	1.000E+00	7.052E-11	2.609E-09 3.314E-09
Pu-239	Pa-231	1.000E+00	4.328E-16	4.443E-13 7.168E-13
Pu-239	Ac-227	1.000E+00	1.366E-17	3.024E-13 5.978E-13
Pu-239	äDSR(j)		2.982E-02	2.980E-02 2.980E-02
0Ra-226	Ra-226	1.000E+00	2.074E+00	2.058E+00 2.053E+00
Ra-226	Pb-210	1.000E+00	9.567E-04	2.708E-02 3.206E-02
Ra-226	äDSR(j)		2.075E+00	2.085E+00 2.085E+00
0Sr-90	Sr-90	1.000E+00	5.736E-03	3.737E-03 3.318E-03
0Th-232	Th-232	1.000E+00	2.318E-02	2.318E-02 2.318E-02

0Pu-239	Pu-239	1.000E+00	3.600E-02	3.598E-02	3.598E-02
0U-235	Pu-239	1.000E+00	0.000E+00	6.380E-10	8.152E-10
0Pa-231	Pu-239	1.000E+00	0.000E+00	1.215E-13	1.983E-13
0Ac-227	Pu-239	1.000E+00	0.000E+00	2.023E-14	4.071E-14
0Sr-90	Sr-90	1.000E+00	8.900E+03	5.798E+03	5.148E+03
0Th-232	Th-232	1.000E+00	3.000E+01	3.000E+01	3.000E+01
0Ra-228	Th-232	1.000E+00	0.000E+00	2.657E+01	2.812E+01
0Th-228	Th-232	1.000E+00	0.000E+00	2.489E+01	2.719E+01

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Summary : Mixed Waste Landfill Industrial (Excavation Scenario - 2003)

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Individual Nuclide Soil Concentration

Parent Nuclide and Branch Fraction Indicated

0Nuclide	Parent	BRF(i)	S(j,t), pCi/g			
(j)	(i)		t=	0.000E+00	1.800E+01	2.300E+01
ÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ
U-238	U-238	1.000E+00	2.800E+02	2.800E+02	2.800E+02	2.800E+02
ÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ

BRF(i) is the branch fraction of the parent nuclide.

0RESCALC.EXE execution time = 2.55 seconds

ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ

[illegible]

Cancer Risk Slope Factors	2
Amount of Intake Quantities and Excess Cancer Risks	
Time= 0.000E+00	5
Time= 1.800E+01	10
Time= 2.300E+01	15

Risk Library: HEAST 1995 Morbidity

Menu	Parameter	Current Value	Default	Parameter Name
Ground external radiation slope factors, 1/yr per (pCi/g):				
Sf-1	Ac-227+D	9.30E-07	9.30E-07	SLPF(1,1)
Sf-1	Am-241	4.60E-09	4.60E-09	SLPF(2,1)
Sf-1	Co-60	9.80E-06	9.80E-06	SLPF(3,1)
Sf-1	Cs-137+D	2.10E-06	2.10E-06	SLPF(4,1)
Sf-1	H-3	0.00E+00	0.00E+00	SLPF(5,1)
Sf-1	Np-237+D	4.60E-07	4.60E-07	SLPF(6,1)
Sf-1	Pa-231	2.70E-08	2.70E-08	SLPF(7,1)
Sf-1	Pb-210+D	1.43E-10	1.43E-10	SLPF(8,1)
Sf-1	Pu-238	1.90E-11	1.90E-11	SLPF(9,1)
Sf-1	Pu-239	1.30E-11	1.30E-11	SLPF(10,1)
Sf-1	Ra-226+D	6.70E-06	6.70E-06	SLPF(11,1)
Sf-1	Ra-228+D	3.30E-06	3.30E-06	SLPF(12,1)
Sf-1	Sr-90+D	1.90E-08	1.90E-08	SLPF(13,1)
Sf-1	Th-228+D	6.20E-06	6.20E-06	SLPF(14,1)
Sf-1	Th-229+D	7.70E-07	7.70E-07	SLPF(15,1)
Sf-1	Th-230	4.40E-11	4.40E-11	SLPF(16,1)
Sf-1	Th-232	2.00E-11	2.00E-11	SLPF(17,1)
Sf-1	U-233	3.50E-11	3.50E-11	SLPF(18,1)
Sf-1	U-234	2.10E-11	2.10E-11	SLPF(19,1)
Sf-1	U-235+D	2.70E-07	2.70E-07	SLPF(20,1)
Sf-1	U-238+D	6.60E-08	6.60E-08	SLPF(21,1)
Inhalation, slope factors, 1/(pCi):				
Sf-2	Ac-227+D	7.90E-08	7.90E-08	SLPF(1,2)
Sf-2	Am-241	3.90E-08	3.90E-08	SLPF(2,2)
Sf-2	Co-60	6.90E-11	6.90E-11	SLPF(3,2)
Sf-2	Cs-137+D	1.90E-11	1.90E-11	SLPF(4,2)
Sf-2	H-3	9.60E-14	9.60E-14	SLPF(5,2)
Sf-2	Np-237+D	3.50E-08	3.50E-08	SLPF(6,2)
Sf-2	Pa-231	2.40E-08	2.40E-08	SLPF(7,2)
Sf-2	Pb-210+D	3.80E-09	3.80E-09	SLPF(8,2)
Sf-2	Pu-238	2.70E-08	2.70E-08	SLPF(9,2)
Sf-2	Pu-239	2.80E-08	2.80E-08	SLPF(10,2)
Sf-2	Ra-226+D	2.70E-09	2.70E-09	SLPF(11,2)
Sf-2	Ra-228+D	9.90E-10	9.90E-10	SLPF(12,2)
Sf-2	Sr-90+D	6.90E-11	6.90E-11	SLPF(13,2)
Sf-2	Th-228+D	9.70E-08	9.70E-08	SLPF(14,2)
Sf-2	Th-229+D	8.30E-08	8.30E-08	SLPF(15,2)
Sf-2	Th-230	1.70E-08	1.70E-08	SLPF(16,2)
Sf-2	Th-232	1.90E-08	1.90E-08	SLPF(17,2)
Sf-2	U-233	1.40E-08	1.40E-08	SLPF(18,2)

Menu	Parameter	Current Value	Default	Parameter Name
Sf-3	Pb-210+D	1.01E-09	1.01E-09	SLPF(8,5)
Sf-3	Pu-238	3.00E-10	3.00E-10	SLPF(9,5)
Sf-3	Pu-239	3.20E-10	3.20E-10	SLPF(10,5)
Sf-3	Ra-226+D	3.00E-10	3.00E-10	SLPF(11,5)
Sf-3	Ra-228+D	2.50E-10	2.50E-10	SLPF(12,5)
Sf-3	Sr-90+D	5.60E-11	5.60E-11	SLPF(13,5)
Sf-3	Th-228+D	2.30E-10	2.30E-10	SLPF(14,5)
Sf-3	Th-229+D	3.60E-10	3.60E-10	SLPF(15,5)
Sf-3	Th-230	3.80E-11	3.80E-11	SLPF(16,5)
Sf-3	Th-232	3.30E-11	3.30E-11	SLPF(17,5)
Sf-3	U-233	4.50E-11	4.50E-11	SLPF(18,5)
Sf-3	U-234	4.40E-11	4.40E-11	SLPF(19,5)
Sf-3	U-235+D	4.70E-11	4.70E-11	SLPF(20,5)
Sf-3	U-238+D	6.20E-11	6.20E-11	SLPF(21,5)
Sf-Rn	Radon Inhalation slope factors, 1/(pCi):			
Sf-Rn	Rn-222	1.80E-12	1.80E-12	SLPFRN(1,1)
Sf-Rn	Po-218	3.70E-12	3.70E-12	SLPFRN(1,2)
Sf-Rn	Pb-214	6.20E-12	6.20E-12	SLPFRN(1,3)
Sf-Rn	Bi-214	1.50E-11	1.50E-11	SLPFRN(1,4)
Sf-Rn	Rn-220	1.90E-13	1.90E-13	SLPFRN(2,1)
Sf-Rn	Po-216	3.00E-15	3.00E-15	SLPFRN(2,2)
Sf-Rn	Pb-212	3.90E-11	3.90E-11	SLPFRN(2,3)
Sf-Rn	Bi-212	3.70E-11	3.70E-11	SLPFRN(2,4)
Sf-Rn	Radon K factors, (mrem/WLM):			
Sf-Rn	Rn-222 Indoor	7.60E+02	7.60E+02	KFACTOR(1,1)
Sf-Rn	Rn-222 Outdoor	5.70E+02	5.70E+02	KFACTOR(1,2)
Sf-Rn	Rn-220 Indoor	1.50E+02	1.50E+02	KFACTOR(2,1)
Sf-Rn	Rn-220 Outdoor	2.50E+02	2.50E+02	KFACTOR(2,2)

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1RESRAD, Version 6.21      T« Limit = 0.5 year      10/18/2002  15:34  Page   5
Intrisk : Mixed Waste Landfill Industrial (Excavation Scenario - 2003)
File    : Mwex2003_v2.rad
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	Water Independent Pathways (Inhalation w/o radon)						Water Dependent Pathways					Total
Radio-Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*	
Ac-227	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	
Am-241	3.620E-03	0.000E+00	0.000E+00	0.000E+00	3.022E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.022E+02	
Co-60	1.508E+00	0.000E+00	0.000E+00	0.000E+00	1.259E+05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.259E+05	
Cs-137	1.106E+00	0.000E+00	0.000E+00	0.000E+00	9.235E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.235E+04	
H-3	3.562E+07	0.000E+00	0.000E+00	0.000E+00	2.686E+05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.686E+05	
Np-237	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	
Pa-231	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	
Pu-238	3.318E-06	0.000E+00	0.000E+00	0.000E+00	2.770E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.770E-01	
Pu-239	3.620E-06	0.000E+00	0.000E+00	0.000E+00	3.022E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.022E-01	
Ra-226	1.810E-02	0.000E+00	0.000E+00	0.000E+00	1.511E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.511E+03	
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	
Sr-90	8.950E-01	0.000E+00	0.000E+00	0.000E+00	7.472E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.472E+04	
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	
Th-229	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	
Th-232	3.017E-03	0.000E+00	0.000E+00	0.000E+00	2.519E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.519E+02	

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U-233      0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
U-234      0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
U-235      0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
U-238      2.816E-02  0.000E+00  0.000E+00  0.000E+00  2.351E+03  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  2.351E+03
iiiiiiii  iiiiiiiiii iiiiiiiiii iiiiiiiiii iiiiiiiiii iiiiiiiiii iiiiiiiiii iiiiiiiiii iiiiiiiiii iiiiiiiiii iiiiiiiiii
* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
  and water-dependent water, fish, plant, meat, milk pathways
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0
Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

0

Radionuclides									
Radon	Pathway								
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212	
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	

Water-ind. == Water-independent Water-dep. == Water-dependent
lRESRAD, Version 6.21 T« Limit = 0.5 year 10/18/2002 15:34 Page 6
Intrisk : Mixed Waste Landfill Industrial (Excavation Scenario - 2003)
File : Mwex2003_v2.rad

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

0
0

Water Independent Pathways (Inhalation excludes radon)													
Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil		
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	
Ac-227	5.755E-20	0.0000	2.654E-24	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.767E-21	0.0000	
Am-241	7.702E-07	0.0000	3.460E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.444E-06	0.0000	
Co-60	1.981E-01	0.6936	7.620E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.752E-05	0.0001	
Cs-137	8.032E-02	0.2812	3.991E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.612E-05	0.0002	
H-3	0.000E+00	0.0000	1.268E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.171E-08	0.0000	
Np-237	3.065E-10	0.0000	1.265E-14	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.056E-12	0.0000	
Pa-231	9.800E-21	0.0000	4.713E-24	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.459E-21	0.0000	
Pb-210	3.742E-08	0.0000	5.220E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.158E-05	0.0000	
Pu-238	2.754E-12	0.0000	2.033E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.885E-09	0.0000	
Pu-239	2.197E-12	0.0000	2.533E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.417E-09	0.0000	
Ra-226	5.524E-03	0.0193	1.215E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.127E-05	0.0000	
Ra-228	3.120E-04	0.0011	5.110E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.077E-06	0.0000	
Sr-90	5.854E-04	0.0020	1.163E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.883E-05	0.0003	
Th-228	4.995E-04	0.0017	4.262E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.437E-07	0.0000	
Th-229	1.108E-17	0.0000	6.486E-22	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.349E-19	0.0000	
Th-230	1.539E-16	0.0000	3.181E-17	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.936E-15	0.0000	
Th-232	2.836E-09	0.0000	1.433E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.078E-07	0.0000	
U-233	8.578E-19	0.0000	1.851E-19	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.967E-17	0.0000	
U-234	9.876E-13	0.0000	3.493E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.164E-11	0.0000	
U-235	5.569E-16	0.0000	1.448E-20	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.371E-18	0.0000	
U-238	8.522E-05	0.0003	8.447E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.643E-06	0.0000	
iiiiiiii	iiiiiiiiii	iiiiii	iiiiiiiiii	iiiiii	iiiiiiiiii	iiiiii	iiiiiiiiii	iiiiii	iiiiiiiiii	iiiiii	iiiiiiiiii	iiiiii	
Total	2.854E-01	0.9993	1.270E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.836E-04	0.0006	

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Intrisk : Mixed Waste Landfill Industrial (Excavation Scenario - 2003)
File : Mwex2003_v2.rad

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	5.755E-20	0.0000	2.654E-24	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.767E-21	0.0000
Am-241	7.702E-07	0.0000	3.460E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.444E-06	0.0000
Co-60	1.981E-01	0.6936	7.620E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.752E-05	0.0001
Cs-137	8.032E-02	0.2812	3.991E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.612E-05	0.0002
H-3	0.000E+00	0.0000	1.268E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.171E-08	0.0000
Np-237	3.065E-10	0.0000	1.265E-14	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.056E-12	0.0000
Pa-231	9.800E-21	0.0000	4.713E-24	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.459E-21	0.0000
Pb-210	3.742E-08	0.0000	5.220E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.158E-05	0.0000
Pu-238	2.754E-12	0.0000	2.033E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.885E-09	0.0000
Pu-239	2.197E-12	0.0000	2.533E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.417E-09	0.0000
Ra-226	5.524E-03	0.0193	1.215E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.127E-05	0.0000
Ra-228	3.120E-04	0.0011	5.110E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.077E-06	0.0000
Sr-90	5.854E-04	0.0020	1.163E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.883E-05	0.0003
Th-228	4.995E-04	0.0017	4.262E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.437E-07	0.0000
Th-229	1.108E-17	0.0000	6.486E-22	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.349E-19	0.0000
Th-230	1.539E-16	0.0000	3.181E-17	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.936E-15	0.0000
Th-232	2.836E-09	0.0000	1.433E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.078E-07	0.0000
U-233	8.578E-19	0.0000	1.851E-19	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.967E-17	0.0000
U-234	9.876E-13	0.0000	3.493E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.164E-11	0.0000
U-235	5.569E-16	0.0000	1.448E-20	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.371E-18	0.0000
U-238	8.522E-05	0.0003	8.447E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.643E-06	0.0000
iiiiiiii	iiiiiiiiii	iiiiii	iiiiiiiiii	iiiiii	iiiiiiiiii	iiiiii	iiiiiiiiii	iiiiii	iiiiiiiiii	iiiiii	iiiiiiiiii	iiiiii
Total	2.854E-01	0.9993	1.270E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.836E-04	0.0006

[illegible]

0 Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.800E+01 years

[illegible]

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0 Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.800E+01 years

[illegible]

U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.887E-05	0.0011
íííííííí	íííííííííí	íííííííí	íííííííííí	íííííííí	íííííííííí	íííííííí	íííííííííí	íííííííí	íííííííííí	íííííííí	íííííííííí	íííííííí	íííííííííí	íííííííí
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.889E-02	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides
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Intrisk : Mixed Waste Landfill Industrial (Excavation Scenario - 2003)
File : Mwex2003_v2.rad

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 2.300E+01 years

Radio- Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total	
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*	
ÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ
Ac-227	4.093E-18	0.000E+00	0.000E+00	0.000E+00	3.417E-13	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.417E-13	
Am-241	3.489E-03	0.000E+00	0.000E+00	0.000E+00	2.913E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.913E+02	
Co-60	7.328E-02	0.000E+00	0.000E+00	0.000E+00	6.117E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.117E+03	
Cs-137	6.502E-01	0.000E+00	0.000E+00	0.000E+00	5.428E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.428E+04	
H-3	7.143E+04	0.000E+00	0.000E+00	0.000E+00	5.386E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.386E+02	
Np-237	2.648E-08	0.000E+00	0.000E+00	0.000E+00	2.210E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.210E-03	
Pa-231	1.995E-17	0.000E+00	0.000E+00	0.000E+00	1.665E-12	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.665E-12	
Pb-210	9.194E-03	0.000E+00	0.000E+00	0.000E+00	7.675E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.675E+02	
Pu-238	2.767E-06	0.000E+00	0.000E+00	0.000E+00	2.310E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.310E-01	
Pu-239	3.618E-06	0.000E+00	0.000E+00	0.000E+00	3.020E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.020E-01	
Ra-226	1.792E-02	0.000E+00	0.000E+00	0.000E+00	1.496E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.496E+03	
Ra-228	2.828E-03	0.000E+00	0.000E+00	0.000E+00	2.361E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.361E+02	
Sr-90	5.177E-01	0.000E+00	0.000E+00	0.000E+00	4.322E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.322E+04	
Th-228	2.735E-03	0.000E+00	0.000E+00	0.000E+00	2.283E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.283E+02	
Th-229	9.724E-16	0.000E+00	0.000E+00	0.000E+00	8.118E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.118E-11	
Th-230	1.901E-10	0.000E+00	0.000E+00	0.000E+00	1.587E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.587E-05	
Th-232	3.017E-03	0.000E+00	0.000E+00	0.000E+00	2.519E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.519E+02	
U-233	1.340E-12	0.000E+00	0.000E+00	0.000E+00	1.118E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.118E-07	
U-234	1.836E-06	0.000E+00	0.000E+00	0.000E+00	1.533E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.533E-01	
U-235	8.197E-14	0.000E+00	0.000E+00	0.000E+00	6.844E-09	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.844E-09	
U-238	2.816E-02	0.000E+00	0.000E+00	0.000E+00	2.351E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.351E+03	
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* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0
Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 2.300E+01 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
íííííííííííí	íííííííííííí	íííííííííííí	íííííííííííí	íííííííííííí	íííííííííííí	íííííííííííí	íííííííííííí	íííííííííííí
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent
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Intrisk : Mixed Waste Landfill Industrial (Excavation Scenario - 2003)
File : Mwex2003_v2.rad

Excess Cancer CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 2.300E+01 years

Water Independent Pathways (Inhalation excludes radon)														
	Ground		Inhalation		Plant		Meat		Milk		Soil			
Radio- Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.		
ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ		
Ac-227	6.477E-19	0.0000	2.987E-23	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.988E-20	0.0000
Am-241	7.422E-07	0.0000	3.334E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.355E-06	0.0000
Co-60	9.623E-03	0.1501	3.702E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.510E-07	0.0000

Cs-137	4.721E-02	0.7362	2.346E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.298E-05	0.0005
H-3	0.000E+00	0.0000	2.542E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.438E-10	0.0000
Np-237	8.565E-10	0.0000	3.536E-14	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.531E-11	0.0000
Pa-231	6.171E-20	0.0000	2.968E-23	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.549E-20	0.0000
Pb-210	8.058E-08	0.0000	1.124E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.494E-05	0.0004
Pu-238	2.297E-12	0.0000	1.695E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.572E-09	0.0000
Pu-239	2.195E-12	0.0000	2.531E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.415E-09	0.0000
Ra-226	5.469E-03	0.0853	1.203E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.116E-05	0.0002
Ra-228	4.468E-04	0.0070	7.319E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.543E-06	0.0000
Sr-90	3.386E-04	0.0053	6.730E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.560E-05	0.0007
Th-228	8.320E-04	0.0130	7.100E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.405E-06	0.0000
Th-229	1.414E-16	0.0000	8.281E-21	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.999E-18	0.0000
Th-230	9.691E-16	0.0000	2.004E-16	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.739E-14	0.0000
Th-232	2.836E-09	0.0000	1.433E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.078E-07	0.0000
U-233	5.348E-18	0.0000	1.154E-18	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.096E-16	0.0000
U-234	2.805E-12	0.0000	9.918E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.602E-10	0.0000
U-235	1.581E-15	0.0000	4.111E-20	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.241E-17	0.0000
U-238	8.522E-05	0.0013	8.447E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.643E-06	0.0001
iiiiiiii	iiiiiiiiii	iiiiii	iiiiiiiiii	iiiiii	iiiiiiiiii	iiiiii	iiiiiiiiii	iiiiii	iiiiiiiiii	iiiiii	iiiiiiiiii	iiiiii
Total	6.400E-02	0.9981	4.909E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.247E-04	0.0019

