Los Alamos National Laboratory

ENVIRONMENTAL RESTORATION

Environmental Restoration

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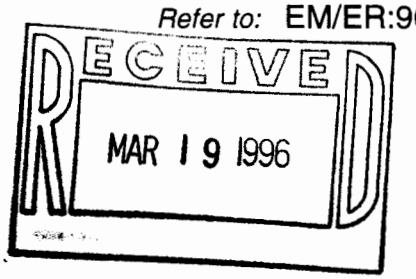

Ms. Julianne Levings, Team Leader
U.S. Department of Energy
Environmental Restoration Division
P.O. Box 5400
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SUBJECT: POLLUTION PREVENTION AND WASTE MINIMIZATION INTEGRATION INTO THE ENVIRONMENTAL RESTORATION PROGRAM REQUEST FOR ASSISTANCE

Dear Ms. Levings:

Enclosed is the 1995 Waste Minimization Accomplishments for the Los Alamos National Laboratory's Environmental Restoration Project in response to a December 4, 1995 memorandum from Robert Fleming, Department of Energy (DOE)-Headquarters (HQ) EM-431. The document contains the finalized data which was reviewed in draft by the DOE-HQ contractor, Lisa Allmon, during a site visit in January 1996. The request was verbally forwarded to us by Jocelyn Siegel of the Albuquerque Environmental Management office. Please forward the enclosure to Mr. Fleming.

If you have any questions, please feel free to contact David McInroy at (505) 667-0819 or Ted Taylor at (505) 665-7203.

Sincerely,

Jorg Jansen, Program Manager
Environmental Restoration

Sincerely,

Theodore J. Taylor, Program Manager
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TC

JJ/TT/bp

Enclosure: 1995 Waste Minimization Accomplishments

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Los Alamos National Laboratory
Environmental Restoration Project

1995 Waste Minimization Accomplishments

Waste Minimization and Pollution Prevention (WMin/P2) was an integral part of the FY 1995 environmental restoration (ER) projects through recycling, reuse, contamination avoidance, risk-based clean up strategies, and many other practices. However, there was limited tracking and reporting of WMin/PP successes on an ER Project-wide or field project basis. Waste reduction benefits are typically difficult to track and quantify because the data to measure the amount of waste reduced (as a direct result of a WMin/P2 activity) is often not available and is not easily extrapolated. Many waste reduction successes are attributed to best management practices or standard practices that are not identified or tracked as independent WMin/P2 practices. In January, 1996, the ER project initiated efforts to collect and report WMin/P2 efforts and successes during the previous year's projects. Similar tracking and reporting efforts will continue in the future.

The effectiveness of the 1995 ER WMin/P2 efforts (for reducing or avoiding) varied with the phase when WMin/P2 was applied and the waste types. For example, WMin/PP efforts that were integrated in the planning stages of a decommissioning project provided a high estimated volume reduction, where WMin/PP during assessment and characterization efforts produced relatively low volume reductions because the waste potential was lower. In addition, recycling potentials are greater for commercial waste streams, but LLW and LLMW streams provided lower opportunities for reuse and recycle.

High volume waste streams produced from ER activities include contaminated soil and demolition debris such as metal and concrete. The WMin/PP techniques used (in 1995) to reduce these high volume waste streams included the following:

- Contaminated soil
  - initiated negotiations to allow remedies that did not remove the soil (e.g. in-situ treatment or no-action);
  - used alternative drilling and sampling techniques to reduce investigative derived wastes;
  - used field screening techniques to allow better definition of contamination boundaries and improved characterization of materials;
  - improved segregation practices to avoid cross contamination;

- Demolition debris
  - included WMin/PP practices in decommissioning plans and specifications
  - used improved segregation techniques to allow staging of recyclables
  - recycled metals and concrete
  - surface scouring and surface decontamination of concrete and other materials

A summary of specific WMin/PP accomplishments for the ER field units during 1995 is presented below. Detailed information is broken out by waste stream after the Field Unit summaries. (It should be noted that many of the practices identified below are used by all the field units; the list below highlights a cross section of practices and is not intended to be a comprehensive list of practices used by the Field Units.)