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Intrisk : Mixed Waste Landfill Industrial (Excavation Scenario - 2003)

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Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 2.300E+01 years

Water Dependent Pathways

[illegible]

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0 Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 2.300E+01 years

[illegible]

Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
íííííííííí	íííííííííí	íííííííííí	íííííííííí	íííííííííí	íííííííííí	íííííííííí	íííííííííí	íííííííííí
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent
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Intrisk : Mixed Waste Landfill Industrial (Excavation Scenario - 2003)
File : Mwex2003_v2.rad

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 2.300E+01 years

0
0 Water Independent Pathways (Inhalation excludes radon)

	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-	ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ		ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ		ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ		ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ		ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ		ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ		ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ	
Nuclide	risk fract.		risk fract.		risk fract.		risk fract.		risk fract.		risk fract.		risk fract.	
ÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁ
Am-241	7.431E-07	0.0000	3.334E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.355E-06	0.0000
Co-60	9.623E-03	0.1501	3.702E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.510E-07	0.0000
Cs-137	4.721E-02	0.7362	2.346E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.298E-05	0.0005
H-3	0.000E+00	0.0000	2.542E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.438E-10	0.0000
Pu-238	2.297E-12	0.0000	1.695E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.572E-09	0.0000
Pu-239	2.197E-12	0.0000	2.531E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.415E-09	0.0000
Ra-226	5.469E-03	0.0853	2.327E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.610E-05	0.0006
Sr-90	3.386E-04	0.0053	6.730E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.560E-05	0.0007
Th-232	1.279E-03	0.0199	8.606E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.156E-06	0.0000
U-238	8.522E-05	0.0013	8.448E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.644E-06	0.0001
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Total	6.400E-02	0.9981	4.909E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.247E-04	0.0019

1RESRAD, Version 6.21 T* Limit = 0.5 year 10/18/2002 15:34 Page 19
Intrisk : Mixed Waste Landfill Industrial (Excavation Scenario - 2003)
File : Mwex2003_v2.rad

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 2.300E+01 years

Water Dependent Pathways

	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Radio-	ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ		ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ		ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ		ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ		ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ		ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ		ÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁÁ	
Nuclide	risk fract.		risk fract.		risk fract.		risk fract.		risk fract.		risk fract.		risk fract.	
ÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁ	ÁÁÁÁÁÁÁÁÁÁ	ÁÁÁÁÁÁ
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.102E-06	0.0000
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.624E-03	0.1501
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.724E-02	0.7367
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.557E-08	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.576E-09	0.0000
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.420E-09	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.505E-03	0.0858
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.842E-04	0.0060
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.282E-03	0.0200
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.887E-05	0.0014
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Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.413E-02	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

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Appendix J.3-Cost Estimate and Assumptions

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Appendix J-3
Cost Assumptions
MWL Alternative V.b – Near-term Excavation of Mixed Waste Landfill
with Off-Site Disposal

Global Assumptions

1. Work will be performed 40 hours per week, 52 weeks per year. Work will begin in Fiscal Year 2003.
2. Work within the exclusion zone (i.e., within the tent structures) will be in PPE Level B. Decontamination activities will be performed in Level C. All other work is performed in Level D.
3. A Professional Labor Management technology has been included in each phase to account for SNL oversight management costs. The Remedial Action (RA) Complexity for each technology was selected as High due to complexity of project.
4. Due to the structure of the RACER software, disposal costs are included in the excavation phases. For this reason, costs associated with waste management activities conducted during those time periods were included in the excavation phases also. A separate phase for Waste Management was added to account for two years of waste management activities following the completion of excavation.

Phase 1. Planning/Permitting

1. This portion of the project will last five years, and will include the following activities:
 - Development of project plans, including:
 - Site Specific Work Plan
 - Health and Safety Plan
 - Waste Management Plan
 - Sampling and Analysis Plan
 - QA/QC Plan
 - Radiation Protection Plan
 - Permitting
 - Engineering Design
 - Scheduling/Cost Engineering
 - Contracting for facility construction, excavation, transportation, and disposal.
2. The following personnel were assumed to complete the above tasks. Labor rates were selected by RACER. Where a specific labor category was not available within RACER, the assumed RACER labor category is listed in parentheses.
 - Senior Project Manager (at 20%).
 - Project Manager (at 50%).
 - (2) Senior Staff Engineers.

- Certified Industrial Hygienist/Certified Industrial Hygienist (CIH/CHP) (Certified Industrial Hygienist).
- (3) Staff Engineers.
- (2) Drafting/ CADD.
- (2) Secretarial/ Administrative.

Phase 2. Facility Construction

1. Facility construction will last approximately one year. See Figure J-1 for site layout. The following activities will be completed:
 - Site grading, including areas for tents, admin/lab areas, parking lot, roads, and site drainage;
 - Utility installation;
 - Purchase and construction of tents;
 - Construction of equipment and personnel decontamination facilities;
 - Construction of fencing;
 - Purchase and construction of long-term storage structure;
 - Purchase and mobilization of site trailers;
 - Utah certification for On-Site Laboratory (purchase, setup, and calibration of laboratory equipment and trailers is included in On-Site Laboratory costs); and
 - Contracting for labor, tents, long-term storage structure, heavy equipment, off-site laboratory, and robotics.
2. The following equipment will be used during facility construction. Full-time operators were assigned to each piece of equipment. Rates for equipment and operators were selected by RACER.
 - (1) 3 cy Rubber-Tire Loader.
 - (1) Road Grader.
 - (2) All-Terrain Forklifts.
 - (1) D-5 Dozer.
 - (1) Sheepsfoot Compactor.
 - (1) Smooth Drum Roller.
 - (1) 1-cy Backhoe with Foot-end Loader
 - (1) 22-ton Crane
3. In addition to the operators for equipment listed above, the following personnel were assumed. Labor rates were selected by RACER. Where a specific labor category was not available within RACER, the assumed RACER labor category is listed in parentheses.
 - Senior Project Manager (at 50%).
 - Project Manager.
 - Site Manager (Senior Staff Engineer).
 - Assistant Site Manager (Senior Staff Engineer).
 - (2) Waste Management Coordinators (Staff Engineers).
 - Certified Industrial Hygienist/Certified Health Physicist (Certified Industrial Hygienist).
 - Health and Safety Officer.
 - QA/QC Officer.
 - (20) Field Technicians.
4. Tent structures will be clamshell buildings with 30' wide access corridors between structures. Costs for tents were estimated using manufacturer's estimate. The following tents are included:

- (1) 350' by 500';
- (3) 300' by 500';
- (1) 200' by 550'; and
- (1) 200' by 200'.

Each tent structure will be equipped with ventilation system for five air exchanges per hour through pre-filter, HEPA, and ULPA filter bank. Ventilation system purchase and installation costs were estimated using manufacturer's estimate. Initial filter installation is included. Weekly filter change-out and filter disposal are included in Phases 3, 4, and 7.

5. Long-term storage structure will be metal 'high-bay' warehouse with concrete floor. The building will be 100' by 200'. Costs were estimated using manufacturer's estimate.
6. Roads will be 2-lane gravel, total length of 6,850 feet.
7. A total of 45 acres will be cleared and grubbed (includes areas for tents, admin, lab, parking, and replaceable soil storage).
8. Parking lot will be gravel, adequate for 80 parking spaces.
9. The following site trailers will be mobilized for the administration area:
 - (1) Administration Trailer with lunchroom, reception area, bathrooms, and three private offices;
 - (1) Shower Trailer with separated shower areas for men and women, bathrooms, and lockers;
 - (3) Office Trailers with two private offices and an open space for up to four desks.
 - (10) Connex boxes for personnel decontamination facilities, air refill station, and tool storage.
10. Costs for a breathing air refill station are included, with costs to replace the block 4 times throughout the project.
10. A total of 6,875 feet of fence will be installed, 7' industrial grade chain link, with 12' double gate and Hazardous Waste signage.
11. The following assumptions were made regarding installation of utilities:
 - Tie-ins to existing utilities will be 2,800 feet from the MWL facility;
 - One 5 KV 3-phase primary overhead line will be installed for electrical supply;
 - Telephone service will be installed in all trailers;
 - One 3" water supply line will be installed; and
 - One 8" SPVC sewer line will be installed.

Phase 3. Excavation of Unclassified Area

1. It is assumed that the Unclassified Area of the landfill will be excavated at a rate of 300 cy per week for a total of 180 weeks (see volume calculations below) and that no robotics will be necessary. The following activities will be conducted:
 - Excavation of landfill contents;
 - Mechanical screening to separate soil from debris;
 - Characterization of soils;
 - Segregation, characterization, and shredding of debris;
 - Packaging, transportation, and off-site disposal of soil and debris;
 - Decontamination of equipment and personnel;
 - Change-out of HEPA and ULPA filters and filter disposal;
 - Management of site-generated waste; and
 - Backfilling of excavated areas.
2. The following equipment will be used during excavation of the Unclassified Area. Full-time operators were assigned to each piece of equipment. Rates for equipment and operators were selected by RACER.
 - (5) 950 Wheel Loaders.
 - (5) 8-cy Dump Trucks.
 - (4) All-terrain Forklifts.
 - (2) Electric/Hydraulic Shredders.
 - (2) D-5 Dozers.
 - (1) 245 Excavator.
 - (1) Vibrating Grizzly Screener.
 - (1) Radial Stacking Conveyor.
 - (1) 84' Boom Manlift.
3. In addition to the operators for equipment listed above, the following personnel were assumed. Labor rates were selected by RACER. Where a specific labor category was not available within RACER, the assumed RACER labor category is listed in parentheses.
 - Senior Project Manager (at 50%).
 - Project Manager.
 - Site Manager (Senior Staff Engineer).
 - Assistant Site Manager (Senior Staff Engineer).
 - (2) Waste Management Coordinators (Staff Engineers).
 - CIH/CHP (Certified Industrial Hygienist).
 - Health and Safety Officer.
 - QA/QC Officer.
 - 20 Field Technicians.
4. The following assumptions were made regarding volume calculations (see Volume Calculations in this Appendix):
 - Trenches A, B, C, and G were originally dug with 1:1 slopes on sides and one end. The other end was dug with a 3:1 slope for disposal access.

- Trenches E and F were originally dug with no slope on sides or ends.
- All trench volumes below the three (3) feet of cover soils consists of 40% debris and 60% soils. See Assumed Excavated Waste Criteria summary page and Waste Inventory for soil and debris distribution and Volume Calculations for volumes.
- Over excavation of all trenches will be performed. Three (3) feet will be over excavated from all trench sides and ends and five (5) feet will be over excavated from all trench bottoms.
- Soils from side and end slope over excavation are replaceable.
- Soils from bottom over excavation will be low level rad waste.
- Trench excavation will be performed with 1:1 side and end slopes to the bottom of the debris.
- Over excavation of trench bottoms will be done vertically with no side or end slopes.
- Two (2) non-designated areas will be investigated by digging 3 feet wide by 13 feet deep trenches. The soils removed during these investigations will be replaceable.

5. Assumptions concerning disposal costs:

- The waste inventory in Attachment 2-1 of the *Environmental Restoration Project Responses to NMED Technical Comments on the Report of the Mixed Waste Landfill Phase 2 RCRA Facility Investigation Dated September 1996* (SNL/NM June 15, 1998) was used to develop assumptions for debris segregation and disposal. The inventory was broken down into assumed waste types (see Appendix J-1) and an associated volume was assumed for each waste type.
- Costs for disposal were supplied by SNL/NM based on the items being handled through the Radioactive and Mixed Waste Management Facility (RMWMF) or the Hazardous Waste Management Facility (HWMF). These costs include packaging, transportation, and disposal at an off-site facility.
- Transuranic (TRU) waste will be packaged in 55-gallon drums and shipped to the Waste Isolation Pilot Plant (WIPP). The cost estimate for these items is based on an independent estimate of \$5,000 per 55-gallon drum. Costs include packaging, transportation, and disposal at WIPP.
- A portion of the debris is assumed to be material that does not have a disposal path and will be packaged in 7-4-4 boxes for placement in the long-term storage structure.

Based on the inventory in Appendix J-1 and the volume calculations in this appendix, the following disposal volumes were assumed:

- 13,083 cy of soil stored on-site and used for backfill;
 - 28,428 cy of low level radioactive soil;
 - 6,157 cy of low level radioactive debris;
 - 3,489 cy of mixed waste debris;
 - 21 cy of TRU waste debris; and
 - 2,409 cy of debris to be stored on site in long-term storage structure.
6. It was assumed that one 8'x8'x1' pre-filter and same size HEPA and ULPA filter will be exchanged per week in each tent. Filter change-out was estimated at \$10,000 per week. Disposal costs are based on packaging of filters in 7-4-4 containers and disposal as low level radioactive waste. Disposal was estimated at \$25,000 per week.

7. Sample analysis will be conducted by the On-site Laboratory with 10% QC duplicates sent off site. Costs for sample analysis are included in the On-site Laboratory and Off-site Laboratory phases.
8. Backfill brought in from off-site will be native fill from a borrow area within 20 miles of the site.

Phase 4. Excavation of Classified Area

1. The Classified Area of the landfill will be excavated at a rate of 150 cy per week for a total of 117 weeks (see volume calculations below). The following activities will be conducted:
 - Remote excavation of landfill contents;
 - Mechanical screening to separate soil from debris;
 - Characterization of soils;
 - Segregation, characterization, and shredding of debris;
 - Packaging, transportation, and off-site disposal of soil and debris;
 - Decontamination of equipment and personnel;
 - Change-out of HEPA and ULPA filters;
 - Management of site-generated waste; and
 - Backfilling of excavated areas.
2. The following equipment will be used during excavation of the Classified Area. These equipment items will augment the robotics equipment described in Appendix G and support waste management activities. Full-time operators were assigned to each piece of equipment. Rates for equipment and operators below were selected by RACER.
 - Augmentation of robotics equipment in Appendix G:
 - (1) Vibrating Grizzly Screen (purchase cost included in Phase 3)
 - (1) 100-ton crane with remote operation;
 - (1) 950 Wheel Loader with remote operation;
 - (2) Kenworth T-800 Semi Tractors;
 - (1) 40' Flat Deck Trailer; and
 - (1) 40' Van Trailer (converted to robotics control trailer).
 - Waste Management Support:
 - (4) 950 Wheel Loaders;
 - (5) 8-cy Dump Trucks;
 - (4) All-terrain Forklifts;
 - (2) Electric/Hydraulic Shredders;
 - (2) 235 Excavators;
 - (2) D-5 Dozers; and
 - (1) 84' Boom Manlift.
3. In addition to the operators for equipment listed above, the following personnel were assumed. Labor rates were selected by RACER. Where a specific labor category was not available within RACER, the assumed RACER labor category is listed in parentheses.
 - Senior Project Manager (at 50%).
 - Project Manager.
 - Site Manager (Senior Staff Engineer).
 - Assistant Site Manager (Senior Staff Engineer).
 - (2) Waste Management Coordinators (Staff Engineers).
 - CIH/CHP (Certified Industrial Hygienist).
 - Health and Safety Officer.
 - QA/QC Officer.
 - (20) Field Technicians.

4. The following assumptions were made regarding volume calculations (see Volume Calculations in this Appendix):
 - The top three (3) feet of cover soil is low level rad waste.
 - Three (3) foot deep concrete caps are mixed waste.
 - See Assumed Excavated Waste Criteria summary page and Waste Inventory for soil and debris distribution and Volume Calculations for volumes.
 - Over excavation of the Classified Area and all pits will be performed. Three (3) feet will be over excavated from all sides/ends and five (5) feet will be over excavated from all bottoms.
 - Over excavated soils from sides/ends are low level rad waste.
 - Over excavated soils from bottoms are mixed waste.
 - One (1) non-designated area will be investigated by digging a 3 feet wide by 13 feet deep trench. The soils removed during this investigation will be replaceable.
 - The estimated volumes of soil and debris that will be excavated from the classified area varies from Appendix G of the CMS report due to the following assumptions:
 - Appendix G of the CMS report assumes that a 3:1 slope will be necessary. This evaluation assumes that a 1:1 slope is feasible due to soil type and limited entry in excavation.
 - Appendix G of the CMS report assumes that a non-designated area (NDA C) in the northwest quadrant of the classified excavation area will be excavated, this evaluation does not.
5. Assumptions for robotics:
 - Existing estimate for remote excavation with trackhoe was assumed with a multiplier of 1.3 to compensate for longer duration (91 weeks versus 117 weeks).
 - Additional costs were added for purchase and operation of remote 100-Ton Crane, remote 3 cy Rubber Tire Loader, 2 remote Semi Tractors, a flat deck trailer, and van trailer for robotics control (see equipment list above). The 100-ton crane was deemed necessary to lift concrete encased sources as a whole unit. Based on information in the inventory, a concrete unit 10 ft in diameter and 7 ft thick can be inferred. At 150 lbs/cf, this unit would weigh 42-tons. Due to drag and assuming a safety factor of 2, a 100-ton crane was selected.
6. Assumptions concerning disposal costs:
 - The waste inventory in Attachment 2-1 of the *Environmental Restoration Project Responses to NMED Technical Comments on the Report of the Mixed Waste Landfill Phase 2 RCRA Facility Investigation Dated September 1996* (SNL/NM June 15, 1998) was used to develop assumptions for debris segregation and disposal. The inventory was broken down into assumed waste types (see Appendix J-1) and an associated volume was assumed for each waste type.
 - Costs for disposal were supplied by SNL/NM based on the items being handled through the Radioactive and Mixed Waste Management Facility (RMWMF) or the Hazardous Waste Management Facility (HWMF). These costs include transportation and disposal at an off-site facility.

- Low Level Rad Soils will be packaged in 10 cy Roll-off containers with 'Super Sack' liners.
- Mixed waste soil will be packaged in 20 cy Intermodal Containers.
- A portion of the mixed waste debris will be shredded and combined with mixed waste soils prior to being loaded into Intermodal Containers.
- Mixed waste debris that cannot be shredded and included with soil will be packaged in 3.5 cy B-25 containers.
- Low Level Rad debris will be packaged in 7-4-4 boxes.
- Transuranic (TRU) waste will be packaged in 55-gallon drums and shipped to the Waste Isolation Pilot Plant (WIPP). The cost estimate for these items is based on an independent estimate of \$5,000 per 55-gallon drum. Costs include packaging, transportation, and disposal at WIPP.
- A portion of the debris is assumed to be material that does not have a disposal path and will be packaged in 7-4-4 boxes for placement in the long-term storage structure.

Based on the inventory in Appendix J-1 and the Volume Calculations in this Appendix, the following disposal volumes were assumed for the cost estimate:

- 9,597 cy of low level radioactive soil;
 - 5,752 cy of mixed waste soil and concrete;
 - 757 cy of low level radioactive debris;
 - 1,118 cy of mixed waste debris;
 - 52 cy of TRU waste debris; and
 - 280 cy of debris to be stored on site in long-term storage structure.
7. It was assumed that one 8'x8'x1' pre-filter and same size HEPA and ULPA filter will be exchanged per week in each tent. Filter change-out was estimated at \$10,000 per week. Disposal costs are based on packaging of filters in 7-4-4 containers and disposal as low level radioactive waste. Disposal was estimated at \$25,000 per week.
 8. Sample analysis will be conducted by the On-site Laboratory with 10% QC duplicates sent off site. Costs for sample analysis are included in the On-site Laboratory and Off-site Laboratory phases.
 9. Backfill brought in from off-site will be native fill from a borrow area within 20 miles of the site.