- **Field Unit #1** conducted investigation, characterization and remediation activities at several operable units. The projects avoided and reduced the generation of LLW, LLMW, HW, and commercial (non-hazardous, non-radioactive) wastes by using the following procedures.
  - Using a cone penetrometer test (CPT) in place of a drill rig to avoid the generation of drill cuttings and core.
  - Consolidating waste containers prior to shipment for disposal.
  - Conducting waste minimization planning prior to implementation of expedited cleanup removal actions.

- **Field Unit #2** conducted investigation and characterization activities at several operable units. The projects avoided and reduced the generation of LLW, LLMW, HW, and commercial (non-hazardous, non-radioactive) wastes by using the following procedures.
  - Using risk-based strategies and field screening to better define and limit the areas of contamination and removal actions.
  - Returning excess sample media to the site, in compliance with EPA and Laboratory procedures.
  - Maximizing the reuse of equipment and supplies, and limiting the use of disposable plastics except when necessary (e.g. for sampling of high explosives).

- Controlling the personnel and equipment allowed into the contamination zones and screening, sorting, and segregating all material out of the contamination zones.
- Limiting the number and size of samples sent for analysis and improved sample management (which has reduced the number of samples shipped for analysis by an estimated 50%).
- Returning drill cuttings to the borehole (avoiding an estimated 7 to 18 cubic yards of waste).
- Testing alternative drilling methods that reduce waste (e.g., vibratory drilling and hydropunch) although the techniques were determined to be not appropriate for the current applications.
- Use of launderable and reusable PPE in place of disposal coveralls and booties.

Purge water and decontamination fluids were returned to the site, in compliance with EPA and Laboratory procedures, avoiding over 400 gallons of liquid waste.

Volume reduction was also accomplished through manual compaction of materials in drums and size reduction, when possible.

The Field Unit has initiated negotiations to allow risk-based, in-situ remedies for the closure of waste lagoons (at TA-53) which could potentially avoid the handling and treatment of over 20 cubic yards of LLMW.

- **Field Unit #3** conducted investigation and characterization activities at TA-16 and 33. The projects avoided and reduced the generation of LLW, LLMW, HW, and commercial (non-hazardous, non-radioactive) wastes by an estimated 26 cubic yards using the following procedures.
  - Including WMin/PP in operating procedures and site specific waste management plans.
  - Training personnel on site specific waste management and WMin procedures.
  - Use of launderable and reusable PPE in place of disposal coveralls and booties, resulting in zero PPE waste during 1995.
  - Maximizing the reuse of other equipment and supplies, such as using high density plastic mats, in place of less-durable plastic sheeting.

- Contamination avoidance such as reducing contact with samples, limiting personnel and equipment into potentially contaminated areas, protecting equipment that is carried into the contamination zones, and prohibiting leaning, kneeling, or sitting in the contaminated zones.
- Expanding the decontamination process to include the removal of obvious contamination while in the contamination zone before exiting or entering the decontamination area.
- Improved waste characterization and segregation, through the use of acceptable knowledge, radioactive analysis and segregation at the point of generation, and the implementation and use of the ER Waste Characterization Strategy Form.

Liquid wastes (an estimated 1180 gallons) were avoided by returning decontamination fluids to the sampling sites, in compliance with EPA and Laboratory procedures.

- **Field Unit #4** conducted investigation, characterization and remediation activities at locations within the canyons on Laboratory property. The projects avoided and reduced the generation of LLW, LLMW, HW, and commercial (non-hazardous, non-radioactive) wastes by using the following procedures.
  - Using a rotary hand auger in place of a drill rig to avoid the generation of drill cuttings and core.
  - Reusing personal protective equipment.
  - Utilizing borehole cuttings as backfill in boreholes.
  - Conducting dry decontamination of equipment prior to liquid decontamination.
  - Conducting a preliminary site survey to justify the need for personnel protective equipment.

Liquid wastes (an estimated 120 gallons) were avoided by returning decontamination fluids to the sampling sites, in compliance with EPA and Laboratory procedures.