Phase 5. On-Site Laboratory

1. The On-Site Laboratory will be certified by the EPA and the State of Utah for chemical and radiological analyses. All soil samples will be analyzed at the on-site laboratory with the exception of 10% duplicate QA samples and verification samples. The laboratory will also contain facilities to conduct HazCat operations to characterize debris items. Water samples, such as decontamination water, will not be analyzed by the On-Site Laboratory. The On-Site Laboratory will be in operation from the beginning of Mob./Facility Construction to the end of Demobilization for a total duration of 10 years.
2. Laboratory Equipment and Personnel:
The laboratory equipment purchased would support the Chemical, Radiological, and HazCat Laboratories. In order to characterize the hazardous constituents in the soil being removed from the Mixed Waste Landfill, the following EPA SW846 Methods will be used:
 - RCRA Metals by EPA SW846 Method 6020 for ICP/MS;
 - Hexavalent Chromium by EPA SW846 Method 7196A for UV-Vis;
 - TSCA regulated PCBs by EPA SW846 Method 8082 for GC/ECD;
 - RCRA VOCs by EPA SW846 Method 8260B for GC/MS with Purge & Trap; and
 - RCRA SVOCs by EPA SW846 Method 8270C for GC/MS.

Estimated costs for the above equipment are listed in Table J.3.4. The estimated costs were obtained through vendor quotations, vendor catalogs, and web-based research.

In order to characterize the radiological constituents in the soil being removed from the Mixed Waste Landfill, the following analyses will be completed:

- Gamma Spectroscopy to measure gamma radiation; and
- Liquid Scintillation Counting to measure tritium, gross alpha, and gross beta rates.

Estimated costs for the above equipment are listed in Table J.3.4. The estimated costs were obtained through vendor quotations, vendor catalogs, and web-based research.

In order to provide laboratory data that will uphold under Level III or offsite laboratory data validation, the laboratory will consist of the following staff. Where a specific labor category was not available within RACER, the assumed RACER labor category is listed in parentheses.

- Laboratory Manager (Project Manager).
- Data/Document Control Manager (Project Engineer)
- QA/QC Officer
- QA/QC Technician (Staff Engineer)
- (4) Chemical Analysts (Staff Engineers)
- (2) Radiological Assessment Analysts (Staff Engineers)
- (2) Personnel to support the Chemical and Radiological Laboratories (Staff Engineers)
- (3) Technicians to support the HazCat Laboratory (Field Technicians)

In order to automate the Chemical laboratory reporting process, the main data management system would be purchased through the vendor of the instrumentation. Costs for equipment include purchasing the Cerity Networked Data System for Chemical QA/QC, an integrated system that automates the analytical process and provides a reporting and web-based publishing system. Costs for a separate data management system to be developed for any debris, containerized waste, and health and safety tracking are included.

The HazCat Laboratory would perform the basic laboratory tests to determine the physical properties and the hazard classification of any debris or containerized waste that is excavated from the Mixed Waste Landfill.

3. Laboratory Supplies

This category represents the supplies needed for the Chemical Laboratory, the Radiological Laboratory, and the HazCat Laboratory. This estimate is based on 10 years of operations. The estimated costs for supplies are listed in Table J.3.5. The estimated costs were obtained through vendor quotations, vendor catalogs, and web-based research.

4. Radiological Monitoring Instruments and Supplies

This category includes the following:

- Exit gate monitoring;
- Conveyor monitoring;
- Heavy Equipment monitoring;
- Friskers; and
- Electronic/Real-time personnel monitoring

Estimated costs for the above equipment are listed in Table J.3.6. The estimated costs were obtained through vendor quotations, vendor catalogs, and web-based research.

Although not an official function of the laboratory, an equipment calibration area will be set up in the Radiological Laboratory trailer.

5. This estimate includes rental of five laboratory trailers and specialized construction of each trailer to meet laboratory requirements. Specialized construction would include installing a vented hood system in each laboratory trailer, installation of chemical resistant laboratory countertops, installation of cabinets and drawers, installation of workstations, computer and equipment installation, and organization of supplies.

Phase 6. Off-Site Laboratory

1. This phase element includes all costs associated with off-site analysis of samples, including packaging, shipping, chain-of-custody, analysis, and reporting. See Off-Site Sample Calculations in this Appendix for approach to determining the total number of samples that will be analyzed off-site.
2. An off-site laboratory will analyze a duplicate of 10% of excavation soil samples and 100% of the verification samples. The total number of off-site soil samples was rounded up to 700 (see calculations below).
3. The off-site laboratory will also analyze 100% of the decontamination water samples. It is assumed that one sample will be collected per month for the ten year duration of the project (120 samples total).
4. Calculations regarding number of off-site analyses:

Quantity of Quality Assurance/Quality Control (QA/QC) Soil Sample Analyses

1. Assumptions:
 - a) A duplicate soil sample will be collected for off-site analysis for 10% of all on-site soil samples.
 - b) One on-site soil sample will be collected for every 100 cy of excavated soil.
 - c) A 20% re-sample contingency has been included
2. Number of on-site soil samples include the following:
 - a) *Unclassified Area*
Total Soil Volume = 41, 511 cy X 1 sample/100 cy = 416 samples
 - b) *Classified Area*
Total Soil Volume = 14,949 X 1 sample/100 cy = 150 samples
 - c) Total number of on-site samples = 416 + 150 = 566
3. Number of off-site QA/QC analyses:

10% of 566 = 57 samples + 20% resample = **69 samples**

Quantity of Verification Sample Analyses

1. Assumptions:
 - a) Verification samples will be collected on a 25-foot grid within the excavated areas. For simplicity, the excavated area was assumed to be the entire area within the tent covering the excavation.
 - b) Verification sampling will be collected on a 50-foot grid within all the waste management areas (i.e., all other tents).
 - c) All verification samples will be analyzed off-site.
 - d) A 20% re-sample contingency has been added.

2. Verification sampling will include the following:

a) *Verification within excavated areas:*

$$\text{Total Area} = 350 \text{ ft} \times 500 \text{ ft} = 175,000 \text{ ft}^2$$

For 25-foot grid, assume one sample per 625 ft²

$$\text{Number of samples} = 175,000 \text{ ft}^2 / 625 \text{ ft}^2 = 280 \text{ samples}$$

b) *Verification sampling within waste management areas:*

Area of Tents:

$$3 \text{ each } (300 \text{ ft} \times 500 \text{ ft}) = 450,000 \text{ ft}^2$$

$$1 \text{ each } (550 \text{ ft} \times 200 \text{ ft}) = 110,000 \text{ ft}^2$$

$$\underline{1 \text{ each } (200 \text{ ft} \times 200 \text{ ft}) = 40,000 \text{ ft}^2}$$

$$600,000 \text{ ft}^2$$

For 50-ft grid, assume one sample per 2500 ft²

$$\text{Number of samples} = 600,000 \text{ ft}^2 / 2500 \text{ ft}^2 = 240 \text{ samples}$$

3. Total Number of Verification Samples = 240 + 280 = 520 + 20% re-sample

$$280 \text{ (excavated areas)} + 240 \text{ (waste management areas)} = 520 + 20\% \text{ resample} = \mathbf{624 \text{ samples}}$$

Quantity of Decontamination Water Samples

1. Assumptions:

- a) One sample will be collected for every month of operations.
- b) Assumed 10 year operational period.

2. Number of samples

$$1 \text{ sample/month} \times 120 \text{ months} = \mathbf{120 \text{ decontamination water samples}}$$

Phase 7. Waste Management

1. This phase element was added to allow 2 years of waste management activities following the completion of excavation. Waste management activities during excavation of the Unclassified and Classified Areas are included in those cost elements. The following activities will be conducted:
 - Characterization of soils;
 - Segregation, characterization, and shredding of debris;
 - Packaging, transportation, and off-site disposal of soil and debris;
 - Change-out of HEPA and ULPA filters;
 - Decontamination of equipment and personnel; and
 - Management of site-generated waste.
2. Costs for waste transportation and disposal are included in the excavation phase elements, except for HEPA/ULPA filters (see below).
3. The following equipment will be used during waste management operations. Full-time operators were assigned to each piece of equipment. Rates for equipment and operators below were selected by RACER.
 - (3) 950 Wheel Loaders.
 - (5) 8-cy Dump Trucks.
 - (4) All-terrain Forklifts.
 - (2) Electric/Hydraulic Shredders.
 - (2) 235 Excavators.
 - (1) 84' Boom Manlift.
4. In addition to the operators listed above, the following personnel were assumed. Labor rates were selected by RACER. Where a specific labor category was not available within RACER, the assumed RACER labor category is listed in parentheses.
 - Senior Project Manager (at 50%).
 - Project Manager.
 - Site Manager (Senior Staff Engineer).
 - Assistant Site Manager (Senior Staff Engineer).
 - (2) Waste Management Coordinators (Staff Engineers).
 - CIH/CHP (Certified Industrial Hygienist).
 - Health and Safety Officer.
 - QA/QC Officer.
 - (20) Field Technicians.
5. It was assumed that one 8'x8'1' HEPA and same size ULPA filter will be exchanged per week in each tent. Filter change-out was estimated at \$10,000 per week. Disposal costs are based on packaging of filters in 7-4-4 containers and disposal as low level radioactive waste. Disposal was estimated at \$25,000 per week.

6. Sample analysis will be conducted by the On-site Laboratory with 10% QC duplicates sent off site. Costs for sample analysis are included in the On-site Laboratory and Off-site Laboratory phase elements.

Phase 8. Site Decontamination, Demolition, and Demobilization

1. This portion of the project will last for one year, beginning with the completion of waste management activities. The following activities will be conducted:
 - Scraping of soil surface within the waste management areas;
 - Analysis and disposal of scraped soils;
 - Collection and off-site analysis of verification samples;
 - Demolition of tent structures;
 - Disposal of remaining site-generated waste;
 - Final decontamination and demobilization of heavy equipment;
 - Removal of fencing.
2. The following equipment will be used during facility construction. Full-time operators were assigned to each piece of equipment. Rates for equipment and operators below were selected by RACER.
 - (2) 950 Wheel Loaders.
 - (4) 8-cy Dump Trucks.
 - (2) All-terrain Forklifts.
 - (1) 22-ton Crane.
 - (2) 235 Excavators.
 - (2) 84' Boom Manlifts.
3. In addition to the operators for equipment listed above, the following personnel were assumed. Labor rates were selected by RACER. Where a specific labor category was not available within RACER, the assumed RACER labor category is listed in parentheses.
 - Senior Project Manager (at 50%)
 - Project Manager
 - Site Manager (Senior Staff Engineer)
 - Assistant Site Manager (Senior Staff Engineer)
 - (2) Waste Management Coordinators (Staff Engineers)
 - CIH/CHP (Certified Industrial Hygienist)
 - Health and Safety Officer
 - QA/QC Officer
 - (20) Field Technicians
4. The top two inches will be scraped from the surface of the waste management areas and stockpiled and sampled in the same manner as excavated soils.
5. It is assumed that the soil generated from scraping the surface along with remaining site-generated waste will constitute 8,000 cubic yards of material that will be disposed off-site as low level radioactive waste.
6. Verification samples will be collected on a 25-foot grid from the floor of the excavation and a 50-foot grid within the waste management areas.

7. It is assumed that no additional excavation will be required following verification sampling.
8. The tents will be washed using a high pressure, low volume water sprayer prior to being dismantled. Wipe samples will be collected to verify proper decontamination. It is assumed that this will be sufficient to dispose of the building materials as solid waste. The total volume of solid waste was estimated at 10,000 cy.

Phase 9. Long-Term Monitoring

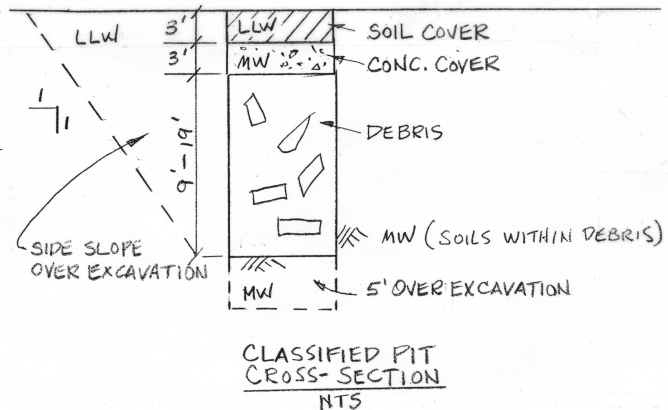
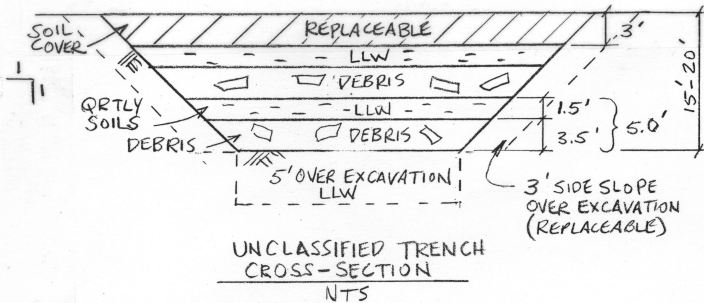
1. Groundwater monitoring is assumed to continue for 30 years following the completion of waste management activities. A total of 12 samples will be collected for each event. Sampling will be conducted quarterly during the first two years following demobilization and semi-annually for the following 28 years.
2. Material within the long-term storage structure will remain in storage for a period of 50 years. A fence will be constructed to surround the building. The cost estimate includes 8 hours per week for 50 years for a Staff Engineer to maintain signage and inspect the storage facility.

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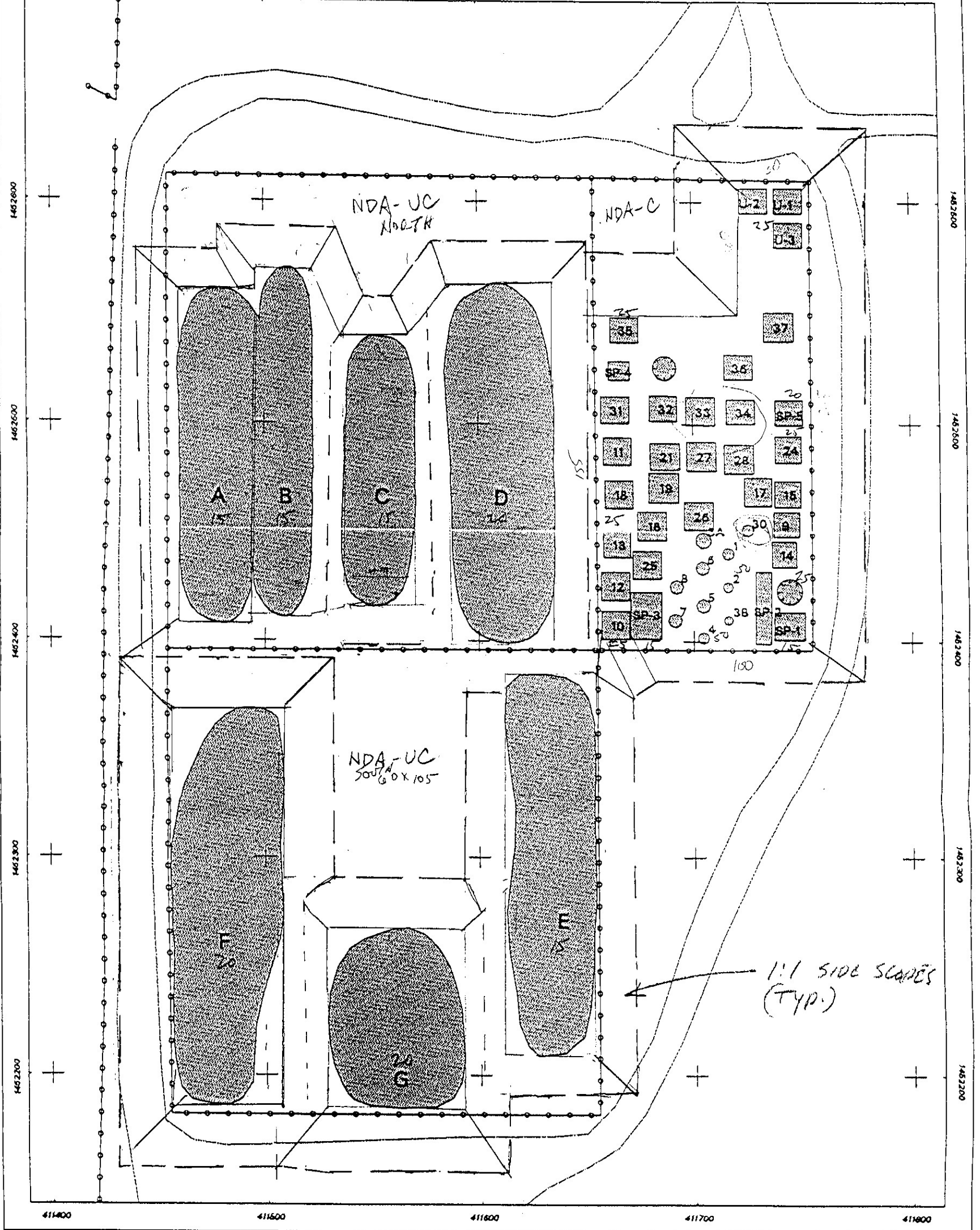
Assumed Excavated Waste Criteria
 Sandia National Laboratories
 Mixed Waste Landfill

Replaceable Material		Soil - Low Level Waste		Debris and Mixed Soil Waste	
Unclassified	Classified	Unclassified	Classified	Unclassified	Classified
3 foot cover soils	none	Soil - 60% of trench volume	NDA	Debris - 40% of trench volume	All concrete, debris and soil below 3 feet
1:1 excavated side slope soils		5 foot bottom over excavation soils	3 foot soil cover		5 foot bottom over excavation soils
NDA North soils			1:1 excavated side slope soils		
NDA South soils					

NDA - Non-designated area



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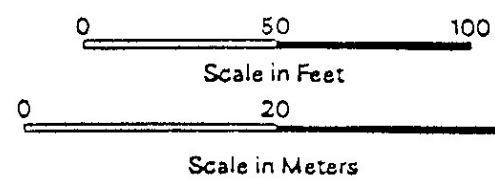


Legend

- Mixed Waste Landfill
- Trench/Pit Location
- Road
- Fence

Mixed Waste Landfill Trenches & Pits

EXCAVATION PLAN
(APPENDIX J-3)



NDA - Non-Designated Area
UC - UNCLASSIFIED
C - CLASSIFIED

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Table J.3.1 - MWL Alternative Vb.-Soil and Excavation Volumes Estimate (Unclassified Area)

Summary					
		Debris (cy)		Soil Low Level (loose cy)	Soil Replaceable (loose cy)
Trench A		1345		2893	1593
Trench B		1393		2979	1427
Trench C		1175		2731	1326
Trench D		3152		6521	2364
Trench E		1154		3815	1891
Trench F		1980		5754	2241
Trench G		1877		3735	1602
NDA		0		0	638
Totals		12,077		28,428	13,083
Soil Expansion Factor = 1.3					
	Area (ft2)	Depth (ft)	Cover (ft)	Side Slope	End slope
Trench A	5081	15	3	1:1	3:1
Core	1122	12			
3 sides	216	12			
1 end	216	12			
cover	5081	3			
Over Exc.					
bottom	1122	5			
sides	--	3			
end	--	3			
Trench A subtotals					1345
					2893
					1593
Trench B	3926	15	3	1:1	3:1
Core	1088	12			
3 sides	216	12			
1 end	180	12			
cover	3926	3			
Over Exc.					
bottom	1088	5			
sides	--	3			
end	--	3			
Trench B subtotals					1393
					2979
					1427

Table J.3.1 - MWL Alternative Vb.-Soil and Excavation Volumes Estimate (Unclassified Area)