- **Field Unit #5** conducted investigation and characterization activities and began remediation of a material disposal area (MDA). The field unit has successfully avoided and reduced the generation of LLW, LLMW, HW, and commercial (non-hazardous, non-radioactive) wastes by using the following procedures.
  - Using preliminary site survey information and field screening to better define the contamination areas, limiting the areas requiring PPE use and refining the areas requiring further action.
  - Including WMin/PP incentives and requirements in subcontractor documents.
  - Improved segregation through field screening and proper characterization, which has reduced the volume of LLMW and HW originally projected.
  - Segregating concrete, rubblizing and distributing concrete for reuse.
  - Segregating metal (non-contaminated) for recycle (estimated 150 cubic yards of metal waste avoided).
  - Returning excess sample media and decontamination fluids to the site, in compliance with EPA and Laboratory procedures.
  - Maximizing the reuse of equipment and supplies, and limiting the use of disposable plastics except when necessary (e.g., for sampling of high explosives).
  - Controlling the personnel and equipment allowed into the contamination zones and screening, sorting, and segregating all material out of the contamination zones.

  Volume reduction was also accomplished through manual compaction of materials for disposal and the use of direct shipment of waste materials for off-site disposal, which reduced the need for bulk containers and minimized the use of space in the disposal unit.

- **Field Unit #6 - Decommissioning** razed radioactively contaminated buildings at TA-21 and TA-35; and demolished high explosives contaminated facilities at TA-16. In addition planning activities were conducted for the TA-2 Omega West Reactor. The activities described below avoided the disposal of 1,200 Yd^3 of LLW, and 420 Yd^3 of commercial waste. The field unit dedicated over $200,000 of project funds to waste minimization activities in 1995.

- Recycling contaminated structural steel.
- Decontaminating structural steel and ductwork.
- Compacting PPE and plastics.
- Scabbling contaminated concrete surfaces.
- Removal of contaminated surface coatings.
- Bulk packaging of debris destined for disposal.

In addition the field unit evaluated several other waste minimization projects for future implementation.

A summary of the specific WMin/PP accomplishments for the ER field units during 1995 is presented below. In some instances,, the "Volume and Type Avoided" and "Cost Savings" was not measured or estimated at the time of implementation. Therefore, the data was left blank in this year's report. These types of data are often difficult to quantify due to the lack of historical data concerning waste generation and activity based costing. The LANL ER Project realizes the importance of these measurements and has initiated an effort to improve tracking and estimating of these activities in future years.

Project Wide

Project: **Solvent Substitution**
Location or Group: Project Wide

Description: During the past fiscal year, each ER Field Unit successfully substituted a decontamination rinse solution comprised of alconox and water for a methanol-based solution. By replacing the potentially hazardous methanol solution, The ER Project has reduced its overall liquid hazardous waste volumes by 98 percent.

Volume and Type Avoided:
Cost Savings:

Project: **Use of Characterization Strategy Form to improve waste characterization**
Location: Project Wide

Description: In cooperation with the Laboratory's waste management group, ER field units implemented the use of a Characterization Strategy Form to improve the characterization of waste materials from investigation activities. Use of the form allows analytical parameters to address site characterization as well as future waste characterization needs. This reduces the need to re-test waste materials for compliance with waste acceptance criteria and improves the ability to segregate materials and reduces the need for LLW and LLMW disposal.

Waste Avoidance Volume and Type
Cost Savings:

Field Unit 1

Project: **Cone Penetrometer Sampling**
Location or Group:

Description: A cone penetrometer test (CPT) was used in place of a drill rig for boreholes with a depth up to 87 feet in depth. The CPT does not generate drill cutting and significantly reduces equipment requiring decontamination. This method was used on approximately 52 boreholes. The method avoided an estimated 4 drums of cuttings per borehole and half a drum of decon water per borehole.

Volume and Type Avoided: 200 drums cuttings, 25 drums decon fluid, Waste Analysis Pending.
Cost Savings:

Project: **Consolidation of Waste Containers**
Location or Group: Field Unit 1

Description: Drums and other waste containers which were originally segregated by sampling location, were consolidated after waste characterization to optimize waste packaging efficiencies.

Volume and Type Avoided:
Cost Savings:

Project: **Waste Minimization Planning**
Location or Group: Hillside 140, Field Unit 1

Description: A waste minimization plan was prepared to evaluate technologies and processes for removal of radioactively contaminated soils from a hillside expedited action cleanup project. The plan specifically addressed field screening and segregation techniques.

Volume and Type Avoided:
Cost Savings:

Field Unit 2

Project: **Risk based strategy for in-situ remedial actions.**
Date of Implementation: Planning initiated in FY 1995; Implementation 96-97
Location: FU #2, TA 53

Description: Field unit managers have initiated negotiations to allow an risk-based, in-situ remedy for the closure of waste lagoons. Allowing in place remedies will avoid excavation of primary waste that would be management as LLMW

Waste Avoidance Volume and Type LLMW; potential avoidance of 17,000 cubic yards
Cost Savings: Estimated avoided waste management costs are over $30 million

Project: **WMin/PP and waste projections included in procedures an operational readiness reviews**

Location: FU #2

Description: Waste implementation plans are written for all field activities. Plans include waste stream projections and disposition options and procedures are set for WMin/PP and waste management. Waste management, material control, segregation procedures, and the waste characterization strategy Form are reviewed during operational readiness reviews, which helps improve segregation and attention to WMin/PP practices.

Waste Avoidance Volume and Type Not quantified

Cost Savings:

Project: **Discharge of Decontamination Fluids**

Location: Operable units # 1085, 1086, 1093; FU #2

Description: Decontamination fluids have historically been collected and managed as waste, pending characterization and release as non-contaminated. This created high volumes of fluids that were staged, sampled, and required disposal. In 1995, field units prepared a notice of intent (under the New Mexico Environment Department, Water Quality Requirements) to discharge decontamination fluids known to be non-contaminated directly to the site. This reduced the need to handle and treat the decontamination fluids.

Waste Avoidance Volume and Type Over 100 gallons/year; liquid waste (non-contaminated)

Cost Savings: Not quantified at this time

Project: **Discharge of Groundwater purge fluids to the site**
Location: Operable units # 1093; FU #2

Description: Purge water from the sampling of monitoring wells have historically been collected and managed as waste, pending characterization and release as non-contaminated. This created high volumes of fluids that were staged, sampled, and required disposal. In 1995, field unit #2 received approval to discharge those purge fluids known to be non-contaminated to the site. This reduced the volumes of fluids that required handling and treatment.

Waste Avoidance Volume and Type: An estimated 480 gallons/year avoided of liquid waste (non-contaminated) (Based on avoided waste of 15 gallon/well/quarter and 8 wells sampled per quarter).
Cost Savings:

Project: **Return drilling cuttings as backfill for the borehole**
Location: All units, FU #2

Description: Cuttings generated from investigative drilling activities have been returned to the borehole. This is allowed if no groundwater is present, the backfill activity will not change the final remedy for the site, or increase potential for contaminant migration. This procedure avoids handling of the investigative derived soil waste, and allows the media to be handled during the final remedial action.

Waste Avoidance Volume and Type LLW avoided, estimated 7 to 18 cubic yards avoided
Cost Savings:

Project: **Return excess sample materials to site**
Location: All units, FU #2

Description: Excess sample materials that are not transported for off site analysis are returned to the site, for remediation during the final action. This is done if no additional contamination is added as a result of the sample material and if the action will not change the final remedy for the site, or increase potential for contaminant migration. This procedure avoids handling of the investigative derived wastes from the samples, and allows the media to be handled during the final remedial action.

Waste Avoidance Volume and Type
Cost Savings:

Project: **Improved sample management, reduced sample number and volume**
Location: All units, FU #2

Description: FU #2 implemented an pilot field sample shipment procedure and improved sample management strategy that reduced the volume and number of samples collected and shipped for analysis by 50 % from previous years. By reducing the number and volume of samples shipped for analysis, the pilot project has reduced the waste generated from analytical procedures. (Excess analytical samples are often required to be returned to the generator for disposal). Under the pilot strategy, the FU uses private (off site) laboratory for sample analysis, and the FU negotiated reductions in the number and volume of sample for analysis while still meeting analytical requirements. In addition, the FU performs field screening of samples to limit the number of samples requiring analysis, targeting the samples that are shown by the field screening to be of concern. The FU directly handles the collection, screening, packaging, and shipment of the samples which reduced the handling time and costs.

Waste Avoidance Volume and Type Not estimated, but expected to be 50% of previous years waste from analytical processes
Cost Savings:

Project: **Vibratory Drilling, cone penetrometer sampling**
Location: FU #2

Description: Alternative drilling techniques of vibratory drilling and hydropuch (cone penetrometer) sampling were tested at FU #2 in an effort to reduce the generation of drilling wastes. The techniques were determined to be non-effective for the FU #2 applications, so the waste avoided benefits were considered moot.