						Soil Expansion Factor = 1.3					
	Area (ft2)	Depth (ft)	Cover (ft)	Side Slope	End slope	Debris (cy)		Soil Low Level		Soil Replaceable	
Trench C	3754	15	3	1:1	3:1						
Core	847	12				151		294			
3 sides	216	12				912		2016			
1 end	216	12				112		218			
cover	3754	3								542	
Over Exc. bottom	847	5						204			
sides	--	3								592	
end	--	3								192	
					Trench C subtotals	1175		2731		1326	
Trench D	7309	20	3	1:1	3:1						
Core	1552	17				391		762			
3 sides	434	17				2440		4759			
1 end	434	17				321		626			
cover	7309	3								1056	
Over Exc. bottom	1552	5						374			
sides	--	3								919	
end	--	3								390	
					Trench D subtotals	3152		6521		2364	
Trench E	6494	15	3	0	0						
Core	6494	12				1154		2251			
2 sides	0	12				0		0			
2 ends	0	12				0		0			
cover	6494	3								938	
Over Exc. bottom	6494	5						1563			
sides	45	3								758	
ends	45	3								195	
					Trench E subtotals	1154		3815		1891	

Table J.3.1 - MWL Alternative Vb.-Soil and Excavation Volumes Estimate (Unclassified Area)

						Soil Expansion Factor = 1.3					
	Area (ft2)	Depth (ft)	Cover (ft)	Side Slope	End slope	Debris (cy)		Soil Low Level		Soil Replaceable	
Trench F	7862	20	3	0	0						
Core	7862	17				1980		3861			
2 sides	0	17				0		0			
2 ends	0	17				0		0			
cover	7862	3								1136	
Over Exc. bottom	7862	5						1893			
sides	51	3								884	
ends	51	3								221	
					Trench F subtotals	1980		5754		2241	
	Area (ft2)	Depth (ft)	Cover (ft)	Side Slope	End slope	Debris (cy)		Soil Low Level (loose cy)		Soil Replaceable (loose cy)	
Trench G	4371	20	3	1:1	3:1						
Core	312	17				79		153			
3 sides	434	17				1413		2755			
1 end	434	17				385		751			
cover	4371	3								631	
Over Exc. bottom	312	5						75			
sides	--	3								763	
end	--	3								208	
					Trench G subtotals	1877		3735		1602	
Non-Designated Areas (NDA)											
	Area (ft2)	Depth (ft)	Cover (ft)	Side Slope	End slope						
North	540	10	3	0	0					338	
South	480	10	3	0	0					300	
					NDA subtotals	0		0		638	
						Debris (cy)		Soil Low Level (loose cy)		Soil Replaceable (loose cy)	
Unclassified Area Totals						12,077		28,428		13,083	

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Table J.3.2 - MWL Alternative V.b-Soil and Excavation Volumes Estimate (Classified Area)

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Table J.3.3 - Disposal Costs based on Information Provided by SNL (Disposal Costs Include Packaging and Transportation)

**Disposal Cost Summary
Unclassified Area**

Waste Type	Disposal Waste Type	Volume of Waste (cy)	Disposal Facility	Disposal Cost (\$ per cy)	Container Type	Container Volume (cy)	Number of Containers	Container Cost (\$ per Container)	Total Cost (Containers and Disposal)
Soil									
Low Level Rad	RAD3	28,428	Envirocare	\$810	Costs for Containers Included in Disposal				\$23,026,680
Mixed	MIXED5	0	N/A	N/A	N/A	N/A	N/A	N/A	\$0
Debris									
Low Level Rad	RAD3	5392	Envirocare	\$810	Costs for Containers Included in Disposal				\$4,367,520
Mixed	MIXED5	2275	Envirocare	\$8,100	Costs for Containers Included in Disposal				\$18,427,500
Small Sources (high)	N/A	1032	On-Site Storage	N/A	7-4-4	4	258	\$800	\$206,400
Large Sources (high)	N/A	600	On-Site Storage	N/A	7-4-4	4	150	\$800	\$120,000
TRU Waste ²	TRU	21	WIPP	\$20,000	Costs for Containers Included in Disposal				\$420,000
Classified	MIXED5	462	Envirocare	\$8,100	Costs for Containers Included in Disposal				\$3,742,200
Tritium	N/A	777	On-Site Storage	N/A	Costs for Containers Included in Disposal				\$0
Depleted Uranium	RAD3	765	Envirocare	\$810	Costs for Containers Included in Disposal				\$619,650
Beryllium	MIXED3	84	Envirocare	\$8,100	Costs for Containers Included in Disposal				\$680,400
PCBs	MIXED5	245	Envirocare	\$8,100	Costs for Containers Included in Disposal				\$1,984,500
Lead	MIXED3	423	Envirocare	\$8,100	Costs for Containers Included in Disposal				\$3,426,300
Total Debris Volume		12076						Total Cost:	\$57,021,150

**Disposal Cost Summary
Classified Area**

Inventory Waste Type	Disposal Waste Type	Volume of Waste (cy)	Disposal Facility	Disposal Cost (\$ per cy)	Container Type	Container Volume (cy)	Number of Containers	Container Cost (\$ per Container)	Total Cost (Containers and Disposal)
Soil									
Low Level Rad	RAD3	9597	Envirocare	\$810	Costs for Containers Included in Disposal				\$7,773,570
Mixed	MIXED5	5352	Envirocare	\$8,100	Costs for Containers Included in Disposal				\$43,351,200
Concrete ¹	MIXED5	400	Envirocare	\$8,100	Costs for Containers Included in Disposal				\$3,240,000
Debris									
Low Level Rad	RAD3	757	Envirocare	\$810	Costs for Containers Included in Disposal				\$613,170
Mixed ¹	MIXED5	233	Envirocare	\$8,100	Costs for Containers Included in Disposal				\$1,887,300
Small Sources (high)	N/A	58	On-Site Storage	N/A	7-4-4	4	15	\$800	\$11,600
Large Sources (high)	N/A	47	On-Site Storage	N/A	7-4-4	4	12	\$800	\$9,400
TRU Waste ²	TRU	52	WIPP	\$20,000	Costs for Containers Included in Disposal				\$1,040,000
Classified ¹	MIXED5	163	Envirocare	\$8,100	Costs for Containers Included in Disposal				\$1,320,300
Tritium	N/A	175	On-Site Storage	N/A	Costs for Containers Included in Disposal				\$0
Depleted Uranium	MIXED3	454	Envirocare	\$8,100	Costs for Containers Included in Disposal				\$3,677,400
Beryllium ¹	MIXED3	134	Envirocare	\$8,100	Costs for Containers Included in Disposal				\$1,085,400
PCBs	MIXED5	6	Envirocare	\$8,100	Costs for Containers Included in Disposal				\$48,600
Lead ¹	MIXED5	128	Envirocare	\$8,100	Costs for Containers Included in Disposal				\$1,036,800
Total Debris Volume		2207						Total Cost:	\$65,094,740

¹These debris items are assumed to be shredded and included with soils

²No costs were provided by SNL for TRU wastes, used MFT estimate for this waste stream

³Costs for intermodal containers are based on rental at \$14/day for 60 days

On-Site Storage:

435 7-4-4 boxes

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Table J.3.4 - Equipment for Radiological, Chemical and HazCat Lab

Description	Unit	Qty	Unit Price	Total Price
Microwave	each	1	\$317.00	\$317.00
Automated Solvent Extractor	each	1	\$44,000.00	\$44,000.00
GC/ECD Complete System for PCBs	each	1	\$61,122.32	\$61,122.32
ICP/MS Complete System for Metals	each	1	\$208,773.22	\$208,773.22
GC/MS Complete System for SVOCs	each	1	\$95,805.60	\$95,805.60
GC/MS/P&T Complete System for VOCs	each	1	\$126,426.29	\$126,426.29
Cerity Networked Data System for Chemical QA/QC	each	1	\$10,000.00	\$10,000.00
Sonicator	each	1	\$4,155.00	\$4,155.00
Local Computer Systems	each	6	\$4,345.00	\$26,070.00
Server System	each	2	\$5,286.00	\$10,572.00
Bottletop Buret with drying tube	each	12	\$750.00	\$9,000.00
Single Cylinder Truck (dolly)	each	4	\$242.70	\$970.80
Lab Dishwasher (high heat)	each	1	\$7,530.00	\$7,530.00
Adjustable Height top rack (dishwasher)	each	1	\$618.35	\$618.35
6" Glassware holder (dishwasher)	each	1	\$54.35	\$54.35
Utensil Holder (dishwasher)	each	1	\$54.35	\$54.35
0.5-10 μ L Adjustable Pipette	each	6	\$65.60	\$393.60
2-20 μ L Adjustable Pipette	each	6	\$270.00	\$1,620.00
10-100 μ L Adjustable Pipette	each	6	\$270.00	\$1,620.00
20-200 μ L Adjustable Pipette	each	6	\$270.00	\$1,620.00
10-1000 μ L Adjustable Pipette	each	6	\$270.00	\$1,620.00
1000-5000 μ L Adjustable Pipette	each	6	\$300.00	\$1,800.00
Pipet Caddy	each	8	\$44.80	\$358.40
Acryl-Lead Safety Shield	each	10	\$486.75	\$4,867.50
Desiccator Cabinet	each	2	\$4.50	\$9.00
Compact Scale	each	6	\$112.10	\$672.60
Analytical Balance	each	2	\$2,424.20	\$4,848.40
Bench Scale	each	1	\$925.00	\$925.00
Calibration Weights	each	1	\$455.70	\$455.70
Calibration Weights	each	1	\$238.00	\$238.00
Orion pH meter	each	2	\$998.35	\$1,996.70
Timer	each	10	\$23.50	\$235.00
Waterbath	each	2	\$874.90	\$1,749.80
Hood	each	6	\$7,227.70	\$43,366.20
Heating mantles	each	24	\$162.00	\$3,888.00
Oven	each	2	\$1,712.70	\$3,425.40
Standards Refrigerator	each	12	\$1,806.20	\$21,674.40
Sample Refrigerator	each	3	\$1,736.65	\$5,209.95
Chiller	each	1	\$2,025.00	\$2,025.00
Microwave digestion bombs	each	50	\$430.00	\$21,500.00
Flamable Cabinet	each	15	\$849.35	\$12,740.25

Table J.3.4 - Equipment for Radiological, Chemical and HazCat Lab

Description	Unit	Qty	Unit Price	Total Price
Acid Cabinet	each	8	\$907.90	\$7,263.20
First Aid Kit	each	20	\$24.05	\$481.00
Eyewash station	each	50	\$39.45	\$1,972.50
HACH 4000	each	1	\$5,550.00	\$5,550.00
HACH software	each	1	\$60.00	\$60.00
Liquid Scintillation Counter for alpha, beta, tritium	each	1	\$60,000.00	\$60,000.00
Gamma Counter System	each	1	\$50,000.00	\$50,000.00
Desks	each	20	\$273.00	\$5,460.00
Desk chairs	each	20	\$267.00	\$5,340.00
Lunch room chairs	each	50	\$171.00	\$8,550.00
Lab Chairs	each	10	\$316.00	\$3,160.00
Water System	each	1	\$3,504.90	\$3,504.90
Manometer	each	6	\$36.85	\$221.10
Total				\$895,890.88

Table J.3.5 - Basic Laboratory Supplies

Description	Unit	Qty	Unit Price	Total Price
50 mL Beakers	case/12	10	\$29.55	\$296
100 mL Beakers	case/12	10	\$31.10	\$311
150 mL Beakers	case/12	10	\$29.70	\$297
250 mL Beakers	case/12	10	\$29.25	\$293
400 mL Beakers	case/12	10	\$34.90	\$349
1000 mL Beakers	case/6	10	\$41.85	\$419
250 mL WM Plastic Bottles	case/24	8	\$65.25	\$522
500 mL WM Plastic Bottles	case/12	10	\$40.10	\$401
1000 mL WM Plastic Bottles	case/12	10	\$44.40	\$444
500 mL TFE Wash Bottles	each	20	\$92.65	\$1,853
1000 mL TFE Wash Bottles	each	20	\$116.15	\$2,323
1 gal Acid/Solvent Carrier	each	12	\$55.95	\$671
Nalgene Carboy (20L)	each	500	\$106.40	\$53,200
Graduated Cylinder starter pack	pack	15	\$88.45	\$1,327
Erlenmeyer starter pack	pack	20	\$27.60	\$552
25 mL Volumetric Flask	pack/6	10	\$117.25	\$1,173
50 mL Volumetric Flask	pack/6	10	\$124.90	\$1,249
100 mL Volumetric Flask	pack/6	10	\$133.15	\$1,332
250 mL Volumetric Flask	pack/6	10	\$166.20	\$1,662
500 mL Volumetric Flask	pack/6	10	\$206.20	\$2,062
1000 mL Volumetric Flask	each	20	\$41.75	\$835
2000 mL Volumetric Flask	each	20	\$52.65	\$1,053
500 mL Filter Flask	pack/6	10	\$97.95	\$980
1000 mL Filter flask	pack/6	10	\$190.60	\$1,906
Liquid Funnels	pack/12	10	\$78.95	\$790
Powder Funnels	pack/6	10	\$55.15	\$552
12.2 gal Pail	each	500	\$20.95	\$10,475
Stainless Steel Spatulas	each	99	\$12.20	\$1,208
Autosampler Vials	case/1000	100	\$94.15	\$9,415
Crimper	each	6	\$164.70	\$988
Decapper	each	6	\$44.00	\$264
Seals	case/1000	150	\$67.60	\$10,140
Detergent	each	20	\$137.75	\$2,755
Test tube brush	each	50	\$169.20	\$8,460
Cylinder brush	each	50	\$2.80	\$140
Volumetric Flask brush	each	50	\$6.20	\$310
Kimwipes EXL	each	500	\$5.95	\$2,975
Kimwipes Std	each	500	\$2.55	\$1,275
Filter Paper	Box/100	100	\$468.65	\$46,865
Prepleated Filter Paper	Box/100	100	\$104.05	\$10,405
0.5-10 μ L Adjustable Pipette tips	case	100	\$42.70	\$4,270
1-200 μ L Adjustable Pipette tips	case	100	\$25.25	\$2,525
201-1000 μ L Adjustable Pipette tips	case	100	\$33.10	\$3,310
1-5 mL Adjustable Pipette tips	case	100	\$23.65	\$2,365
Plastic Disposable Pipets	pack	100	\$48.20	\$4,820
Disposable Pastuer Pipets	case/1000	100	\$55.60	\$5,560
Rubber Bulbs	pack	100	\$5.50	\$550
TFE Forceps	pack/2	50	\$30.50	\$1,525
Dräger Hazmat Kit	each	3	\$1,942.05	\$5,826
Weigh boats	pack	100	\$48.65	\$4,865
Water filters	each	10	\$355.05	\$3,551

Table J.3.5 - Basic Laboratory Supplies

Description	Unit	Qty	Unit Price	Total Price
RO Membrane	each	10	\$904.10	\$9,041
Safety glasses	each	1000	\$1.80	\$1,800
Nitrile Gloves	Bag	1000	\$24.20	\$24,200
Hazcat Kit	each	3	\$3,338.75	\$10,016
Non-Haz labels	roll	100	\$71.50	\$7,150
Non-Reg labels	roll	100	\$71.50	\$7,150
Accum Labels	roll	100	\$42.45	\$4,245
Rad Labels	box	100	\$15.45	\$1,545
Flamable Labels	box	100	\$15.45	\$1,545
Methanol	case/12	50	\$507.00	\$25,350
Methylene Chloride	case/4	50	\$294.98	\$14,749
Acetone	case/4	50	\$202.00	\$10,100
pH Buffer 4.0	case/6	10	\$207.20	\$2,072
pH Buffer 7.0	case/6	10	\$112.02	\$1,120
pH Buffer 9.0	case/6	10	\$98.16	\$982
Nitric Acid	case/4	100	\$131.08	\$13,108
Potassium Permanganate	each	10	\$11.78	\$118
ICPMS Internal Std Mix	each	30	\$109.00	\$3,270
Toluene	case/4	20	\$238.40	\$4,768
ICPMS ICV Std	each	20	\$164.00	\$3,280
ICPMS Soil Spike Std	each	20	\$164.00	\$3,280
ICPMS Calib std	each	20	\$217.00	\$4,340
ICPMS tuning std	each	20	\$73.80	\$1,476
ICPMS Interference Check A	each	20	\$364.00	\$7,280
ICPMS Interference Check B	each	20	\$133.00	\$2,660
ICPMS Memory Check B	each	20	\$394.00	\$7,880
ICPMS Memory Check A	each	20	\$394.00	\$7,880
8260 Std Kit	each	35	\$280.00	\$9,800
8270 Std kit	each	35	\$641.73	\$22,461
PCB 1232 Std	each	40	\$40.20	\$1,608
PCB 1260 Std	each	40	\$31.80	\$1,272
PCB 1016 Std	each	40	\$37.50	\$1,500
Marinelli	case/33	350	\$520.00	\$182,000
Amber Sampling jars	case	100	\$43.86	\$4,386
4 oz sampling jars	case	200	\$57.56	\$11,512
Hydrazine	case	20	\$18.46	\$369
2 oz sampling jars	case	200	\$74.38	\$14,876
Other Direct Costs	each	1	\$10,000.00	\$10,000
Total				\$661,878

Table J.3.6 - Radiological Monitoring Equipment

Description	Unit	Qty	Unit Price	Total Price
Alpha particulate air monitoring	each	2	\$24,750.00	\$49,500.00
Beta particulate air monitoring	each	2	\$28,390.00	\$56,780.00
Monitor for conveyor	each	1	\$7,000.00	\$7,000.00
Monitor for heavy equipment	each	1	\$13,500.00	\$13,500.00
Exit Monitors-alpha/beta	each	4	\$71,500.00	\$286,000.00
Exit Monitors-gamma	each	4	\$40,360.00	\$161,440.00
Electronic/Real-time dose rate monitoring system	each	1	\$68,525.00	\$68,525.00
Electronic/Real-time dose rate monitoring dosimeters	each	200	\$635.00	\$127,000.00
Electronic/Real-time dose rate monitoring dosimeter calibration	each	200	\$70.00	\$14,000.00
Total				\$783,745.00

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Project Cost Summary Report (with Markups)

Folder: MWL Cost Estimate 111802

Project

Name: Mixed waste landfill
ID: 1
Location: ALBUQUERQUE, NEW MEXICO
Modifiers: **Material** 0.9862 (Modified)
 Labor 1.1017 (Modified)
 Equipment 0.9432 (Modified)
Category: None
Report Option: Fiscal Year
Description: Excavation, waste management, disposal of landfill contents

Phase	Direct Cost	Markups	Total Cost
Remedial Design	\$0	\$0	\$0
Remedial Action (Capital)	\$348,607,545	\$273,158,340	\$621,765,885
<hr/>			
Total Project Cost	\$348,607,545	\$273,158,340	\$621,765,885
			Escalation
			\$163,824,153
			Escalated Project Cost
			\$785,590,038

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Project Cost Detail Report (with Markups)

Folder: MWL Cost Estimate 111802

Project

Name: Mixed waste landfill
ID: 1
Location: ALBUQUERQUE, NEW MEXICO
Modifiers: **Material** 0.9862 (Modified)
 Labor 1.1017 (Modified)
 Equipment 0.9432 (Modified)
Category: None
Report Option: Fiscal Year
Description: Excavation, waste management, disposal of landfill contents

Site

Name: Complete Excavation with Off-Site Dispos
ID: 1
Type: None

Phase Element (Markup Template)	Direct Cost	General Conditions	Overhead	Sub Profit	Prime Markup on Sub	Prime Profit	Risk	Owner Cost	Markup Total	Total
Classisfied Area Excavation (Capital)	\$132,454,023								\$72,936,758	\$205,390,781
(System Defaults)		\$6,781,256	\$41,050,684	\$0	\$0	\$15,324,307	\$0	\$9,780,513		
Demob./Site Clean-up (Capital)	\$17,880,322								\$19,559,387	\$37,439,709
(System Defaults)		\$947,278	\$14,035,870	\$0	\$0	\$2,793,395	\$0	\$1,782,843		
Mob./Facility Construction (Capital)	\$30,614,294								\$23,876,933	\$54,491,227

Cost Database Date: 2002

Cost Type: User-Defined

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Project Cost Detail Report (with Markups)