Waste Avoidance Volume and Type
Cost Savings:

Project: **Acceptable knowledge and field screening to improve characterization**
Location: FU #2

Description: This technique is practiced concurrently to the improved sample management practice. Materials during investigation are screened, characterized and segregated using acceptable knowledge and radioactive analysis (scintillation gamma, alpha and gamma smears) and hazardous waste (photo and flame ionization detectors) field screening techniques at the point of generation. The field screening helps to better define the areas of concern and reduce the samples that require laboratory analysis. Field screening improves segregation, reducing the volumes of waste that requires analysis and management as LLW or HW.

Waste Avoidance Volume and Type
Cost Savings:

Project : **Maximize the reuse of PPE, supplies and equipment, and control and segregation of materials in/out of contamination zones**

Location: FU #2

Description: Reusable equipment such as PPE and stainless steel sampling tools, are used in place of disposable equipment as much as possible. The use of plastic (disposable) sampling tools are limited to only high explosive sampling activities. Practices are written in the operating procedures to limit the materials and equipment allowed in the contamination areas and to screen, sort, and segregate materials exiting the contamination areas. Designated areas are established to segregate materials and avoid cross contamination. Personnel are trained on these procedures during the operational readiness reviews.

Waste Avoidance Volume and Type LLW, estimates not quantified at this time
Cost Savings: Not quantified at this time

Field Unit 3

Project: **Acceptable knowledge and field screening to improve segregation**
Location: FU #3

Description: Materials during investigation are characterized and segregated using acceptable knowledge and radioactive analysis field screening techniques at the point of generation. This reduces the volumes of waste that requires analysis and management as LLW or HW.

Waste Avoidance Volume and Type:
Cost Savings: None

Project: **Maximize the reuse of Personal Protective Equipment (PPE), supplies and equipment**

Location: FU #3

Description: PPE is reused as much as possible. Launderable coveralls were substituted for disposable, steel toes chemical resistant boots were used in place of disposable booties, and disposable site control materials (such as plastic sheeting) were replaced with longer-life, reusable materials, such as high density plastic mats.

Waste Avoidance Volume and Type LLW PPE (zero PPE waste disposed in 1995)
Commercial waste, avoided 28 cu yds (total from all WMin/PP practices)

Cost Savings:

Project: **Contamination avoidance and control of materials in/out of contamination zones**

Location: FU #3

Description: Practices were routinely followed to avoid contact with contaminants and to minimize material in the contamination areas. Practices included: only one designated sampler handles or contacts the sample; minimum contact is maintained to limit glove requirements; leaning, kneeling, or sitting in the contamination zone is prohibited; easily decontaminated and designated tubs are used to handle equipment in the contamination zone to limit the possibility of contamination; only necessary materials are brought into or out of the contamination zone.

Waste Avoidance Volume and Type LLW - not quantified at this time
Commercial waste, avoided 28 cu yds (total from all WMin/PP practices)

Cost Savings:

Project: **Improved characterization and segregation**
Location: FU #3

Description: All waste are characterize and segregated using acceptable knowledge and radioactive analysis field screening techniques at the point of generation. This reduces the volumes of waste that requires analysis and management as LLW or HW.

Waste Avoidance Volume and Type LLW - not quantified at this time
Commercial waste, avoided 28 cu yds (total from all WMin/PP practices)
Cost Savings:

Project: **Discharge of Decontamination Fluids**
Location: FU #3, TA 16 and 33

Description: Decontamination fluids have historically been collected and managed as waste, pending characterization and release as non-contaminated. This created high volumes of fluids that were staged, sampled, and required disposal. In 1995, field units prepared a notice of intent (under the New Mexico Environment Department, Water Quality Requirements) to discharge decontamination fluids known to be non-contaminated directly to the site. This reduced the need to handle and treat the decontamination fluids.

Waste Avoidance Volume and Type An estimated 1180 gallons/year; liquid waste (non-contaminated)
Cost Savings:

Field Unit 4

Project: **Rotary Hand Augers**
Location or Group: Canyons Investigation, Field Unit 4

Description: A rotary hand auger was used in place of a drill rig for boreholes with a depth of less than 15 feet. The rotary hand auger does not generate drill cutting and significantly reduces equipment requiring decontamination. This method was used on approximately 25 boreholes out of 40 total. The method avoided an estimated 4 drums of cuttings per borehole and half a drum of decon water per borehole.