Phase Element (Markup Template)	Direct Cost	General Conditions	Overhead	Sub Profit	Prime Markup on Sub	Prime Profit	Risk	Owner Cost	Markup Total	Total
(System Defaults)		\$1,707,703	\$15,508,792	\$0	\$0	\$4,065,617	\$0	\$2,594,820		
Non- Classified Excavation (Capital)	\$108,829,025								\$68,338,042	\$177,167,067
(System Defaults)		\$5,862,060	\$40,820,934	\$0	\$0	\$13,218,522	\$0	\$8,436,527		
Off Site Laboratory Analysis (Capital)	\$1,663,007								\$1,427,496	\$3,090,503
(System Defaults)		\$83,150	\$966,595	\$0	\$0	\$230,584	\$0	\$147,167		
On Site Laboratory Analysis (Capital)	\$17,760,600								\$28,352,205	\$46,112,805
(System Defaults)		\$930,157	\$21,785,702	\$0	\$0	\$3,440,499	\$0	\$2,195,848		
Planning/Permits (Capital)	\$8,414,834								\$16,989,654	\$25,404,488
(System Defaults)		\$420,742	\$13,463,734	\$0	\$0	\$1,895,441	\$0	\$1,209,738		
Post Closure Institutional Controls (Cap	\$13,296,379								\$23,241,401	\$36,537,780
(System Defaults)		\$665,132	\$18,110,273	\$0	\$0	\$2,726,102	\$0	\$1,739,894		
Waste Management (Capital)	\$17,695,062								\$18,436,464	\$36,131,526
(System Defaults)		\$981,176	\$13,038,948	\$0	\$0	\$2,695,791	\$0	\$1,720,549		

Cost Database Date: 2002

Cost Type: User-Defined

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Project Cost Detail Report (with Markups)

Total Site Cost	\$348,607,545	\$18,378,653	\$178,781,53	\$0	\$0	\$46,390,257	\$0	\$29,607,899	\$273,158,340	\$621,765,885
								Escalation		\$163,824,153
								Escalated Site Cost		\$785,590,038
						Direct Cost	Markups	Escalation		Total
			Total Project Cost			\$348,607,545	\$273,158,340	\$163,824,153		\$785,590,038

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Folder: MWL Cost Estimate 102802

Project

Name: Mixed waste landfill
ID: 1
Location: ALBUQUERQUE, NEW MEXICO
Modifiers:
 Material 0.9862 (Modified)
 Labor 1.1017 (Modified)
 Equipment 0.9432 (Modified)
Category: None
Report Option: Fiscal Year
Description: Excavation, waste mangament, disposal of landfill contents

Site

Name: Complete Excavation with Off-Site Disposal
ID: 1
Type: None

Phase Element

Name: Planning/Permits	Media/Waste Type: N/A
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: None
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: Ex Situ	Markup Template: System Defaults
Start Date: 10/1/2003	O&M Markup Template: N/A
Description: Planning/Permits	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: USER-DEFINED ESTIMATE

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220101	Senior Project Manager	2,808.00	HR	0.00	61.52	0.00	\$172,749.56	<input type="checkbox"/>
33220102	Project Manager	7,020.00	HR	0.00	51.54	0.00	\$361,797.46	<input type="checkbox"/>
33220104	Senior Staff Engineer	28,080.00	HR	0.00	51.44	0.00	\$1,444,547.52	<input type="checkbox"/>
33220106	Staff Engineer	42,120.00	HR	0.00	30.40	0.00	\$1,280,624.90	<input type="checkbox"/>
33220111	Certified Industrial Hygienist	14,040.00	HR	0.00	57.89	0.00	\$812,817.72	<input type="checkbox"/>
33220113	Secretarial/ Administrative	28,080.00	HR	0.00	19.25	0.00	\$540,621.43	<input type="checkbox"/>
33220115	Draftsman/CADD	28,080.00	HR	0.00	26.59	0.00	\$746,607.89	<input type="checkbox"/>
Total Element Cost							\$5,359,766.49	
Total Technology Cost							\$5,359,766.49	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Professional Labor Management

Element: Professional Labor Percentage

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220138	Project Management Labor Cost	1.00	LS	0.00	803,965.00	0.00	\$803,965.00	<input checked="" type="checkbox"/>
33220139	Planning Documents Labor Cost	1.00	LS	0.00	643,172.00	0.00	\$643,172.00	<input checked="" type="checkbox"/>
33220140	Construction Oversight Labor Cost	1.00	LS	0.00	522,577.22	0.00	\$522,577.22	<input checked="" type="checkbox"/>
33220141	Reporting Labor Cost	1.00	LS	0.00	120,594.75	0.00	\$120,594.75	<input checked="" type="checkbox"/>
33220142	As-Built Drawings Labor Cost	1.00	LS	0.00	120,594.75	0.00	\$120,594.75	<input checked="" type="checkbox"/>
33220143	Public Notice Labor Cost	1.00	LS	0.00	40,198.25	0.00	\$40,198.25	<input checked="" type="checkbox"/>
33220144	Site Closure Activities Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220145	Permitting Labor Cost	1.00	LS	0.00	803,965.00	0.00	\$803,965.00	<input checked="" type="checkbox"/>
33220146	Responsible Party Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220147	Reimbursement Claims Preparation Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220148	Other Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
Total Element Cost							\$3,055,066.97	
Total Technology Cost							\$3,055,066.97	
Total Phase Element Cost							\$8,414,833.46	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Folder: MWL Cost Estimate 111802

Project

Name: Mixed waste landfill
ID: 1
Location: ALBUQUERQUE, NEW MEXICO
Modifiers:
 Material 0.9862 (Modified)
 Labor 1.1017 (Modified)
 Equipment 0.9432 (Modified)
Category: None
Report Option: Fiscal Year
Description: Excavation, waste management, disposal of landfill contents

Site

Name: Complete Excavation with Off-Site Disposal
ID: 1
Type: None

Phase Element

Name: Mob./Facility Construction	Media/Waste Type: N/A
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: None
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: Ex Situ	Markup Template: System Defaults
Start Date: 10/1/2008	O&M Markup Template: N/A
Description: Mob./Facility Construction	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Access Roads

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
17030103	Rough Grading, 14G, 1 Pass	48,711.11	SY	0.00	0.42	0.57	\$48,238.61	<input type="checkbox"/>
17030108	Fine Grading, 130G, 2 Passes	22,072.22	SY	0.00	0.09	0.11	\$4,553.50	<input type="checkbox"/>
17030202	Ditch Excavation, Normal Soil, Haul Spoil 1 Mile	5,137.50	CY	0.00	2.15	2.70	\$24,951.30	<input type="checkbox"/>
17030204	Roadway Sand Excavation, with Scraper, Load & Haul Spoil	6,131.17	CY	0.00	4.56	7.81	\$75,850.54	<input type="checkbox"/>
17030506	Compact Sand Subgrade (Wet & 2 Passes)	24,355.55	SY	0.00	0.20	0.24	\$10,777.33	<input type="checkbox"/>
18010102	Gravel, Delivered & Dumped	6,131.17	CY	19.18	2.20	1.38	\$139,608.58	<input type="checkbox"/>
19030402	34' Complete, 24" Corrugated Metal Pipe Culvert with Headwalls	3.00	EA	3,136.07	1,784.22	724.10	\$16,933.16	<input type="checkbox"/>
Total Element Cost							\$320,913.02	
Total Technology Cost							\$320,913.02	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Clear and Grub

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
17010101	Light Brush without Grub, Clearing	45.00	ACRE	0.00	49.57	22.33	\$3,235.28	<input type="checkbox"/>
17010212	Clear Trees to 24" Diameter with D8 Cat	2,250.00	EA	0.00	4.35	11.43	\$35,485.43	<input type="checkbox"/>
17010316	> 12" and <= 24" Stump Removal, with D8	2,250.00	EA	0.00	17.39	45.70	\$141,942.15	<input type="checkbox"/>
17010501	Dozer 105 HP D5, Grubbing & Stacking	3,630.00	CY	0.00	3.19	3.62	\$24,725.75	<input type="checkbox"/>
Total Element Cost							\$205,388.60	
Total Technology Cost							\$205,388.60	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Demolition, Fencing

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
17020225	Remove Chain-link Fence	2,000.00	LF	0.00	2.07	0.00	\$4,134.60	<input type="checkbox"/>
17020401	Dump Charges	240.00	CY	15.00	0.00	0.00	\$3,600.00	<input checked="" type="checkbox"/>
17030220	910, 1.25 CY, Wheel Loader	6.00	HR	0.00	32.83	25.28	\$348.65	<input type="checkbox"/>
17030284	8 CY, Dump Truck	18.00	HR	0.00	27.54	40.05	\$1,216.67	<input type="checkbox"/>
Total Element Cost							\$9,299.92	
Total Technology Cost							\$9,299.92	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Fencing

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
18040108	7' Galvanized Chain-link Fence	6,875.00	LF	27.25	1.53	0.00	\$197,802.00	<input type="checkbox"/>
18040118	7' Swing Gate, 12' Double	1.00	EA	361.16	77.62	89.74	\$528.52	<input type="checkbox"/>
18040501	Hazardous Waste Signing	35.00	EA	15.93	40.05	0.00	\$1,959.45	<input type="checkbox"/>
Total Element Cost							\$200,289.97	
Total Technology Cost							\$200,289.97	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Parking Lots

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
17030102	Rough Grading, 12G, 1 Pass	8,033.33	SY	0.00	0.22	0.41	\$5,093.13	<input type="checkbox"/>
17030107	Fine Grading, 120G, 2 Passes	8,033.33	SY	0.00	0.09	0.10	\$1,539.19	<input type="checkbox"/>
17030203	Roadway Soil Excavation, with Scraper, Load & Haul Spoil	892.59	CY	0.00	2.58	3.33	\$5,272.17	<input type="checkbox"/>
17030501	Compact Subgrade, 2 Lifts	1,115.74	CY	0.00	0.19	0.24	\$482.22	<input type="checkbox"/>
17030510	Dry Roll Gravel, Steel Roller	4,016.67	SY	0.00	0.51	0.25	\$3,060.30	<input type="checkbox"/>
18010102	Gravel, Delivered & Dumped	892.59	CY	19.18	2.20	1.38	\$20,324.54	<input type="checkbox"/>
Total Element Cost							\$35,771.56	
Total Technology Cost							\$35,771.56	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Professional Labor Management

Element: Professional Labor Percentage

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220138	Project Management Labor Cost	1.00	LS	0.00	1,428,294.13	0.00	\$1,428,294.13	<input checked="" type="checkbox"/>
33220139	Planning Documents Labor Cost	1.00	LS	0.00	1,428,294.13	0.00	\$1,428,294.13	<input checked="" type="checkbox"/>
33220140	Construction Oversight Labor Cost	1.00	LS	0.00	1,785,367.63	0.00	\$1,785,367.63	<input checked="" type="checkbox"/>
33220141	Reporting Labor Cost	1.00	LS	0.00	178,536.77	0.00	\$178,536.77	<input checked="" type="checkbox"/>
33220142	As-Built Drawings Labor Cost	1.00	LS	0.00	178,536.77	0.00	\$178,536.77	<input checked="" type="checkbox"/>
33220143	Public Notice Labor Cost	1.00	LS	0.00	24,995.15	0.00	\$24,995.15	<input checked="" type="checkbox"/>
33220144	Site Closure Activities Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220145	Permitting Labor Cost	1.00	LS	0.00	1,785,367.63	0.00	\$1,785,367.63	<input checked="" type="checkbox"/>
33220146	Responsible Party Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220147	Reimbursement Claims Preparation Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220148	Other Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
Total Element Cost							\$6,809,392.18	
Total Technology Cost							\$6,809,392.18	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Overhead Electrical Distribution

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
20020301	1/0 ACSR Conductor	8,904.00	LF	0.20	0.60	0.05	\$7,475.80	<input type="checkbox"/>
20020310	1/C #2 Aluminum, Bare, Wire	3,488.00	LF	0.15	0.58	0.04	\$2,682.62	<input type="checkbox"/>
20020403	40' Class 3 Treated Power Pole	13.00	EA	294.83	336.60	38.23	\$8,705.45	<input type="checkbox"/>
20020420	Straight-line Structure, 5 KV Pole Top	11.00	EA	100.72	303.32	34.45	\$4,823.40	<input type="checkbox"/>
20020430	Terminal Structure, 5 KV Pole Top	2.00	EA	1,138.42	1,150.96	130.72	\$4,840.18	<input type="checkbox"/>
20020511	5 KV, 3/0, Shielded Cable, Copper	120.00	LF	2.47	1.48	0.17	\$494.64	<input type="checkbox"/>
20020545	5 KV, 1/0 to 4/0 Conductor, Terminations & Splicing	6.00	EA	439.41	229.36	0.00	\$4,012.60	<input type="checkbox"/>
20039902	4" Rigid Steel Conduit	40.00	LF	8.71	9.24	0.00	\$717.94	<input type="checkbox"/>
Total Element Cost							\$33,752.63	
Total Technology Cost							\$33,752.63	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Sanitary Sewer

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
17030259	Cat 225, 1.5 CY, Soil/Sand, Trenching	1,645.22	CY	0.00	0.45	0.49	\$1,547.00	<input type="checkbox"/>
17030401	950, 3.00 CY, Backfill with Excavated Material	1,599.40	CY	0.00	0.56	0.62	\$1,889.05	<input type="checkbox"/>
17030511	Compact Soil with Vibrating Plate	1,599.40	CY	0.00	3.97	0.15	\$6,588.89	<input type="checkbox"/>
19020127	8" PVC Pipe Sanitary	2,800.00	LF	5.23	5.02	1.77	\$33,654.32	<input type="checkbox"/>
19020201	Precast, CIP Base, 4' Diameter, 6' Deep, Manhole	10.00	EA	491.26	372.52	70.46	\$9,342.40	<input type="checkbox"/>
Total Element Cost							\$53,021.66	
Total Technology Cost							\$53,021.66	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: USER-DEFINED ESTIMATE

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220101	Senior Project Manager	1,040.00	HR	0.00	61.52	0.00	\$63,981.32	<input type="checkbox"/>
33220102	Project Manager	2,080.00	HR	0.00	51.54	0.00	\$107,199.25	<input type="checkbox"/>
33220104	Senior Staff Engineer	4,160.00	HR	0.00	51.44	0.00	\$214,007.04	<input type="checkbox"/>
33220106	Staff Engineer	4,160.00	HR	0.00	30.40	0.00	\$126,481.47	<input type="checkbox"/>
33220110	QA/QC Officer	2,080.00	HR	0.00	67.45	0.00	\$140,286.64	<input type="checkbox"/>
33220111	Certified Industrial Hygienist	2,080.00	HR	0.00	57.89	0.00	\$120,417.44	<input type="checkbox"/>
33220112	Field Technician	41,600.00	HR	0.00	20.70	0.00	\$861,282.24	<input type="checkbox"/>
33220119	Health and Safety Officer	2,080.00	HR	0.00	27.07	0.00	\$56,301.44	<input type="checkbox"/>
Total Element Cost							\$1,689,956.84	
Total Technology Cost							\$1,689,956.84	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: USER-DEFINED ESTIMATE

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
16019913	950, 3.0 CY Wheel Loader	2,080.00	HR	0.00	40.04	43.67	\$174,111.81	<input type="checkbox"/>
17030431	580K, 1.0 CY, Backhoe with Front-end Loader	2,080.00	HR	0.00	41.92	21.06	\$130,998.40	<input type="checkbox"/>
17030703	D5 with A-blade Bulldozer	2,080.00	HR	0.00	40.04	54.24	\$196,092.62	<input type="checkbox"/>
33040165	22 Ton 4WD Rough Terrain Hydraulic Crane, No Operator	2,080.00	HR	0.00	0.00	74.21	\$154,358.88	<input type="checkbox"/>
33100118	R60 Rough Terrain Forklift, 6,000 Lb @ 24" LC	4,160.00	HR	22.91	40.04	27.38	\$375,749.92	<input type="checkbox"/>
95010705	Miscellaneous Tools and Supplies	12.00	MO	5,000.00	0.00	0.00	\$60,000.00	<input checked="" type="checkbox"/>
95010901	14 H Motor Grader	12.00	MO	0.00	0.00	10,185.00	\$122,220.00	<input checked="" type="checkbox"/>
95010902	825 G Sheepsfoot	12.00	MO	0.00	0.00	13,355.00	\$160,260.00	<input checked="" type="checkbox"/>
95010903	Vibratory Smooth Drum Roller CS583C	12.00	MO	0.00	0.00	5,685.00	\$68,220.00	<input checked="" type="checkbox"/>
Total Element Cost							\$1,442,011.63	
Total Technology Cost							\$1,442,011.63	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: USER-DEFINED ESTIMATE

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
95010603	Administrative Trailer	120.00	MO	0.00	0.00	1,200.00	\$144,000.00	<input checked="" type="checkbox"/>
95010604	Co-ed Shower Trailer	120.00	MO	0.00	0.00	1,200.00	\$144,000.00	<input checked="" type="checkbox"/>
95010605	Office Trailer	360.00	MO	0.00	0.00	1,200.00	\$432,000.00	<input checked="" type="checkbox"/>
95010610	10 X 25 Connex Storage Box	1,200.00	MO	0.00	0.00	115.00	\$138,000.00	<input checked="" type="checkbox"/>
95010611	Mob./Demob. Administrative Trailer	2.00	LS	0.00	0.00	2,662.00	\$5,324.00	<input checked="" type="checkbox"/>
95010612	Mob./Demob. Office Trailer	6.00	LS	0.00	0.00	431.00	\$2,586.00	<input checked="" type="checkbox"/>
95010613	Mob./Demob. Laboratory Trailer	5.00	LS	0.00	0.00	431.00	\$2,155.00	<input checked="" type="checkbox"/>
95010614	Mob./Demob. Shower Trailer	1.00	LS	0.00	0.00	431.00	\$431.00	<input checked="" type="checkbox"/>
95010621	Water Line Installation	2,800.00	FT	20.00	0.00	0.00	\$56,000.00	<input checked="" type="checkbox"/>
95010622	Phone Installation	1.00	EA	5,000.00	0.00	0.00	\$5,000.00	<input checked="" type="checkbox"/>
95010623	Breathing Air Refill System	1.00	EA	110,000.00	0.00	0.00	\$110,000.00	<input checked="" type="checkbox"/>
95010703	Tent Structure	1.00	LS	0.00	0.00	13,275,000.00	\$13,275,000.00	<input checked="" type="checkbox"/>
95010704	Permanent Storage Facility	1.00	LS	0.00	0.00	500,000.00	\$500,000.00	<input checked="" type="checkbox"/>
95010708	Ventilation System Installation	1.00	LS	5,000,000.00	0.00	0.00	\$5,000,000.00	<input checked="" type="checkbox"/>
Total Element Cost							\$19,814,496.00	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Total Technology Cost	\$19,814,496.00
Total Phase Element Cost	\$30,614,294.01

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Phase Element Technology Cost Detail Report (without Markups)

Folder: MWL Cost Estimate 111802

Project

Name: Mixed waste landfill
ID: 1
Location: ALBUQUERQUE, NEW MEXICO
Modifiers:
 Material 0.9862 (Modified)
 Labor 1.1017 (Modified)
 Equipment 0.9432 (Modified)
Category: None
Report Option: Fiscal Year
Description: Excavation, waste management, disposal of landfill contents

Site

Name: Complete Excavation with Off-Site Disposal
ID: 1
Type: None

Phase Element

Name: Non- Classified Excavation	Media/Waste Type: Soil
Type: Remedial Action	Secondary Media/Waste Type: Solids
Labor Rate Group: System Labor Rate	Contaminant: Low Level Radioactive
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: Volatile Organic Compounds (VOCs)
Approach: Ex Situ	Markup Template: System Defaults
Start Date: 10/1/2009	O&M Markup Template: N/A

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Description: Non- Classified Area