Volume and Type Avoided: 100 drums of cuttings, Low-level Radioactive
12.5 drums decon water, Low-level Radioactive
Cost Savings: Not estimated.

Project: **Discharge of Decontamination Fluids**
Location or Group: Canyons Investigation, Field Unit 4

Description: Historically, decontamination water from sampling activities was drummed and managed as a waste based upon suspected site contamination. Recently some investigation sites have prepared a Notice of Intent (NOI) for discharge of decontamination fluids back onto the site within under the New Mexico Environment Department, Water Quality Requirements limitations.

Volume and Type Avoided: 120 gallons, liquid waste (non-contaminated).
Cost Savings: Not estimated.

Project: **Reuse of Personal Protective Equipment (PPE)**
Location or Group: Field Unit 4

Description: Throughout the field unit, PPE is reused until unserviceable. PPE is removed and stored within the contamination reduction zone for reuse during the following days. This procedure eliminated approximately 50% of the PPE from the field unit during FY1995.

Volume and Type Avoided: Not estimated , Low-level Radioactive.
Cost Savings:

Project: **Segregation of Mercury contaminated soils**
Location or Group: Field Unit 4

Description: During a Field Unit 4 Expedited Cleanup which removed mercury contaminated soils from a container storage area, soils with visible mercury contamination was separated from less contaminated material which could be treated and disposed at a lower cost. Proper segregation saved significant treatment costs prior to disposal.

Volume and Type Avoided: No volume reduction.
Cost Savings: Cost differential for treatment and disposal.

Project: **Utilizing drill rig cuttings as borehole backfill**
Location or Group: Field Unit 4

Description: Cuttings generated from investigative drilling activities have been returned to the borehole. This is allowed if no groundwater is present and the backfill activity will not change the final remedy for the site, or increase potential for contaminant migration. This procedure avoids handling of the investigative derived soil waste, and allows the media to be handled during the final remedial action.

Volume and Type Avoided: 10 drums, Low-level Radioactive
Cost Savings:

Project: **Preliminary Dry Decontamination Step Added**
Location or Group: Field Unit 4

Description: The drilling and sampling equipment decontamination process was modified to add a dry decontamination step. This step removes the majority of potentially contaminated soil from the equipment, which in turn reduces the amount of liquid decontamination fluids generated by approximately 50%.

Volume and Type Avoided: Not estimated.
Cost Savings:

Project: **Preliminary Site Survey**
Location or Group: Field Unit 4

Description: Prior to initiating a surface sampling campaign, the area of concern is screened for contamination. If no contamination is identified the health and safety plan is revised to indicate a lesser level or no personal protective equipment. This source reduces all of the PPE from the activity.

Volume and Type Avoided: Not estimated.
Cost Savings:

Field Unit 5

Project: **Sampling grid, field screening to improve hazard assessment, segregation, and reduce use of Personal Protective Equipment (PPE)**
Location: FU #5, MDA "M"

Description: Field screening, preliminary site survey information, and a 25 ft by 25 ft grid system was used to better define the contamination reduction zones and exclusion zones. This helped reduce the need for PPE and decontamination by limiting the use of PPE, etc only to those areas that were known to be contaminated.

Waste Avoidance Volume and Type LLW and HW PPE
Cost Savings: Not quantified at this time.

Project: **Sampling grid and field screening to improve segregation**
Location: FU #5, MDA "M"

Description: A sampling grid (25 ft by 25 ft) was established and field screening were used to better define the areas and contamination of concern. The original site was believed to contain LLMW, and covered an area of over 3 acres. The refined sampling techniques allowed materials to be better characterized and segregated at the point of generation, allowing waste materials to be classified as Commercial waste instead of suspect LLMW, LLW, or HW. This reduced the LLMW and LLW generated and reduced the analytical requirements.

Waste Avoidance Volume and Type: LLMW
Potentially contaminated area was over 14,000 cu yds; only 2 cu yd generated after grid and segregation techniques.
Cost Savings: Not calculated at this time.