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Excavation

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
17030223	950, 3.0 CY, Wheel Loader	36,000.00	HR	0.00	78.17	72.78	\$5,434,264.80	<input type="checkbox"/>
17030232	Crawler-mounted, 2.0 CY, 235 Hydraulic Excavator	14,400.00	HR	0.00	84.86	189.08	\$3,944,697.12	<input type="checkbox"/>
17030233	Crawler-mounted, 3.125 CY, 245 Hydraulic Excavator	7,200.00	HR	0.00	84.86	279.80	\$2,625,528.96	<input type="checkbox"/>
17030284	8 CY, Dump Truck	36,000.00	HR	0.00	65.58	66.75	\$4,763,811.60	<input type="checkbox"/>
17030415	Backfill with Excavated Material	17,481.18	CY	0.30	5.80	1.23	\$128,079.36	<input type="checkbox"/>
17030418	Delivered & Dumped, Backfill with Stone	1,790.13	BCY	23.02	1.30	1.21	\$45,691.10	<input type="checkbox"/>
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	86,561.38	CY	5.33	2.44	3.18	\$947,855.80	<input type="checkbox"/>
17030703	D5 with A-blade Bulldozer	14,400.00	HR	0.00	78.17	90.40	\$2,427,331.68	<input type="checkbox"/>
33100118	R60 Rough Terrain Forklift, 6,000 Lb @ 24" LC	28,800.00	HR	22.91	40.04	27.38	\$2,601,345.60	<input type="checkbox"/>
33110701	Vibrating Grizzly Screen w/3" Screen Openings	1.00	EA	33,140.19	19.44	4.95	\$33,164.57	<input type="checkbox"/>
33132405	Electric Shredder, Minimum Rental Charge, 50 - 75 Tons/Hour	2.00	EA	41,223.16	0.00	0.00	\$82,446.32	<input type="checkbox"/>

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33132406	Electric Shredder, Additional Monthly Rental, 50 - 75 Tons/Hour	86.00	MO	18,639.18	0.00	0.00	\$1,602,969.44	<input type="checkbox"/>
33150432	Radial Stacking Conveyor with 2 CY Hopper, 55' Long	1.00	EA	50,789.30	0.00	0.00	\$50,789.30	<input type="checkbox"/>
33170803	Decontaminate Heavy Equipment	19.00	EA	0.00	665.05	0.00	\$12,635.86	<input type="checkbox"/>
33341011	Man-Lift Rental, Boom, 84' High, 600# capacity	43.00	MO	10,160.31	0.00	0.00	\$436,893.14	<input type="checkbox"/>
Total Element Cost							\$25,137,504.64	
Total Technology Cost							\$25,137,504.64	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Decontamination Facilities

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
17030109	Pad Subgrade Preparation	133.33	CY	0.00	2.82	2.94	\$767.42	<input type="checkbox"/>
17030257	Cat 215, 1.0 CY, Soil, Shallow, Trenching	2.49	CY	0.00	0.87	0.87	\$4.33	<input type="checkbox"/>
17030501	Compact Subgrade, 2 Lifts	133.33	CY	0.00	0.29	0.32	\$80.86	<input type="checkbox"/>
17030510	Dry Roll Gravel, Steel Roller	200.00	SY	0.00	0.76	0.33	\$219.32	<input type="checkbox"/>
18010102	Gravel, Delivered & Dumped	55.56	CY	19.18	3.29	1.84	\$1,350.83	<input type="checkbox"/>
18010103	Gravel (90%) & Sand Base (10%), with Calcium Chloride 3/4 - 1 Lb/CY	55.56	CY	19.14	3.65	1.93	\$1,373.65	<input type="checkbox"/>
18010201	Concrete Curb, 6" x 6"	166.00	LF	1.11	1.45	0.01	\$425.96	<input type="checkbox"/>
18020203	26" x 26", 5' Deep Area Drain with Grate	1.00	EA	1,486.35	1,679.61	27.11	\$3,193.08	<input type="checkbox"/>
18020321	6" Structural Slab on Grade	1,500.00	SF	2.42	3.55	0.20	\$9,265.80	<input type="checkbox"/>
19020313	5' x 5' x 5' Reinforced Concrete Sump	1.00	EA	1,428.19	2,376.03	95.64	\$3,899.85	<input type="checkbox"/>
19020604	12" x 12" CIP Concrete In-Ground Trench Drain with Metal Grate	28.00	LF	37.93	77.17	0.68	\$3,242.01	<input type="checkbox"/>
19040606	5,000 Gallon Steel Sump, Aboveground with Supports & Fittings	1.00	EA	4,372.96	1,966.09	215.89	\$6,554.93	<input type="checkbox"/>

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	199.20	LF	0.05	0.96	0.22	\$243.24	<input type="checkbox"/>
33080532	8 oz/sy Erosion Control/Drainage Filter Fabric (80 Mil)	200.00	SY	0.66	0.77	0.03	\$292.76	<input type="checkbox"/>
33080571	40 Mil Polymeric Liner, High-density Polyethylene	1,800.00	SF	0.27	1.64	0.22	\$3,817.26	<input type="checkbox"/>
33170814	1,800 PSI Pressure Washer, 6 HP, 4.8 GPM	1.00	EA	1,602.58	0.00	0.00	\$1,602.58	<input type="checkbox"/>
33170823	Operation of Pressure Washer, Including Water, Soap, Electricity, Labor	1,800.00	HR	6.16	59.72	0.00	\$118,585.44	<input type="checkbox"/>
33199921	DOT Steel Drum, 55 Gallon	624.00	EA	71.50	0.00	0.00	\$44,615.69	<input type="checkbox"/>
33231306	High Sump Level Switch for Avoiding Overflow	1.00	EA	202.17	249.95	0.00	\$452.12	<input type="checkbox"/>
33260623	(2 1/2", 4") PVC Double-wall Piping, with Fittings	30.00	LF	15.37	32.78	0.00	\$1,444.42	<input type="checkbox"/>
33290401	25 GPM, 1 1/2" Discharge, Cast-iron Sump Pump	1.00	EA	1,993.97	578.63	0.00	\$2,572.60	<input type="checkbox"/>
Total Element Cost							\$204,004.15	
Total Technology Cost							\$204,004.15	

Cost Database Date: 2002

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Professional Labor Management

Element: Professional Labor Percentage

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220138	Project Management Labor Cost	1.00	LS	0.00	2,789,363.50	0.00	\$2,789,363.50	<input checked="" type="checkbox"/>
33220139	Planning Documents Labor Cost	1.00	LS	0.00	2,649,895.25	0.00	\$2,649,895.25	<input checked="" type="checkbox"/>
33220140	Construction Oversight Labor Cost	1.00	LS	0.00	5,578,727.00	0.00	\$5,578,727.00	<input checked="" type="checkbox"/>
33220141	Reporting Labor Cost	1.00	LS	0.00	697,340.88	0.00	\$697,340.88	<input checked="" type="checkbox"/>
33220142	As-Built Drawings Labor Cost	1.00	LS	0.00	697,340.88	0.00	\$697,340.88	<input checked="" type="checkbox"/>
33220143	Public Notice Labor Cost	1.00	LS	0.00	27,893.63	0.00	\$27,893.63	<input checked="" type="checkbox"/>
33220144	Site Closure Activities Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220145	Permitting Labor Cost	1.00	LS	0.00	1,394,681.75	0.00	\$1,394,681.75	<input checked="" type="checkbox"/>
33220146	Responsible Party Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220147	Reimbursement Claims Preparation Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220148	Other Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
Total Element Cost							\$13,835,242.88	
Total Technology Cost							\$13,835,242.88	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Decontamination Facilities

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
17030109	Pad Subgrade Preparation	53.33	CY	0.00	2.82	2.94	\$306.96	<input type="checkbox"/>
17030257	Cat 215, 1.0 CY, Soil, Shallow, Trenching	1.60	CY	0.00	0.87	0.87	\$2.78	<input type="checkbox"/>
17030501	Compact Subgrade, 2 Lifts	53.33	CY	0.00	0.29	0.32	\$32.34	<input type="checkbox"/>
17030510	Dry Roll Gravel, Steel Roller	80.00	SY	0.00	0.76	0.33	\$87.73	<input type="checkbox"/>
18010102	Gravel, Delivered & Dumped	22.22	CY	19.18	3.29	1.84	\$540.23	<input type="checkbox"/>
18010103	Gravel (90%) & Sand Base (10%), with Calcium Chloride 3/4 - 1 Lb/CY	22.22	CY	19.14	3.65	1.93	\$549.36	<input type="checkbox"/>
18010201	Concrete Curb, 6" x 6"	106.00	LF	1.11	1.45	0.01	\$272.00	<input type="checkbox"/>
18020203	26" x 26", 5' Deep Area Drain with Grate	1.00	EA	1,486.35	1,679.61	27.11	\$3,193.08	<input type="checkbox"/>
18020321	6" Structural Slab on Grade	600.00	SF	2.42	3.55	0.20	\$3,706.32	<input type="checkbox"/>
19020313	5' x 5' x 5' Reinforced Concrete Sump	1.00	EA	1,428.19	2,376.03	95.64	\$3,899.85	<input type="checkbox"/>
19020604	12" x 12" CIP Concrete In-Ground Trench Drain with Metal Grate	18.00	LF	37.93	77.17	0.68	\$2,084.15	<input type="checkbox"/>
19040606	5,000 Gallon Steel Sump, Aboveground with Supports & Fittings	1.00	EA	4,372.96	1,966.09	215.89	\$6,554.93	<input type="checkbox"/>

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	127.20	LF	0.05	0.96	0.22	\$155.32	<input type="checkbox"/>
33080532	8 oz/sy Erosion Control/Drainage Filter Fabric (80 Mil)	80.00	SY	0.66	0.77	0.03	\$117.10	<input type="checkbox"/>
33080571	40 Mil Polymeric Liner, High-density Polyethylene	720.00	SF	0.27	1.64	0.22	\$1,526.90	<input type="checkbox"/>
33170814	1,800 PSI Pressure Washer, 6 HP, 4.8 GPM	1.00	EA	1,602.58	0.00	0.00	\$1,602.58	<input type="checkbox"/>
33170823	Operation of Pressure Washer, Including Water, Soap, Electricity, Labor	3,600.00	HR	6.16	59.72	0.00	\$237,170.88	<input type="checkbox"/>
33231306	High Sump Level Switch for Avoiding Overflow	1.00	EA	202.17	249.95	0.00	\$452.12	<input type="checkbox"/>
33260623	(2 1/2", 4") PVC Double-wall Piping, with Fittings	30.00	LF	15.37	32.78	0.00	\$1,444.42	<input type="checkbox"/>
33290401	25 GPM, 1 1/2" Discharge, Cast-iron Sump Pump	1.00	EA	1,993.97	578.63	0.00	\$2,572.60	<input type="checkbox"/>
Total Element Cost							\$266,271.66	
Total Technology Cost							\$266,271.66	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: USER-DEFINED ESTIMATE

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220101	Senior Project Manager	3,600.00	HR	0.00	61.52	0.00	\$221,473.80	<input type="checkbox"/>
33220102	Project Manager	7,200.00	HR	0.00	51.54	0.00	\$371,074.32	<input type="checkbox"/>
33220104	Senior Staff Engineer	14,400.00	HR	0.00	51.44	0.00	\$740,793.60	<input type="checkbox"/>
33220106	Staff Engineer	14,400.00	HR	0.00	30.40	0.00	\$437,820.48	<input type="checkbox"/>
33220110	QA/QC Officer	7,200.00	HR	0.00	67.45	0.00	\$485,607.60	<input type="checkbox"/>
33220111	Certified Industrial Hygienist	7,200.00	HR	0.00	57.89	0.00	\$416,829.60	<input type="checkbox"/>
33220112	Field Technician	144,000.00	HR	0.00	20.70	0.00	\$2,981,361.60	<input type="checkbox"/>
33220119	Health and Safety Officer	7,200.00	HR	0.00	27.07	0.00	\$194,889.60	<input type="checkbox"/>
Total Element Cost							\$5,849,850.60	
Total Technology Cost							\$5,849,850.60	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Off-site Transportation and Waste Disposal

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
95010707	Pre-filter/HEPA/ULPA Filter Disposal	180.00	WK	25,000.00	0.00	0.00	\$4,500,000.00	<input checked="" type="checkbox"/>
95011201	Mixed Waste Transportation, Packaging, and Disposal	3,489.00	CY	8,100.00	0.00	0.00	\$28,260,900.00	<input checked="" type="checkbox"/>
95011202	Low Level Radioactive Waste Transportation, Packaging, and Disposal	34,585.00	CY	810.00	0.00	0.00	\$28,013,850.00	<input checked="" type="checkbox"/>
95011203	7-4-4 containers	408.00	EA.	800.00	0.00	0.00	\$326,400.00	<input checked="" type="checkbox"/>
95011204	TRU Waste Disposal	21.00	CY	20,000.00	0.00	0.00	\$420,000.00	<input checked="" type="checkbox"/>
Total Element Cost							\$61,521,150.00	
Total Technology Cost							\$61,521,150.00	
Total Phase Element Cost							\$106,814,023.93	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Folder: MWL Cost Estimate 111802

Project

Name: Mixed waste landfill
ID: 1
Location: ALBUQUERQUE, NEW MEXICO
Modifiers:
 Material 0.9862 (Modified)
 Labor 1.1017 (Modified)
 Equipment 0.9432 (Modified)
Category: None
Report Option: Fiscal Year
Description: Excavation, waste management, disposal of landfill contents

Site

Name: Complete Excavation with Off-Site Disposal
ID: 1
Type: None

Phase Element

Name: Classisfied Area Excavation	Media/Waste Type: Soil
Type: Remedial Action	Secondary Media/Waste Type: Solids
Labor Rate Group: System Labor Rate	Contaminant: Low Level Radioactive
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: Volatile Organic Compounds (VOCs)
Approach: Ex Situ	Markup Template: System Defaults
Start Date: 5/1/2013	O&M Markup Template: N/A

Cost Database Date: 2002

Cost Type: User-Defined

Print Date: 11/22/2002 2:44:35 PM

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Phase Element Technology Cost Detail Report (without Markups)

Description: Classified Area

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Excavation

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
17020205	Demolish Unreinforced Concrete to 6" Thick with Air Equipment	520.91	CY	0.00	96.46	19.13	\$60,214.85	<input type="checkbox"/>
17030212	Hand Excavation, Sand/Gravel	48.78	CY	0.00	78.20	0.00	\$3,814.64	<input type="checkbox"/>
17030223	950, 3.0 CY, Wheel Loader	18,720.00	HR	0.00	40.04	43.67	\$1,567,006.27	<input type="checkbox"/>
17030232	Crawler-mounted, 2.0 CY, 235 Hydraulic Excavator	9,360.00	HR	0.00	43.46	113.45	\$1,468,691.64	<input type="checkbox"/>
17030284	8 CY, Dump Truck	23,400.00	HR	0.00	33.59	40.05	\$1,723,147.92	<input type="checkbox"/>
17030418	Delivered & Dumped, Backfill with Stone	520.91	BCY	23.02	1.30	1.21	\$13,295.65	<input type="checkbox"/>
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes Delivery, Spreading, and Compaction	34,253.33	CY	5.33	2.44	3.18	\$375,077.37	<input type="checkbox"/>
17030703	D5 with A-blade Bulldozer	9,360.00	HR	0.00	40.04	54.24	\$882,416.81	<input type="checkbox"/>
33100118	R60 Rough Terrain Forklift, 6,000 Lb @ 24" LC	18,720.00	HR	22.91	40.04	27.38	\$1,690,874.64	<input type="checkbox"/>
33132406	Electric Shredder, Additional Monthly Rental, 50 - 75 Tons/Hour	56.00	MO	18,639.18	0.00	0.00	\$1,043,794.05	<input type="checkbox"/>
33170803	Decontaminate Heavy Equipment	3.00	EA	0.00	665.05	0.00	\$1,995.14	<input type="checkbox"/>
33341011	Man-Lift Rental, Boom, 84' High, 600# capacity	28.00	MO	10,160.31	0.00	0.00	\$284,488.55	<input type="checkbox"/>

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
95010501	Robotics Excavation of the MWL Classified Area	1.30	EA	24,923,585.00	0.00	0.00	\$32,400,659.31	<input checked="" type="checkbox"/>
95010701	100-Ton Crane with Remote	1.00	LS	0.00	0.00	1,000,000.00	\$1,000,000.00	<input checked="" type="checkbox"/>
95010702	950 Loader with Remote	1.00	LS	0.00	0.00	500,000.00	\$500,000.00	<input checked="" type="checkbox"/>
95010705	Miscellaneous Tools and Supplies	28.00	MO	5,000.00	0.00	0.00	\$140,000.00	<input checked="" type="checkbox"/>
95010706	Pre-filter/HEPA/ULPA Filter Changeout	117.00	WK	10,000.00	0.00	0.00	\$1,170,000.00	<input checked="" type="checkbox"/>
95010801	Kenworth T-800	2.00	LS	0.00	0.00	95,000.00	\$190,000.00	<input checked="" type="checkbox"/>
95010802	40' Van Trailer	1.00	LS	0.00	0.00	25,000.00	\$25,000.00	<input checked="" type="checkbox"/>
95010803	40' Flatdeck Trailer	1.00	LS	0.00	0.00	22,000.00	\$22,000.00	<input checked="" type="checkbox"/>
				Total Element Cost			\$44,562,476.85	
				Total Technology Cost			\$44,562,476.85	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Decontamination Facilities

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
17030109	Pad Subgrade Preparation	133.33	CY	0.00	2.82	2.94	\$767.42	<input type="checkbox"/>
17030257	Cat 215, 1.0 CY, Soil, Shallow, Trenching	2.49	CY	0.00	0.87	0.87	\$4.33	<input type="checkbox"/>
17030501	Compact Subgrade, 2 Lifts	133.33	CY	0.00	0.29	0.32	\$80.86	<input type="checkbox"/>
17030510	Dry Roll Gravel, Steel Roller	200.00	SY	0.00	0.76	0.33	\$219.32	<input type="checkbox"/>
18010102	Gravel, Delivered & Dumped	55.56	CY	19.18	3.29	1.84	\$1,350.83	<input type="checkbox"/>
18010103	Gravel (90%) & Sand Base (10%), with Calcium Chloride 3/4 - 1 Lb/CY	55.56	CY	19.14	3.65	1.93	\$1,373.65	<input type="checkbox"/>
18010201	Concrete Curb, 6" x 6"	166.00	LF	1.11	1.45	0.01	\$425.96	<input type="checkbox"/>
18020203	26" x 26", 5' Deep Area Drain with Grate	1.00	EA	1,486.35	1,679.61	27.11	\$3,193.08	<input type="checkbox"/>
18020321	6" Structural Slab on Grade	1,500.00	SF	2.42	3.55	0.20	\$9,265.80	<input type="checkbox"/>
19020313	5' x 5' x 5' Reinforced Concrete Sump	1.00	EA	1,428.19	2,376.03	95.64	\$3,899.85	<input type="checkbox"/>
19020604	12" x 12" CIP Concrete In-Ground Trench Drain with Metal Grate	28.00	LF	37.93	77.17	0.68	\$3,242.01	<input type="checkbox"/>
19040606	5,000 Gallon Steel Sump, Aboveground with Supports & Fittings	1.00	EA	4,372.96	1,966.09	215.89	\$6,554.93	<input type="checkbox"/>

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	199.20	LF	0.05	0.96	0.22	\$243.24	<input type="checkbox"/>
33080532	8 oz/sy Erosion Control/Drainage Filter Fabric (80 Mil)	200.00	SY	0.66	0.77	0.03	\$292.76	<input type="checkbox"/>
33080571	40 Mil Polymeric Liner, High-density Polyethylene	1,800.00	SF	0.27	1.64	0.22	\$3,817.26	<input type="checkbox"/>
33170814	1,800 PSI Pressure Washer, 6 HP, 4.8 GPM	1.00	EA	1,602.58	0.00	0.00	\$1,602.58	<input type="checkbox"/>
33170822	8' x 36' Decontamination Trailer with 2 Showers, Fans	28.00	MO	2,169.64	0.00	0.00	\$60,749.92	<input type="checkbox"/>
33170823	Operation of Pressure Washer, Including Water, Soap, Electricity, Labor	1,170.00	HR	6.16	59.72	0.00	\$77,080.54	<input type="checkbox"/>
33199921	DOT Steel Drum, 55 Gallon	406.00	EA	71.50	0.00	0.00	\$29,028.80	<input type="checkbox"/>
33220112	Field Technician	18,720.00	HR	0.00	30.87	0.00	\$577,841.47	<input type="checkbox"/>
33231306	High Sump Level Switch for Avoiding Overflow	1.00	EA	202.17	249.95	0.00	\$452.12	<input type="checkbox"/>
33260623	(2 1/2", 4") PVC Double-wall Piping, with Fittings	30.00	LF	15.37	32.78	0.00	\$1,444.42	<input type="checkbox"/>
33290401	25 GPM, 1 1/2" Discharge, Cast-iron Sump Pump	1.00	EA	1,993.97	578.63	0.00	\$2,572.60	<input type="checkbox"/>

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Total Element Cost	\$785,503.74
Total Technology Cost	\$785,503.74

Phase Element Technology Cost Detail Report (without Markups)

Technology: Professional Labor Management

Element: Professional Labor Percentage

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220138	Project Management Labor Cost	1.00	LS	0.00	2,638,993.75	0.00	\$2,638,993.75	<input checked="" type="checkbox"/>
33220139	Planning Documents Labor Cost	1.00	LS	0.00	2,814,926.50	0.00	\$2,814,926.50	<input checked="" type="checkbox"/>
33220140	Construction Oversight Labor Cost	1.00	LS	0.00	6,157,652.00	0.00	\$6,157,652.00	<input checked="" type="checkbox"/>
33220141	Reporting Labor Cost	1.00	LS	0.00	879,664.56	0.00	\$879,664.56	<input checked="" type="checkbox"/>
33220142	As-Built Drawings Labor Cost	1.00	LS	0.00	879,664.56	0.00	\$879,664.56	<input checked="" type="checkbox"/>
33220143	Public Notice Labor Cost	1.00	LS	0.00	35,186.58	0.00	\$35,186.58	<input checked="" type="checkbox"/>
33220144	Site Closure Activities Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220145	Permitting Labor Cost	1.00	LS	0.00	1,759,329.13	0.00	\$1,759,329.13	<input checked="" type="checkbox"/>
33220146	Responsible Party Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220147	Reimbursement Claims Preparation Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220148	Other Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
Total Element Cost							\$15,165,417.08	
Total Technology Cost							\$15,165,417.08	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Decontamination Facilities

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
17030109	Pad Subgrade Preparation	133.33	CY	0.00	2.82	2.94	\$767.42	<input type="checkbox"/>
17030257	Cat 215, 1.0 CY, Soil, Shallow, Trenching	2.49	CY	0.00	0.87	0.87	\$4.33	<input type="checkbox"/>
17030501	Compact Subgrade, 2 Lifts	133.33	CY	0.00	0.29	0.32	\$80.86	<input type="checkbox"/>
17030510	Dry Roll Gravel, Steel Roller	200.00	SY	0.00	0.76	0.33	\$219.32	<input type="checkbox"/>
18010102	Gravel, Delivered & Dumped	55.56	CY	19.18	3.29	1.84	\$1,350.83	<input type="checkbox"/>
18010103	Gravel (90%) & Sand Base (10%), with Calcium Chloride 3/4 - 1 Lb/CY	55.56	CY	19.14	3.65	1.93	\$1,373.65	<input type="checkbox"/>
18010201	Concrete Curb, 6" x 6"	166.00	LF	1.11	1.45	0.01	\$425.96	<input type="checkbox"/>
18020203	26" x 26", 5' Deep Area Drain with Grate	1.00	EA	1,486.35	1,679.61	27.11	\$3,193.08	<input type="checkbox"/>
18020321	6" Structural Slab on Grade	1,500.00	SF	2.42	3.55	0.20	\$9,265.80	<input type="checkbox"/>
19020313	5' x 5' x 5' Reinforced Concrete Sump	1.00	EA	1,428.19	2,376.03	95.64	\$3,899.85	<input type="checkbox"/>
19020604	12" x 12" CIP Concrete In-Ground Trench Drain with Metal Grate	28.00	LF	37.93	77.17	0.68	\$3,242.01	<input type="checkbox"/>
19040606	5,000 Gallon Steel Sump, Aboveground with Supports & Fittings	1.00	EA	4,372.96	1,966.09	215.89	\$6,554.93	<input type="checkbox"/>

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33080503	Polymeric Liner Anchor Trench, 3' x 1.5'	199.20	LF	0.05	0.96	0.22	\$243.24	<input type="checkbox"/>
33080532	8 oz/sy Erosion Control/Drainage Filter Fabric (80 Mil)	200.00	SY	0.66	0.77	0.03	\$292.76	<input type="checkbox"/>
33080571	40 Mil Polymeric Liner, High-density Polyethylene	1,800.00	SF	0.27	1.64	0.22	\$3,817.26	<input type="checkbox"/>
33170814	1,800 PSI Pressure Washer, 6 HP, 4.8 GPM	1.00	EA	1,602.58	0.00	0.00	\$1,602.58	<input type="checkbox"/>
33170823	Operation of Pressure Washer, Including Water, Soap, Electricity, Labor	1,170.00	HR	6.16	59.72	0.00	\$77,080.54	<input type="checkbox"/>
33231306	High Sump Level Switch for Avoiding Overflow	1.00	EA	202.17	249.95	0.00	\$452.12	<input type="checkbox"/>
33260623	(2 1/2", 4") PVC Double-wall Piping, with Fittings	30.00	LF	15.37	32.78	0.00	\$1,444.42	<input type="checkbox"/>
33290401	25 GPM, 1 1/2" Discharge, Cast-iron Sump Pump	1.00	EA	1,993.97	578.63	0.00	\$2,572.60	<input type="checkbox"/>
Total Element Cost							\$117,883.55	
Total Technology Cost							\$117,883.55	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: USER-DEFINED ESTIMATE

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220101	Senior Project Manager	2,340.00	HR	0.00	61.52	0.00	\$143,957.97	<input type="checkbox"/>
33220102	Project Manager	4,680.00	HR	0.00	51.54	0.00	\$241,198.31	<input type="checkbox"/>
33220104	Senior Staff Engineer	9,360.00	HR	0.00	51.44	0.00	\$481,515.84	<input type="checkbox"/>
33220106	Staff Engineer	9,360.00	HR	0.00	30.40	0.00	\$284,583.31	<input type="checkbox"/>
33220110	QA/QC Officer	4,680.00	HR	0.00	67.45	0.00	\$315,644.94	<input type="checkbox"/>
33220111	Certified Industrial Hygienist	4,680.00	HR	0.00	57.89	0.00	\$270,939.24	<input type="checkbox"/>
33220112	Field Technician	93,600.00	HR	0.00	20.70	0.00	\$1,937,885.04	<input type="checkbox"/>
33220119	Health and Safety Officer	4,680.00	HR	0.00	27.07	0.00	\$126,678.24	<input type="checkbox"/>
Total Element Cost							\$3,802,402.89	
Total Technology Cost							\$3,802,402.89	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Off-site Transportation and Waste Disposal

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
95010707	Pre-filter/HEPA/ULPA Filter Disposal	117.00	WK	25,000.00	0.00	0.00	\$2,925,000.00	<input checked="" type="checkbox"/>
95011201	Mixed Waste Transportation, Packaging, and Disposal	6,870.00	CY	8,100.00	0.00	0.00	\$55,647,000.00	<input checked="" type="checkbox"/>
95011202	Low Level Radioactive Waste Transportation, Packaging, and Disposal	10,354.00	CY	810.00	0.00	0.00	\$8,386,740.00	<input checked="" type="checkbox"/>
95011203	7-4-4 containers	27.00	EA.	800.00	0.00	0.00	\$21,600.00	<input checked="" type="checkbox"/>
95011204	TRU Waste Disposal	52.00	CY	20,000.00	0.00	0.00	\$1,040,000.00	<input checked="" type="checkbox"/>
Total Element Cost							\$68,020,340.00	
Total Technology Cost							\$68,020,340.00	
Total Phase Element Cost							\$132,454,024.11	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Folder: MWL Cost Estimate 102802

Project

Name: Mixed waste landfill
ID: 1
Location: ALBUQUERQUE, NEW MEXICO
Modifiers:
 Material 0.9862 (Modified)
 Labor 1.1017 (Modified)
 Equipment 0.9432 (Modified)
Category: None
Report Option: Fiscal Year
Description: Excavation, waste mangament, disposal of landfill contents

Site

Name: Complete Excavation with Off-Site Disposal
ID: 1
Type: None

Phase Element

Name: On Site Laboratory Analysis	Media/Waste Type: N/A
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: None
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: Ex Situ	Markup Template: System Defaults
Start Date: 10/1/2008	O&M Markup Template: N/A
Description: On Site Laboratory Analysis	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: USER-DEFINED ESTIMATE

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
95010606	Laboratory Trailer	600.00	MO	0.00	0.00	1,200.00	\$720,000.00	<input checked="" type="checkbox"/>
95010615	Basic Laboratory Supplies	120.00	MO	0.00	0.00	5,515.65	\$661,878.00	<input checked="" type="checkbox"/>
95010616	Customized Construction Costs For 5 Lab Trailers	5.00	EA	0.00	0.00	150,000.00	\$750,000.00	<input checked="" type="checkbox"/>
95010617	Radiological Monitoring Instruments And Supplies	1.00	LS	0.00	0.00	783,745.00	\$783,745.00	<input checked="" type="checkbox"/>
95010618	Laboratory Equipment	1.00	LS	0.00	0.00	895,891.00	\$895,891.00	<input checked="" type="checkbox"/>
95010619	Field Equipment	1.00	LS	0.00	0.00	401,155.00	\$401,155.00	<input checked="" type="checkbox"/>
95010620	Data Management System for Soil and Debris tracking	1.00	EA	150,000.00	0.00	0.00	\$150,000.00	<input checked="" type="checkbox"/>
Total Element Cost							\$4,362,669.00	
Total Technology Cost							\$4,362,669.00	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Professional Labor Management

Element: Professional Labor Percentage

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220138	Project Management Labor Cost	1.00	LS	0.00	657,664.69	0.00	\$657,664.69	<input checked="" type="checkbox"/>
33220139	Planning Documents Labor Cost	1.00	LS	0.00	723,431.19	0.00	\$723,431.19	<input checked="" type="checkbox"/>
33220140	Construction Oversight Labor Cost	1.00	LS	0.00	986,497.06	0.00	\$986,497.06	<input checked="" type="checkbox"/>
33220141	Reporting Labor Cost	1.00	LS	0.00	109,610.78	0.00	\$109,610.78	<input checked="" type="checkbox"/>
33220142	As-Built Drawings Labor Cost	1.00	LS	0.00	109,610.78	0.00	\$109,610.78	<input checked="" type="checkbox"/>
33220143	Public Notice Labor Cost	1.00	LS	0.00	10,961.08	0.00	\$10,961.08	<input checked="" type="checkbox"/>
33220144	Site Closure Activities Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220145	Permitting Labor Cost	1.00	LS	0.00	548,053.94	0.00	\$548,053.94	<input checked="" type="checkbox"/>
33220146	Responsible Party Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220147	Reimbursement Claims Preparation Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220148	Other Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
Total Element Cost							\$3,145,829.52	
Total Technology Cost							\$3,145,829.52	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: USER-DEFINED ESTIMATE

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220102	Project Manager	20,800.00	HR	0.00	51.54	0.00	\$1,071,992.48	<input type="checkbox"/>
33220105	Project Engineer	20,800.00	HR	0.00	38.16	0.00	\$793,653.12	<input type="checkbox"/>
33220106	Staff Engineer	187,200.00	HR	0.00	30.40	0.00	\$5,691,666.24	<input type="checkbox"/>
33220110	QA/QC Officer	20,800.00	HR	0.00	67.45	0.00	\$1,402,866.40	<input type="checkbox"/>
33220112	Field Technician	62,400.00	HR	0.00	20.70	0.00	\$1,291,923.36	<input type="checkbox"/>
Total Element Cost							\$10,252,101.60	
Total Technology Cost							\$10,252,101.60	
Total Phase Element Cost							\$17,760,600.12	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Folder: MWL Cost Estimate 102802

Project

Name: Mixed waste landfill
ID: 1
Location: ALBUQUERQUE, NEW MEXICO
Modifiers:
 Material 0.9862 (Modified)
 Labor 1.1017 (Modified)
 Equipment 0.9432 (Modified)
Category: None
Report Option: Fiscal Year
Description: Excavation, waste mangament, disposal of landfill contents

Site

Name: Complete Excavation with Off-Site Disposal
ID: 1
Type: None

Phase Element

Name: Off Site Laboratory Analysis	Media/Waste Type: Soil
Type: Remedial Action	Secondary Media/Waste Type: Solids
Labor Rate Group: System Labor Rate	Contaminant: Low Level Radioactive
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: Volatile Organic Compounds (VOCs)
Approach: Ex Situ	Markup Template: System Defaults
Start Date: 10/1/2009	O&M Markup Template: N/A

Cost Database Date: 2002

Cost Type: User-Defined

Print Date: 11/6/2002 8:53:08 AM

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Phase Element Technology Cost Detail Report (without Markups)

Description: Off Site Laboratory Analysis

Cost Database Date: 2002

Cost Type: User-Defined

Print Date: 11/6/2002 8:53:08 AM

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Phase Element Technology Cost Detail Report (without Markups)

Technology: USER-DEFINED ESTIMATE

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33021602	pH (EPA 150.1), Water Analysis	120.00	EA	7.40	0.00	0.00	\$887.58	<input type="checkbox"/>
33021603	Total Dissolved Solids (EPA 160.1), Water Analysis	120.00	EA	11.49	0.00	0.00	\$1,378.70	<input type="checkbox"/>
33021604	Total Suspended Solids (EPA 160.2), Water Analysis	120.00	EA	12.87	0.00	0.00	\$1,544.59	<input type="checkbox"/>
33021613	Oil And Grease (EPA 413.2), Water Analysis	120.00	EA	57.26	0.00	0.00	\$6,871.79	<input type="checkbox"/>
33021614	Total Petroleum Hydrocarbons (EPA 418.1), Water Analysis	120.00	EA	62.62	0.00	0.00	\$7,514.84	<input type="checkbox"/>
33021615	Phenols (Method 420.1), Water Analysis	120.00	EA	33.99	0.00	0.00	\$4,078.22	<input type="checkbox"/>
33021653	Chloride (EPA 300), Water Analysis	120.00	EA	15.98	0.00	0.00	\$1,917.17	<input type="checkbox"/>
33021656	Fluoride Electrode (EPA 300), Water Analysis	120.00	EA	21.70	0.00	0.00	\$2,603.57	<input type="checkbox"/>
33022118	Total Organic Carbon, TOC (EPA 415.1)	120.00	EA	23.18	0.00	0.00	\$2,781.08	<input type="checkbox"/>
33022127	Metals Screen, 25 Listed in SW 3005A/SW 6010B	120.00	EA	295.00	0.00	0.00	\$35,399.72	<input type="checkbox"/>

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33022128	Chromium, Hexavalent (SW 7195) with prep	120.00	EA	22.56	0.00	0.00	\$2,707.49	<input type="checkbox"/>
33022133	Pesticides/PCB's (SW 3510C/SW 8081/8082), Water Analysis	120.00	EA	215.18	0.00	0.00	\$25,821.70	<input type="checkbox"/>
33022139	BTEX/MTBE (Mod EPA 602), Water Analysis	120.00	EA	83.29	0.00	0.00	\$9,995.33	<input type="checkbox"/>
33022257	Liquid, Gross Beta - Total, Gas Flow Proportional Count	120.00	EA	64.21	0.00	0.00	\$7,704.74	<input type="checkbox"/>
33022271	Liquid, Gamma Isotopic, Gamma Spectroscopy	120.00	EA	105.52	0.00	0.00	\$12,662.81	<input type="checkbox"/>
33022284	Liquid, Tritium, (Direct Counting), Liquid Scintillation	120.00	EA	61.64	0.00	0.00	\$7,396.50	<input type="checkbox"/>
33022287	Liquid, Gross Alpha - Total, Gas Flow &/or Alpha Spectroscopy	120.00	EA	53.25	0.00	0.00	\$6,390.58	<input type="checkbox"/>
Total Element Cost							\$137,656.42	
Total Technology Cost							\$137,656.42	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: USER-DEFINED ESTIMATE

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33020216	Alpha Spectroscopy	700.00	EA	52.06	0.00	0.00	\$36,441.30	<input type="checkbox"/>
33021707	Target Analyte List (TAL) Metals, Soil Analysis	700.00	EA	325.50	0.00	0.00	\$227,849.37	<input type="checkbox"/>
33021712	Mercury (SW 7471), with prep, Soil Analysis	700.00	EA	30.89	0.00	0.00	\$21,624.26	<input type="checkbox"/>
33021717	Pesticides/PCBs (SW 3550B/SW 8081/8082), Soil Analysis	700.00	EA	160.08	0.00	0.00	\$112,057.12	<input type="checkbox"/>
33021720	Volatile Organic Analysis (SW 5035/SW 8260B), Soil Analysis	700.00	EA	190.88	0.00	0.00	\$133,618.10	<input type="checkbox"/>
33021739	Semi-Volatile Organics, GC/MS (SW 8270C), with prep, Soil Analysis	700.00	EA	281.12	0.00	0.00	\$196,783.16	<input type="checkbox"/>
33021762	Chromium, Hexavalent (SW 7195), with prep, Soil Analysis	700.00	EA	34.01	0.00	0.00	\$23,808.40	<input type="checkbox"/>
33022336	Vegetation/Soil/Sediment, Gross Beta - Total, Gas Flow Proportional Counting	700.00	EA	64.21	0.00	0.00	\$44,944.34	<input type="checkbox"/>
33022342	Vegetation/Soil/Sediment, Gamma Isotopic, Gamma Spectroscopy	700.00	EA	100.59	0.00	0.00	\$70,414.68	<input type="checkbox"/>
33022351	Vegetation/Soil/Sediment, Tritium, Liquid Scintillation	700.00	EA	82.35	0.00	0.00	\$57,643.39	<input type="checkbox"/>

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report
(without Markups)

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33022352	Vegetation/Soil/Sediment, Gross Alpha - Total, Gas Flow Proportional Counting	700.00	EA	73.97	0.00	0.00	\$51,775.50	<input type="checkbox"/>
Total Element Cost							\$976,959.62	
Total Technology Cost							\$976,959.62	

Cost Database Date: 2002

Cost Type: User-Defined

Print Date: 11/6/2002 8:53:08 AM

Phase Element Technology Cost Detail Report (without Markups)

Technology: Professional Labor Management

Element: Professional Labor Percentage

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220138	Project Management Labor Cost	1.00	LS	0.00	125,394.30	0.00	\$125,394.30	<input checked="" type="checkbox"/>
33220139	Planning Documents Labor Cost	1.00	LS	0.00	117,034.68	0.00	\$117,034.68	<input checked="" type="checkbox"/>
33220140	Construction Oversight Labor Cost	1.00	LS	0.00	100,315.44	0.00	\$100,315.44	<input checked="" type="checkbox"/>
33220141	Reporting Labor Cost	1.00	LS	0.00	16,719.24	0.00	\$16,719.24	<input checked="" type="checkbox"/>
33220142	As-Built Drawings Labor Cost	1.00	LS	0.00	16,719.24	0.00	\$16,719.24	<input checked="" type="checkbox"/>
33220143	Public Notice Labor Cost	1.00	LS	0.00	5,015.77	0.00	\$5,015.77	<input checked="" type="checkbox"/>
33220144	Site Closure Activities Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220145	Permitting Labor Cost	1.00	LS	0.00	167,192.41	0.00	\$167,192.41	<input checked="" type="checkbox"/>
33220146	Responsible Party Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220147	Reimbursement Claims Preparation Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220148	Other Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
Total Element Cost							\$548,391.07	
Total Technology Cost							\$548,391.07	
Total Phase Element Cost							\$1,663,007.11	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Folder: MWL Cost Estimate 102802

Project

Name: Mixed waste landfill
ID: 1
Location: ALBUQUERQUE, NEW MEXICO
Modifiers:
 Material 0.9862 (Modified)
 Labor 1.1017 (Modified)
 Equipment 0.9432 (Modified)
Category: None
Report Option: Fiscal Year
Description: Excavation, waste mangament, disposal of landfill contents

Site

Name: Complete Excavation with Off-Site Disposal
ID: 1
Type: None

Phase Element

Name: Waste Management
Type: Remedial Action
Labor Rate Group: System Labor Rate
Analysis Rate Group: System Analysis Rate

Approach: Ex Situ
Start Date: 10/1/2009

Media/Waste Type: Soil
Secondary Media/Waste Type: Solids
Contaminant: Low Level Radioactive
Secondary Contaminant: Volatile Organic Compounds (VOCs)