Project: **Discharge of Decontamination Fluids**
Location: FU #5

Description: Decontamination fluids have historically been collected and managed as waste, pending characterization and release as non-contaminated. This created high volumes of fluids that were staged, sampled, and required disposal. In 1995, field units prepared a notice of intent (under the New Mexico Environment Department, Water Quality Requirements) to discharge decontamination fluids known to be non-contaminated directly to the site. This reduced the need to handle and treat the decontamination fluids.

Waste Avoidance Volume and Type liquid waste (non-contaminated)
Cost Savings:

Project: **Minimize drill core "kerf" and use drilling cuttings as backfill for the borehole**

Location: FU #5, MDA "M"

Description: The diameter and kerf of the drilling/core barrel were minimized to reduce the drilling wastes while maintaining the drilling core. This reduced the volume of drilling waste generated. In addition, drilling cuttings were returned to the borehole.

Waste Avoidance Volume and Type LLW and commercial waste, estimated up to 22 cubic yards avoided.

Cost Savings:

Project: **Use bulk packaging and direct shipment for waste disposal**

Location: FU #5, MDA "M"

Description: Volume reduction was also accomplished through manual compaction of IDW and other containerized waste. Bulk packaging (B-25 boxes) were used for on site disposal of LLW soil, which minimized the landfill space required for disposal. Contaminated soil for off site disposal is excavated directly to dump-trunks for direct transport to the disposal facility, reducing the need for containers, handling, and more efficient use of the landfill space.

Waste Avoidance Volume and Type LLW landfill space avoided; HW landfill space avoided.

Cost Savings:

Project: **WMin/PP incentives and requirements were included in subcontractor documents**

Location: FU #5, MDA M

Description: Remediation subcontractor documents included incentives for recycling and waste reduction. The contract required the contractor to be responsible for waste disposal, allotting a unit price for waste disposal and providing initial waste projections. This resulted in the subcontractor using all efforts to reduce the waste generation and identify lower cost disposal options. Significant waste disposal cost savings were realized (for DOE) by the contractor's direct contract with an off-site disposal facility.

Waste Avoidance Volume and Type Hazardous and Commercial waste

Cost Savings: Waste management cost savings estimated at over $5 Million

Project: **Concrete recycling**

Location: FU #5, MDA M

Description: Concrete was screened, segregated and non-contaminated concrete rubblized for reuse. Remediation contractor initiated actions for reuse, because the subcontractor documents provided incentives for avoiding waste disposal. The contract required the contractor to be responsible for waste disposal, allotting a unit price for waste disposal and providing initial waste projections. This resulted in the subcontractor using all efforts to recycle, when possible and reduce the waste generation.

Waste Avoidance Volume and Type: Concrete (Commercial waste)

Cost Savings:

Project: **Metal recycling**
Location: FU #5, MDA M

Description: Metal scrap was screened, segregated and non-contaminated metal was sent off-site for recycle. The remediation contractor initiated actions for recycle, because the subcontractor documents provided incentives for avoiding waste disposal. The contract required the contractor to be responsible for waste disposal, allotting a unit price for waste disposal and providing initial waste projections. This resulted in the subcontractor using all efforts to recycle, when possible and reduce the waste generation.

Waste Avoidance Volume and Type: Metal (Commercial waste); over 40,000 pounds.
Cost Savings:

Field Unit 6 - Decommissioning

Project: **Recycling of Contaminated Structural Carbon Steel**
Location or Group: TA-21, Decommissioning Group

Description: Structural steel generated during demolition of building 3 and 4 south is being segregated from the LLW debris and staged for shipment to a commercial recycler. During FY1995 a contractual vehicle was obtained, procedures for waste handling prepared, and containers were sent or staged for smelting.

Volume and Type Avoided: 180 M^3, Low-level Radioactive
Cost Savings:
Waste Minimization Expenditures: $4,500 - reusable transportainers for staging and shipment.

Project: **Decontamination of Contaminated Concrete**
Location or Group: TA-21, Decommissioning Group

Description: The razing of buildings 3 and 4 south involved the removal of contaminated concrete. The portions of the concrete was scabbled which removed surface contamination, screened to ensure attainment of cleanup levels, and the clean waste stream staged for crushing and reuse as backfill.

Volume and Type Avoided: 530 M3, Low-level Radioactive.
Cost Savings:
Waste Minimization Expenditures: $30,000 - Blast-track scabbling unit.