Markup Template: System Defaults
O&M Markup Template: N/A

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Description: Waste Management

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Decontamination Facilities

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
17030223	950, 3.0 CY, Wheel Loader	12,480.00	HR	0.00	40.04	43.67	\$1,044,670.85	<input type="checkbox"/>
17030232	Crawler-mounted, 2.0 CY, 235 Hydraulic Excavator	8,320.00	HR	0.00	43.46	113.45	\$1,305,503.68	<input type="checkbox"/>
17030284	8 CY, Dump Truck	20,800.00	HR	0.00	33.59	40.05	\$1,531,687.04	<input type="checkbox"/>
33100118	R60 Rough Terrain Forklift, 6,000 Lb @ 24" LC	16,640.00	HR	22.91	40.04	27.38	\$1,502,999.68	<input type="checkbox"/>
33132406	Electric Shredder, Additional Monthly Rental, 50 - 75 Tons/Hour	48.00	MO	18,639.18	0.00	0.00	\$894,680.62	<input type="checkbox"/>
33170814	1,800 PSI Pressure Washer, 6 HP, 4.8 GPM	1.00	EA	1,602.58	0.00	0.00	\$1,602.58	<input type="checkbox"/>
33170823	Operation of Pressure Washer, Including Water, Soap, Electricity, Labor	1,040.00	HR	6.16	59.72	0.00	\$68,516.03	<input type="checkbox"/>
33199921	DOT Steel Drum, 55 Gallon	361.00	EA	71.50	0.00	0.00	\$25,811.32	<input type="checkbox"/>
33341011	Man-Lift Rental, Boom, 84' High, 600# capacity	24.00	MO	10,160.31	0.00	0.00	\$243,847.33	<input type="checkbox"/>
95010705	Miscellaneous Tools and Supplies	24.00	MO	5,000.00	0.00	0.00	\$120,000.00	<input checked="" type="checkbox"/>
95010706	HEPA/ULPA Filter Changeout	104.00	WK	10,000.00	0.00	0.00	\$1,040,000.00	<input checked="" type="checkbox"/>
95010707	HEPA/ULPA Filter Disposal	104.00	WK	25,000.00	0.00	0.00	\$2,600,000.00	<input checked="" type="checkbox"/>

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Total Element Cost	\$10,379,319.12
Total Technology Cost	\$10,379,319.12

Phase Element Technology Cost Detail Report (without Markups)

Technology: USER-DEFINED ESTIMATE

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220101	Senior Project Manager	2,080.00	HR	0.00	61.52	0.00	\$127,962.64	<input type="checkbox"/>
33220102	Project Manager	4,160.00	HR	0.00	51.54	0.00	\$214,398.50	<input type="checkbox"/>
33220104	Senior Staff Engineer	8,320.00	HR	0.00	51.44	0.00	\$428,014.08	<input type="checkbox"/>
33220106	Staff Engineer	8,320.00	HR	0.00	30.40	0.00	\$252,962.94	<input type="checkbox"/>
33220110	QA/QC Officer	4,160.00	HR	0.00	67.45	0.00	\$280,573.28	<input type="checkbox"/>
33220111	Certified Industrial Hygienist	4,160.00	HR	0.00	57.89	0.00	\$240,834.88	<input type="checkbox"/>
33220112	Field Technician	83,200.00	HR	0.00	20.70	0.00	\$1,722,564.48	<input type="checkbox"/>
33220119	Health and Safety Officer	4,160.00	HR	0.00	27.07	0.00	\$112,602.88	<input type="checkbox"/>
Total Element Cost							\$3,379,913.68	
Total Technology Cost							\$3,379,913.68	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Professional Labor Management

Element: Professional Labor Percentage

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220138	Project Management Labor Cost	1.00	LS	0.00	825,554.00	0.00	\$825,554.00	<input checked="" type="checkbox"/>
33220139	Planning Documents Labor Cost	1.00	LS	0.00	825,554.00	0.00	\$825,554.00	<input checked="" type="checkbox"/>
33220140	Construction Oversight Labor Cost	1.00	LS	0.00	1,031,942.50	0.00	\$1,031,942.50	<input checked="" type="checkbox"/>
33220141	Reporting Labor Cost	1.00	LS	0.00	103,194.25	0.00	\$103,194.25	<input checked="" type="checkbox"/>
33220142	As-Built Drawings Labor Cost	1.00	LS	0.00	103,194.25	0.00	\$103,194.25	<input checked="" type="checkbox"/>
33220143	Public Notice Labor Cost	1.00	LS	0.00	14,447.19	0.00	\$14,447.19	<input checked="" type="checkbox"/>
33220144	Site Closure Activities Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220145	Permitting Labor Cost	1.00	LS	0.00	1,031,942.50	0.00	\$1,031,942.50	<input checked="" type="checkbox"/>
33220146	Responsible Party Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220147	Reimbursement Claims Preparation Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220148	Other Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
Total Element Cost							\$3,935,828.69	
Total Technology Cost							\$3,935,828.69	
Total Phase Element Cost							\$17,695,061.49	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Folder: MWL Cost Estimate 102802

Project

Name: Mixed waste landfill
ID: 1
Location: ALBUQUERQUE, NEW MEXICO
Modifiers:
 Material 0.9862 (Modified)
 Labor 1.1017 (Modified)
 Equipment 0.9432 (Modified)
Category: None
Report Option: Fiscal Year
Description: Excavation, waste mangament, disposal of landfill contents

Site

Name: Complete Excavation with Off-Site Disposal
ID: 1
Type: None

Phase Element

Name: Demob./Site Clean-up	Media/Waste Type: N/A
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: None
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: Ex Situ	Markup Template: System Defaults
Start Date: 8/1/2018	O&M Markup Template: N/A
Description: Demob./Site Clean-up	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: USER-DEFINED ESTIMATE

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220101	Senior Project Manager	1,040.00	HR	0.00	61.52	0.00	\$63,981.32	<input type="checkbox"/>
33220102	Project Manager	2,080.00	HR	0.00	51.54	0.00	\$107,199.25	<input type="checkbox"/>
33220104	Senior Staff Engineer	4,160.00	HR	0.00	51.44	0.00	\$214,007.04	<input type="checkbox"/>
33220106	Staff Engineer	4,160.00	HR	0.00	30.40	0.00	\$126,481.47	<input type="checkbox"/>
33220110	QA/QC Officer	2,080.00	HR	0.00	67.45	0.00	\$140,286.64	<input type="checkbox"/>
33220111	Certified Industrial Hygienist	2,080.00	HR	0.00	57.89	0.00	\$120,417.44	<input type="checkbox"/>
33220112	Field Technician	41,600.00	HR	0.00	20.70	0.00	\$861,282.24	<input type="checkbox"/>
33220119	Health and Safety Officer	2,080.00	HR	0.00	27.07	0.00	\$56,301.44	<input type="checkbox"/>
Total Element Cost							\$1,689,956.84	
Total Technology Cost							\$1,689,956.84	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Professional Labor Management

Element: Professional Labor Percentage

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220138	Project Management Labor Cost	1.00	LS	0.00	1,348,214.63	0.00	\$1,348,214.63	<input checked="" type="checkbox"/>
33220139	Planning Documents Labor Cost	1.00	LS	0.00	1,258,333.63	0.00	\$1,258,333.63	<input checked="" type="checkbox"/>
33220140	Construction Oversight Labor Cost	1.00	LS	0.00	1,078,571.75	0.00	\$1,078,571.75	<input checked="" type="checkbox"/>
33220141	Reporting Labor Cost	1.00	LS	0.00	179,761.95	0.00	\$179,761.95	<input checked="" type="checkbox"/>
33220142	As-Built Drawings Labor Cost	1.00	LS	0.00	179,761.95	0.00	\$179,761.95	<input checked="" type="checkbox"/>
33220143	Public Notice Labor Cost	1.00	LS	0.00	53,928.59	0.00	\$53,928.59	<input checked="" type="checkbox"/>
33220144	Site Closure Activities Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220145	Permitting Labor Cost	1.00	LS	0.00	1,797,619.50	0.00	\$1,797,619.50	<input checked="" type="checkbox"/>
33220146	Responsible Party Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220147	Reimbursement Claims Preparation Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220148	Other Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
Total Element Cost							\$5,896,191.99	
Total Technology Cost							\$5,896,191.99	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: USER-DEFINED ESTIMATE

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
16019913	950, 3.0 CY Wheel Loader	4,160.00	HR	0.00	40.04	43.67	\$348,223.62	<input type="checkbox"/>
17030232	Crawler-mounted, 2.0 CY, 235 Hydraulic Excavator	4,160.00	HR	0.00	43.46	113.45	\$652,751.84	<input type="checkbox"/>
17030284	8 CY, Dump Truck	8,320.00	HR	0.00	33.59	40.05	\$612,674.82	<input type="checkbox"/>
33040165	22 Ton 4WD Rough Terrain Hydraulic Crane, No Operator	2,080.00	HR	0.00	0.00	74.21	\$154,358.88	<input type="checkbox"/>
33100118	R60 Rough Terrain Forklift, 6,000 Lb @ 24" LC	4,160.00	HR	22.91	40.04	27.38	\$375,749.92	<input type="checkbox"/>
33341011	Man-Lift Rental, Boom, 84' High, 600# capacity	24.00	MO	10,160.31	0.00	0.00	\$243,847.33	<input type="checkbox"/>
95010611	Mob./Demob. Administrative Trailer	2.00	LS	0.00	0.00	2,662.00	\$5,324.00	<input checked="" type="checkbox"/>
95010612	Mob./Demob. Office Trailer	6.00	LS	0.00	0.00	431.00	\$2,586.00	<input checked="" type="checkbox"/>
95010613	Mob./Demob. Laboratory Trailer	5.00	LS	0.00	0.00	431.00	\$2,155.00	<input checked="" type="checkbox"/>
95010614	Mob./Demob. Shower Trailer	1.00	LS	0.00	0.00	431.00	\$431.00	<input checked="" type="checkbox"/>
95010705	Miscellaneous Tools and Supplies	12.00	MO	5,000.00	0.00	0.00	\$60,000.00	<input checked="" type="checkbox"/>
Total Element Cost							\$2,458,102.40	
Total Technology Cost							\$2,458,102.40	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Decontamination Facilities

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33170814	1,800 PSI Pressure Washer, 6 HP, 4.8 GPM	4.00	EA	1,602.58	0.00	0.00	\$6,410.30	<input type="checkbox"/>
33170823	Operation of Pressure Washer, Including Water, Soap, Electricity, Labor	8,320.00	HR	6.16	59.72	0.00	\$548,128.26	<input type="checkbox"/>
33199921	DOT Steel Drum, 55 Gallon	361.00	EA	71.50	0.00	0.00	\$25,811.32	<input type="checkbox"/>
33220112	Field Technician	16,640.00	HR	0.00	30.87	0.00	\$513,636.86	<input type="checkbox"/>
Total Element Cost							\$1,093,986.74	
Total Technology Cost							\$1,093,986.74	

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report

(without Markups)

Technology: Load and Haul

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
17020401	Dump Charges	10,000.00	CY	15.00	0.00	0.00	\$150,000.00	<input checked="" type="checkbox"/>
17030288	26 CY, Semi Dump	840.00	HR	0.00	33.59	58.35	\$77,225.57	<input type="checkbox"/>
Total Element Cost							\$227,225.57	
Total Technology Cost							\$227,225.57	

Cost Database Date: 2002

Cost Type: User-Defined

Print Date: 11/6/2002 8:56:38 AM

Phase Element Technology Cost Detail Report (without Markups)

Technology: Off-site Transportation and Waste Disposal

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
95011202	Low Level Radioactive Waste Transportation, Packaging, and Disposal	8,000.00	CY	810.00	0.00	0.00	\$6,480,000.00	<input checked="" type="checkbox"/>
Total Element Cost							\$6,480,000.00	
Total Technology Cost							\$6,480,000.00	

Cost Database Date: 2002

Cost Type: User-Defined

Print Date: 11/6/2002 8:56:38 AM

Phase Element Technology Cost Detail Report (without Markups)

Technology: Demolition, Fencing

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
17020225	Remove Chain-link Fence	6,875.00	LF	0.00	2.07	0.00	\$14,212.69	<input type="checkbox"/>
17020401	Dump Charges	825.00	CY	15.00	0.00	0.00	\$12,375.00	<input checked="" type="checkbox"/>
17030287	20 CY, Semi Dump	97.00	HR	0.00	27.54	57.73	\$8,270.97	<input type="checkbox"/>
Total Element Cost							\$34,858.65	
Total Technology Cost							\$34,858.65	
Total Phase Element Cost							\$17,880,322.19	

Cost Database Date: 2002

Cost Type: User-Defined

Print Date: 11/6/2002 8:56:38 AM

Phase Element Technology Cost Detail Report (without Markups)

Folder: MWL Cost Estimate 102802

Project

Name: Mixed waste landfill
ID: 1
Location: ALBUQUERQUE, NEW MEXICO
Modifiers:
 Material 0.9862 (Modified)
 Labor 1.1017 (Modified)
 Equipment 0.9432 (Modified)
Category: None
Report Option: Fiscal Year
Description: Excavation, waste mangagement, disposal of landfill contents

Site

Name: Complete Excavation with Off-Site Disposal
ID: 1
Type: None

Phase Element

Name: Post Closure Institutional Controls	Media/Waste Type: Solids
Type: Remedial Action	Secondary Media/Waste Type: N/A
Labor Rate Group: System Labor Rate	Contaminant: Other
Analysis Rate Group: System Analysis Rate	Secondary Contaminant: None
Approach: Ex Situ	Markup Template: System Defaults
Start Date: 10/1/2019	O&M Markup Template: N/A
Description: Post Closure Institutional Controls	

Cost Database Date: 2002

Cost Type: User-Defined

Print Date: 11/6/2002 8:58:25 AM

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Professional Labor Management

Element: Professional Labor Percentage

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220138	Project Management Labor Cost	1.00	LS	0.00	127,431.47	0.00	\$127,431.47	<input checked="" type="checkbox"/>
33220139	Planning Documents Labor Cost	1.00	LS	0.00	101,945.17	0.00	\$101,945.17	<input checked="" type="checkbox"/>
33220140	Construction Oversight Labor Cost	1.00	LS	0.00	82,830.45	0.00	\$82,830.45	<input checked="" type="checkbox"/>
33220141	Reporting Labor Cost	1.00	LS	0.00	19,114.72	0.00	\$19,114.72	<input checked="" type="checkbox"/>
33220142	As-Built Drawings Labor Cost	1.00	LS	0.00	19,114.72	0.00	\$19,114.72	<input checked="" type="checkbox"/>
33220143	Public Notice Labor Cost	1.00	LS	0.00	6,371.57	0.00	\$6,371.57	<input checked="" type="checkbox"/>
33220144	Site Closure Activities Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220145	Permitting Labor Cost	1.00	LS	0.00	127,431.47	0.00	\$127,431.47	<input checked="" type="checkbox"/>
33220146	Responsible Party Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220147	Reimbursement Claims Preparation Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
33220148	Other Labor Cost	1.00	LS	0.00	0.00	0.00	\$0.00	<input type="checkbox"/>
Total Element Cost							\$484,239.58	
Total Technology Cost							\$484,239.58	

Cost Database Date: 2002

Cost Type: User-Defined

Print Date: 11/6/2002 8:58:25 AM

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Monitoring (12 - months only)

Element: Groundwater

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33020217	Gamma Spectroscopy	53.00	EA	114.03	0.00	0.00	\$6,043.56	<input type="checkbox"/>
33020401	Disposable Materials per Sample	53.00	EA	7.56	0.00	0.00	\$400.93	<input type="checkbox"/>
33020402	Decontamination Materials per Sample	53.00	EA	6.80	0.00	0.00	\$360.65	<input type="checkbox"/>
33020505	Groundwater Contamination Analysis, per Sample	53.00	EA	154.56	0.00	0.00	\$8,191.86	<input type="checkbox"/>
33020508	Detection/Compliance Monitoring Analysis, per Well	53.00	EA	1,104.38	0.00	0.00	\$58,532.38	<input type="checkbox"/>
33020561	Nylon Tubing, 1/4" Outside Diameter	24,025.00	LF	0.39	0.00	0.00	\$9,477.86	<input type="checkbox"/>
33021509	Water Quality Parameter Testing Device	3.00	WK	215.98	0.00	0.00	\$647.93	<input type="checkbox"/>
33021620	TAL Metals (EPA 6010/7000s), Water, Water Analysis	53.00	EA	377.00	0.00	0.00	\$19,980.92	<input type="checkbox"/>
33021651	Alkalinity (EPA 310.1/310.2), Water Analysis	53.00	EA	33.90	0.00	0.00	\$1,796.73	<input type="checkbox"/>
33021662	Nitrogen, Nitrate & Nitrite (EPA 353.2), Water Analysis	53.00	EA	71.76	0.00	0.00	\$3,803.23	<input type="checkbox"/>
33021834	Volatile Organic Compounds (TO-14)	53.00	DAY	127.02	0.00	0.00	\$6,732.31	<input type="checkbox"/>

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Element: Groundwater

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33022036	Documentation Package for QA Verification, Data & Benchwork	53.00	EA	132.75	0.00	0.00	\$7,035.78	<input type="checkbox"/>
33022284	Liquid, Tritium, (Direct Counting), Liquid Scintillation	53.00	EA	77.05	0.00	0.00	\$4,083.49	<input type="checkbox"/>
33022290	Liquid, Gross Alpha & Gross Beta - Total	53.00	EA	80.26	0.00	0.00	\$4,253.66	<input type="checkbox"/>
33220106	Staff Engineer	20,800.00	HR	0.00	30.40	0.00	\$632,407.36	<input type="checkbox"/>
33230510	4" Submersible Pump Rental, Week	3.00	WK	211.60	0.00	0.00	\$634.80	<input type="checkbox"/>
33231186	Well Development Equipment Rental (weekly)	3.00	WK	215.98	0.00	0.00	\$647.93	<input type="checkbox"/>
Total Element Cost							\$765,031.39	

Element: General Monitoring

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33010104	Car or Van Mileage Charge	480.00	MI	0.33	0.00	0.00	\$159.89	<input type="checkbox"/>
33220102	Project Manager	44.00	HR	0.00	51.54	0.00	\$2,267.68	<input type="checkbox"/>
33220105	Project Engineer	220.00	HR	0.00	38.16	0.00	\$8,394.41	<input type="checkbox"/>
33220108	Project Scientist	626.00	HR	0.00	31.02	0.00	\$19,419.96	<input type="checkbox"/>

Cost Database Date: 2002

Cost Type: User-Defined

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Phase Element Technology Cost Detail Report (without Markups)

Element: General Monitoring

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
33220109	Staff Scientist	756.00	HR	0.00	29.61	0.00	\$22,386.29	<input type="checkbox"/>
33220112	Field Technician	96.00	HR	0.00	20.70	0.00	\$1,987.57	<input type="checkbox"/>
33220114	Word Processing/Clerical	176.00	HR	0.00	17.16	0.00	\$3,019.63	<input type="checkbox"/>
33220115	Draftsman/CADD	88.00	HR	0.00	26.59	0.00	\$2,339.80	<input type="checkbox"/>
Total Element Cost							\$59,975.23	
Total Technology Cost							\$825,006.62	

Cost Database Date: 2002

Cost Type: User-Defined

Print Date: 11/6/2002 8:58:25 AM

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Phase Element Technology Cost Detail Report (without Markups)

Technology: Fencing

Element: N/A

Assembly	Description	Quantity	Unit of Measure	Material Unit Cost	Labor Unit Cost	Equipment Unit Cost	Extended Cost	Cost Override
18040101	Security Fence, 10' Galvanized with 3 Strands Barbed Wire	680.00	LF	13.40	11.47	10.88	\$24,312.58	<input type="checkbox"/>
18040501	Hazardous Waste Signing	4.00	EA	15.93	40.05	0.00	\$223.94	<input type="checkbox"/>
Total Element Cost							\$24,536.52	
Total Technology Cost							\$24,536.52	
Total Phase Element Cost							\$1,333,782.72	

Cost Database Date: 2002

Cost Type: User-Defined

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