Project: **Stripping of Contaminated Surface Coatings**
Location or Group: TA-21, Decommissioning Group

Description: Many surfaces within buildings 3 and 5 south contained embedded contamination under surface coatings but no volume contamination. To effectively decontaminate the surfaces for demolition a coatings removal mechanical scraper was purchased. Portions of the building debris were scraped, and then were eligible for survey and release. This also resulted in a marked improvement in worker safety.

Volume and Type Avoided: Low-level Radioactive.
Cost Savings:
Waste Minimization Expenditures: $4,000 - Mechanical Scraper.

Project: **Compaction of PPE/Cellulose Waste**
Location or Group: TA-21, Decommissioning

Description: Two waste compactors, one drum and one B-25 box, were purchased, approved for operation, and utilized. During the last several months of the project all of the compatible waste from TA-21 was compacted in either the 55 gallon drum or B-25 box compactor. In addition specially designed B-25 boxes were purchased for usage with the compactors.

Volume and Type Avoided: 118 M^3, Low-level Radioactive.
Cost Savings:
Waste Minimization Expenditures: $43,000 - Two waste compactors.
$9,000 - Special B-25 Boxes.

Project: **Bulk Packaging and Void Space Reduction**
Location or Group: TA-21, Decommissioning Group

Description: Additional packaging requirements and procurement efforts have been made to bulk package waste, and to ensure that minimal void space exists in packages sent for disposal. Used bulk transportainers were procured to ship and dispose building debris at TA-54. This method minimizes the amount of space used for packaging in the landfill and increases packaging efficiencies.

In addition the group rented demolition shearing equipment which removes sections of the building structure in a manner which lends to efficient bulk packaging. The shears were also used to section the structural metal into two waste streams, one destined for metal melt and a second which is staged for potential decontamination.

Volume and Type Avoided:
Cost Savings:
Waste Minimization Expenditures: $63,000 - Demolition equipment rental.
$47,000 - Bulk waste containers.

Project: **Recycling of Enriched Uranium**
Location or Group: TA-21, Decommissioning Group

Description: Decontamination of the furnaces in building 4 south resulted in the recovery of 1.5 kg of 93% enriched uranium which was sent to an on-site laboratory for re-use.

Volume and Type Avoided: 1.5 kg, Low-level Radioactive
Cost Savings:
Waste Minimization Expenditures:

Project: **Reuse of Soils as Fill Material**
Location or Group: TA-16, Decommissioning Group

Description: Clean soils removed during demolition of structures at TA-16 were shipped for usage as fill material at other locations throughout the laboratory.

Volume and Type Avoided: 400 yd^3, Commercial waste
Cost Savings:
Waste Minimization Expenditures:

Project: **Recycling of Structural Debris**
Location or Group: TA-16, Decommissioning Group

Description: Metal framing and piping was segregated and shipped for recycling at a regional scrap vendor.

Volume and Type Avoided: 1 yd^3, Commercial Waste.
Cost Savings:
Waste Minimization Expenditures:

Project: **Recycling of Contaminated Steel**
Location or Group: TA-35 Phase Separator Pit, Decommissioning Group

Description: Metal generated during the demolition of structures at TA-35 were segregated and staged for shipment to a commercial radioactive smelting company.

Volume and Type Avoided: 283 yd^3, Low-level Radioactive
Cost Savings:
Waste Minimization Expenditures:

Project: **Decontamination, Survey, and Free Release of Metals**
Location or Group: TA-35 Phase Separator Pit, Decommissioning Group

Description: Ductwork and other materials agreeable for radiological screening were decontaminated, surveyed using approved procedures and shipped to a regional salvage company.

Volume and Type Avoided: 107 yd^3, Low-level Radioactive
Cost Savings:
Waste Minimization Expenditures:

Project: **Value Engineering Study**
Location or Group: TA-2 Omega West Reactor, Decommissioning Group

Description: The Omega West Reactor is scheduled for decommissioning during the next several years. To prepare for the project, a value engineering study was conducted to evaluate potential options for projected waste streams. The study quantified waste streams which are eligible for decontamination, recycling, and reuse.

Volume and Type Avoided: Between 53-80% Reduction of Planned Volumes, Low-level Radioactive.
Cost Savings: Estimated waste management cost savings are projected between $1M-3M, Waste Minimization Expenditures.